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C O N T E N T

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THE IMPACT OF THE PEASANT FARMS FUNCTIONING ON THE DIFFERENTIATION OF THE LIVING LEVEL OF THE RURAL POPULATION. A CASE STUDY OF VOLYN REGION, UKRAINE

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Abstract

The article analyses the modern features and the differentiation level of the rural population life quality. The influence of income from personal peasant farms the functioning on the rural population life quality is considered. The peculiarities of functioning of personal peasant farms are determined. The study proved, that the ratio of the consumed products grown value in personal peasant farms between the extreme decile groups, which are formed by average per capita expenditures, exceeded 5.3 times for the entire Volyn region household population in 2018. In order to visualize the presentation of information on the degree of uneven distribution of the average per capita money and total expenditures of rural personal peasant farms in the Volyn region of Ukraine, we constructed the Lorentz curve, which represents the cumulative distribution of population and the corresponding expenditures. The study proved, that the functioning of the private economy is a significant factor for the smoothing of income unevenness and social polarization of the rural population. It has been found that some levelling of living standards in the countryside is achieved largely by the self-sufficiency of food produced in the personal peasant farms than by the income from their sale.

Key words**:** *rural population, peasant farms, decile coefficient of funds, decile coefficient of cost differentiation, the Lorentz factor, the Gini coefficient*

INTRODUCTION

The standard of living is one of the most important socio-economic categories that characterizes the position of a person in society, the possibility of meeting his needs and human development [7]. It should be noted that in most scientific studies, living standards are measured through welfare assessments.

However, personal peasant farms can be defined as a form of agricultural production in which the worker and the entrepreneur are combined in one person [8]. Today, as a result of significant structural shifts in agricultural production, the share of products produced in the private sector, namely, in private peasant farms (PPF), has increased significantly. Therefore, there is a need to evaluate these transformations in terms of determining the importance of functioning and development of peasant farms in shaping the standard of living of the rural population. The scientific and practical importance of this issue has determined the relevance, purposefulness and necessity of researching the impact of the private peasant farms functioning on the differentiation of the living standards of the rural population.

In the scientific works of A. Boiar and O. Stashchuk [3], D. Bohynia [2], E. Libanova [9], O. Borodina and I. Prokopa [4], P. Sabluk [13], R. Sodoma and H. Skhidnytska [14], I.

Tofan [15], V. Yakubiv [16; 17] the mechanism of formation of the living standard of the population is investigated. However, in modern scientific work the problems of estimation of incomes influence from functioning of personal peasant farms on graduation indicators of rural population and formation of middle class, as social foundation of the state, bases of its dynamic and progressive economic development are insufficiently covered.

MATERIALS AND METHODS

The tasks set are: to evaluate the dynamics of the polarization development of living standards of the rural population and to determine the role and value of revenues from the activities of personal peasant farms in the differentiation of income and expenditure indicators and the formation of the middle class in rural areas of Volyn region, Ukraine.

Conducting of the research is based on the use of such methods and methodological approaches: analysis and synthesis, structural analysis, grouping methods, graphical and tabular methods – to display visually the results of the research. Figures were drawn using Microsoft Excel, 2013 version.

The work is based on the analysis and evaluation of the results of the analysis of statistics State Statistics Service of Ukraine and Volyn contained in statistical databases.

RESULTS AND DISCUSSIONS

The result of the functioning of the socio-economic mechanism of income generation and expenditure of the population is their differentiation. Depending on many factors, households receive unequal public benefits. Some are richer, others poorer [6].

In particular, the estimation of the uneven distribution of expenditures of rural population of the Volyn region with the help of a decile coefficient of differentiation indicates its decrease during the period from 2013 to 2018 for monetary expenditures – by 30%, for aggregate expenditures – by 10%. Moreover, the ratio of the minimum level of expenditures among the 10% of the most affluent urban population to the maximum level of expenditures among the 10% of the least affluent urban population in the studied period decreased for total expenses – by 1.1 times, and for monetary – remained constant. The declining ratio of the rural population's cash spending in 2013-2018 decreased from 6.9 to 6.0, and the urban ratio from 7.0 to 5.4. The results obtained show that the degree of differentiation of monetary incomes in rural areas of Volyn region is somewhat higher now than in urban settlements.

The decile ratio of funds of money income from the products sale of personal peasant farms, as a ratio of their average values within the extreme decile groups, determined by the average per capita expenditures, for the entire household total, in 2018 in Volyn was 11.3 times. Moreover, the share of monetary income from the sale of agricultural products in the first decile group held 3.9%, and in the last – 11.8%.

Because of an international comparison, the income ratio of rich and poorest households, in particular, in China and the EU-5 countries is 7:1, in Japan – 4.3:1, and in Ukraine – 30:1 [10]. At the same time, the estimation of the indicators of socio-economic stratification of the population at the cumulative expenditures in some countries [12] (Table 1) and in Ukraine indicates some of its smoothing.

Table 1. Indicators of socio-economic stratification of the population in 2017

Country	Gini coefficient	Total expenditure ratio of 10% of the most deprived (decile coefficient of funds)
Bulgaria	0.27	3.90
Hungary	0.28	3.49
Armenia	0.32	4.08
Poland	0.34	4.29
Latvia	0.34	4.54
Georgia	0.37	5.69
Moldova	0.41	6.14
Russia	0.47	8.06

Source: Author's results based on [12].

However, the rather high growth rates of real monetary incomes of the rural population in the study period still did not ensure the exit of a large mass of peasants from the poverty zone [6]. For the rural population, which, according

to the nature of its activities, should not be distinguished by a high level of variability in income and expenditure [1], the estimation of the differentiation of these coefficients indicates the continued dominance of significant social stratification.

In our opinion, some other conclusions can be drawn regarding the degree of the rural population polarization at aggregate costs. Thus, the decile coefficient of differentiation of the total expenditures of rural population of Volyn region for 2013-2018 decreased by 1.1 times and amounted to 3.1, and for urban population – 3.5. The decile ratio of the funds of total expenditures of the rural population of Volyn region, as the ratio between the average values of expenditures within the extreme comparable decile groups, decreased from 4.4 to 3.7 during the study period, and from 5.9 to 5.0 for the urban population. It should be noted that the ratio of the consumed products grown value in personal peasant farms between the extreme decile groups, which are formed by average per capita expenditures, exceeded 5.3 times for the entire Volyn region household population in 2018. Moreover, the results of the analysis of the share of designated income in the context of decile groups indicate that there is no sharp differentiation: in the first decile it was 12.7%, in the tenth – 18.1%, i.e. it remained relatively stable.

The estimation of tendencies of stratification change of rural population of Volyn region during 2013-2018 on aggregate expenses shows a slightly lower in comparison with monetary expenses, degree of their differentiation. Our study provide grounds to argue that to some extent the differentiation degree of the population by aggregate expenditures smooths out and equalizes the income derived from the functioning of the personal economy. After all, under current conditions, the value of products consumed by personal peasant farms and the assistance of relatives with food products produced in private households occupy the lion's share (more than 36.4%) in the total resources of the rural population of Volyn region.

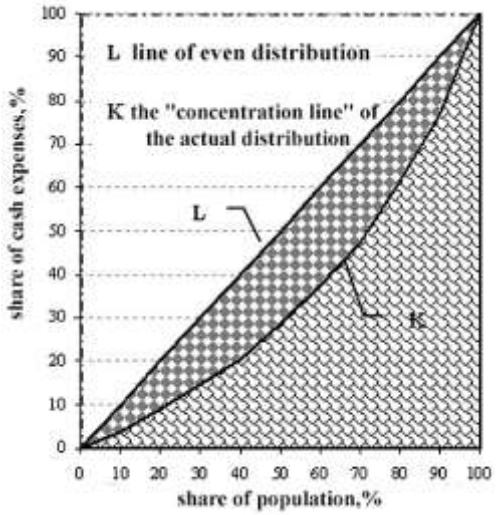

Fig. 1. The Lorentz curve on monetary expenditures of rural population of Volyn region, Ukraine, 2018
Source: Built by the Authors.

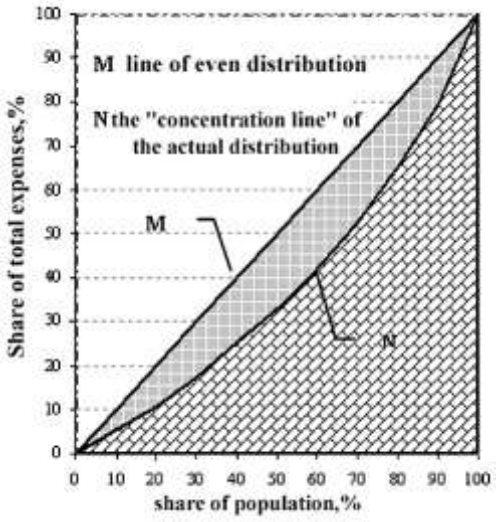

Fig. 2. The Lorentz Curve on Aggregate Expenditure of Rural Population of Volyn Region, Ukraine, 2018
Source: Built by the Authors.

It should be noted that in the rural personal peasant farms of Volyn region during 2013-2018 there is a clear tendency to increase the total expenditures of the share of the first decile group – from 5.2% to 5.6%, i.e. by 0.4 percentage points. Simultaneously with the increase in the share of the first decile, during the study period, the share of the tenth decile group decreases from 22.6% to 20.8%, i.e. by 1.8 percentage points. As a result of these transformations, in 2018, the first quintile group of the rural population of Volyn region accounted for 10.7% of total expenditures, and the fifth – 34.6%, i.e. 3.2 times more (in 2013, the outlined difference was 3.0 times). Thus,

the characterized trends serve to confirm the partial equalization of rural population differentiation in aggregate costs.

In order to visualize the presentation of information on the degree of uneven distribution of the average per capita money and total expenditures of rural personal peasant farms in the Volyn region, we constructed the Lorentz curve, which represents the cumulative distribution of population and the corresponding expenditures.

The graphs (Figs. 1, 2, 3, 4) clearly show that in 2013 the level of differentiation of total and especially monetary expenditures of the rural population was slightly higher than their corresponding level in 2018. Particularly significant is the polarization of the distribution of rural population monetary expenditure in 2013, because the «concentration line» (F) during this period differs most (is the most concave) from the line of uniform distribution (H), i.e. the concentration of the identified costs is the highest. Although in 2018, the distribution of average per capita cash expenditures of rural peasant farms is not balanced with the distribution of per capita total expenditures, but compared to 2013, their differentiation is somewhat smoothed (Figs. 1 and 2).

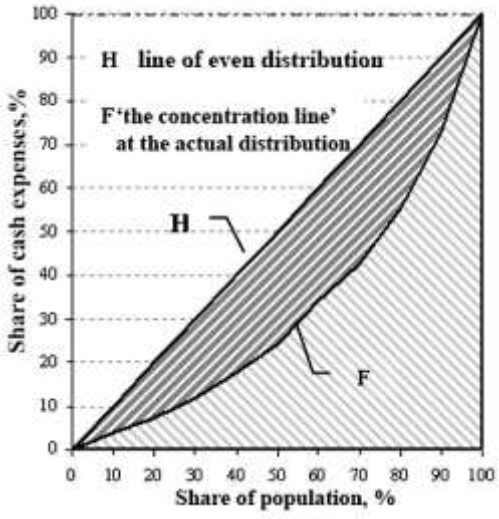

Fig. 3. The Lorentz curve on monetary expenditures of rural population of Volyn region, Ukraine, in 2013
Source: Built by the Authors.

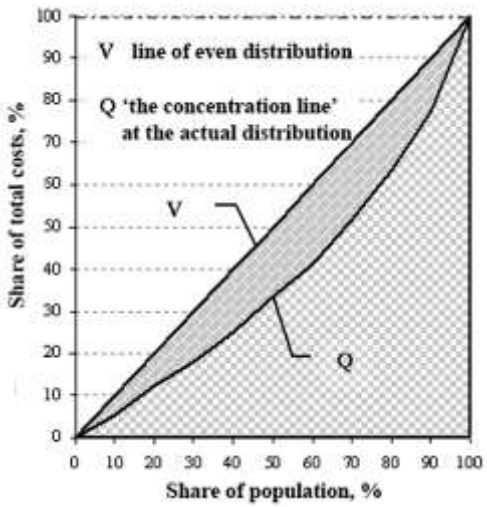

Fig. 4. The Lorentz curve on total expenditures of rural population of Volyn region, Ukraine, 2013
Source: Built by the Authors.

The Gini coefficient was used to estimate the deviation degree of the actual expenditures distribution by numerically equal groups of rural population from the line of their real distribution. It should be noted that for 2013 – 2018, the average difference in the average per capita money income of rural personal peasant farms in Volyn region decreased by 6 percentage points and amounted to 30% (in the whole country – 31%) relative to the average income in their entirety. During the study period in Volyn region, it was the lowest in 2015 – 27% (Table 2). For the aggregate average per capita incomes of rural personal peasant farms in the Volyn region, this average difference for 2013 – 2018 remained constant – 24% (in the whole country – 28%), and the smallest in 2015 was only 9% (Table 2).

Table 2. Indicators of socio-economic of Volyn region rural population differentiation in 2013-2018, Ukraine

Year	Gini coefficient		Decile coefficient of population spending differentiation (times)		Percentage of households with an average per capita expenditure per month below the subsistence level (%)	
	pecu-niary	cumu-lative	pecu-niary	cumu-lative	pecu-niary	cumu-lative
2013	0.36	0.24	5.5	2.8	95.9	81.1
2014	0.32	0.24	4.6	3.1	98.7	89.0
2015	0.27	0.09	3.5	2.8	99.1	89.4
2016	0.28	0.20	3.2	2.4	96.6	82.8
2017	0.28	0.21	4.1	2.8	89.6	72.3
2018	0.30	0.24	4.3	3.1	75.9	56.4

Source: Author's results based on [5].

In the urban households of Volyn region, the average difference in average per capita income for the study period increased by 3 percentage points and amounted to 27% relative to the average income for their entire population.

According to the results of a sample survey of households in the Volyn region, in 2013, only 4.1% of the rural population (urban – 5.8%) by average per capita money expenditures and 18.9% (urban – 11.8 %) by average per capita total expenditures, were above the official poverty line and all others were outside (Table 2). In 2018, the situation has improved somewhat: average per capita spending over and above the officially established subsistence level was made by 24.1% of rural (31.4% of urban) households. 43.6% of rural households and 27.9% of urban households were above the subsistence minimum on average per capita expenditures. It should be noted that in households of Volyn region with average per capita total expenses below the subsistence minimum in 2018 the total income from the operation of private households accounted for 27.9% of all resources.

However, the real cost of living differs significantly from the officially established one. Because the state is not able to provide social guarantees at the minimum subsistence level due to the limited financial resources, the corresponding level of its provision has been legislated [11]. In reality, the subsistence minimum is a much larger value, and so the poverty threshold at the subsistence level is actually higher [1], and the extent of its spread in society, particularly in rural areas, is much higher. Thus, according to UN standards, the poverty line in Central and Eastern European countries is set at the average daily income of 4 USD [9], which at the current exchange rate is about 100 UAH, or an average of 3 000 UAH per month.

CONCLUSIONS

The above gives grounds to argue that the functioning of the private economy is a significant factor for the smoothing of income unevenness and social polarization of the rural population. It has been found that some levelling of living standards in the countryside is achieved largely by the self-sufficiency of food produced in the personal peasant farms than by the income from their sale. However, it should be noted that the peasant economy is characterized by consumer efficiency, which is expressed by the degree of satisfaction of the needs of the rural population in food products of their own production. Thus, the personal economy is the response of the rural population majority to the low financial income and unemployment that prevails in rural settlements.

We believe that increasing the number of medium- and high-performing households, while further increasing their efficiency, is one of the important economic prerequisites for the formation of a middle class in the countryside. In addition, the performance of personal peasant farms is an integral and important feature of the performance of the agricultural industry. However, under the realities of the socio-economic conditions of the present, through work in the personal economy is mainly self-protection of the rural population, the internal economic content of the economy is reduced to food self-sufficiency, which leads to the formation in the vast majority of personal peasant farms rather low level of their marketability. Therefore, we consider it appropriate to emphasize the priority of supporting both commodity personal peasant forms of business and entrepreneurship in general, which concentrates on the middle class (existing and potential) – the objective basis of economic growth.

Summing up, we emphasize the need to create the permanent monitoring mechanism of the rural population living standards polarization, which would contribute to the development of a measures system aimed at reducing the outlined deformations.

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ROMANIAN SPA TOURISM: GROWTH, TOURISM PATTERNS, PERSPECTIVES

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Abstract

The aim of the paper is to identify the profile of the consumer who chooses as a holiday destination the spa resorts in Romania. This research relates to the opinion of young consumers regarding Romanian spa tourism, travel preferences and habits based on a field survey sustained by questionnaires. The results obtained have important implications, allowing the stakeholders to understand the profile of tourists visiting spa resorts for a better adaptation of spa tourism products.

Key words**:** *Romania, spa tourism, consumers' profile, survey*

INTRODUCTION

Tourism is considered an important growth engine of the economy, with significant impact on other related activities (agriculture and forestry, food industry, chemical industry, textile industry, construction etc.), a factor of development, with contribution to economic growth, bringing benefits to local communities [16], [13]. Over the years, the expansion of tourism activities has stimulated the development of infrastructure and public services [11]. Tourism is facing a shortage of labour force, with an important share of employment in the informal sector, low wages, excessively long working hours, lack of social protection and gender-based discrimination [11].

Rural areas are vulnerable and in need for alternative development solutions, including tourism, especially local resources that may be exploited. Tourism can contribute to the development of rural areas and communities, stimulating the creation of jobs and improving the local economic situation.

Tourism sustains rural development, and it represents a driving force in rural regions, supporting also the local culture, by encouraging restoration of historic sites, and it may contribute to environmental conservation [13], [9], [20], [2].

In various countries, the share of rural tourism is local development is important. Thus, in Serbia and Slovenia, the development of rural areas is stimulated by rural tourism competitiveness [19]. In Albania, rural tourism has a positive impact on the rural areas' development, and contributes to the creation of jobs, and creates new business opportunities [15]. Rural tourism in Cyprus generates strong backward linkages with other sectors related to output generation, with effects on the diversification of economic activities [7]. In Romanian rural areas, tourism created employment and income opportunities [10].

Rural areas are endowed with various natural resources: climate, forestry, fauna, mountains, hills, but also different therapeutic factors such as climate, spring water, mud, etc.

Various countries have reoriented to the development of spa, wellness, and health tourism. In Hungary, Slovenia, Croatia, and Serbia, health tourism has a wider contribution to the national and international tourism flows [4], [8], [3], [18]. A similar situation is found in the Czech Republic, and also in Slovakia – countries with diverse spa facilities [17], [12].
Spa tourism sustain the local economic development, underlying the resource richness of those regions [5]. Spa tourism contributes to social development and helps health promotion and both disease prevention and treatment of illnesses. Spas destinations are focused on offers targeted to improve the well-being of people, using natural factors [6], [14]. Spa tourism may be promoted by using various social programs and integrated with other tourism types (wellness, cultural, sports), improving the international tourism market [1], [14].
Since ancient times, Romania was endowed with various mineral resources that sustained the development of spa and wellness tourism, used for healing purposes, mainly: mineral waters, thermal waters, therapeutic lakes, therapeutic mud, therapeutic gases, salt mines, and salt water. The therapies practiced in Romanian spa resorts include hydrotherapy, thalassotherapy, mud treatment, internal treatments with mineral waters, speleotherapy, aerosols, sand therapy, massage, etc.
Romania has impressive mineral water resources; the latest recorded hydrological research has highlighted over 2,500 springs and water wells, which address a wide spectrum of diseases. The quality of mineral waters is like the most important sources in Europe.
Various natural resources are in rural areas. Some of them have started to be used successfully in various spa resorts, but others have not yet been exploited for tourism purposes, due to the lack of investments and development projects.
The geothermal and thermo-mineral waters of Romania are used in external treatment and are recommended in numerous medical conditions, in resorts such as Băile Herculane, Felix, 1 Mai, Moneasa, Geoagiu Băi, Călan, and Călimăneşti. Various therapeutic (salty) lakes are interesting destinations for tourists: Techirghiol, Amara, Lacul Sărat, Balta Albă, Ursu, and the lake complex from Ocna Sibiului.
The therapeutic mud used for curative purposes through external treatments, and mud baths, is found in resorts such as Techirghiol, Bazna, Sovata, Amara, Ocna Sibiului, Vatra Dornei, Ocnele Mari, and Govora.
Therapeutic gases are used in the treatment of peripheral circulatory disorders, high blood pressure, nervous system disorders or rheumatic diseases. Romania is one of the few European countries endowed with important therapeutic gas resources, in resorts such as Tuşnad, Covasna, Balvanyos, and Borsec.
The speleotherapy is practiced in the therapeutic salt mines, Romania having several underground spaces with special renowned facilities (Praid, Târgu Ocna, Ocnele Mari, Cacica, Slănic Prahova, and Turda), where the salt mine climate is used to treat respiratory diseases.
The accommodation capacity in spa resorts is concentrated mainly in Băile Herculane, Băile Felix, Techirghiol, Mangalia, Călimănești - Căciulata, Sovata, Borsec, Covasna, and Vatra Dornei. Most of the resorts are in a special natural setting (mountains and secular forests) that offers the possibility to practice outdoor activities.
The capacity of accommodation of spa resorts decreased in 1993-2019 period, due to several problems related to: the long period of privatization, the degradation of the existing tourism capacity, etc. Still, an increasing trend of the bed-places number registered after 2014, with the emergence and development of new accommodation facilities (many Bed & Breakfast built with European structural funds), and with the renovation and the rehabilitation of the existing hotels. The accommodation capacity in the spa resorts represents about 10% of the total number of bed-places in Romania.

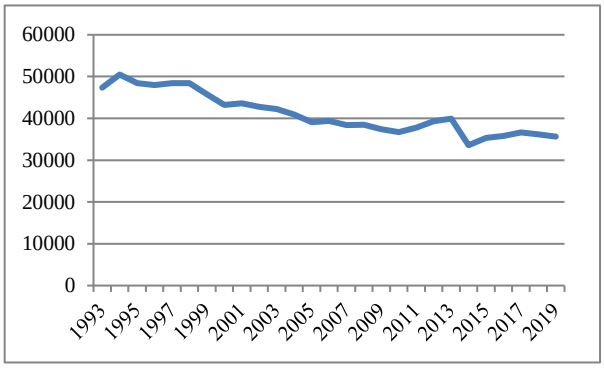

Fig. 1. Accommodation capacity in Romanian spa resorts (no. of bed-places), 1993 – 2019 period
Source: The National Institute of Statistics, Romania.

Although the number of tourists in Romanian spa resorts registered an oscillating evolution, it was mainly a positive trend. This evolution is remarkable, especially after 2014, with a growth rate of about 36%. The number of tourists exceeded 1 million persons in 2018. Still, the tourism flows are mainly domestic; the percentage of foreign tourists is around 5% or even lower.

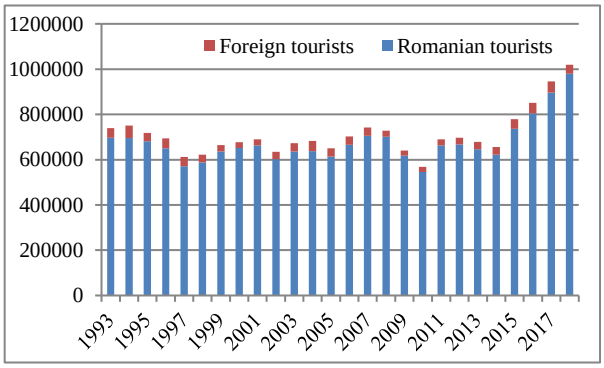

Fig. 2. Tourist flows in Romanian spa resorts, 1993-2018 period
Source: The National Institute of Statistics, Romania.

The occupancy rate in Romanian spa resorts was 44% in 2018, compared with 32% at the national level; the average length of stay is higher and the seasonality specific to this type of tourism is smaller. This rate is superior to other tourism destinations, because of the subsidization of this sector by the Romanian Government, offering treatment vouchers through the Health Insurance House and holiday vouchers for the public sector employees. Despite this growth, spa tourism has only 7.8% of all arrivals and 15% of total overnight stays registered in Romania, a modest contribution, considering the presence of important natural resources.

The spa resorts are highly dependent on spa tickets. Thus, it is important to attract other categories of tourists in these resorts, such as young tourists, by diversifying the tourism products, including wellness services.

The health tourism in Romania involves the collaboration of several public bodies: the Ministry of Tourism - that elaborated the Masterplan for the development of the spa tourism, the Ministry of Health - that evaluates and certifies the spa treatment infrastructure, the Ministry of Labour - that grants vouchers for the spa tourism, the National Agency of Mineral Resources, etc. References to Spa tourism can be found in the Master plan for Tourism Development in Romania 2007-2026, elaborated by the Ministry of Tourism.

The Romanian Government issued the Ordinance 114/2018, which supports the spa resorts investments, through a public program. This document is in line with tourism development directions from the Governance Program. The draft decision of the Romanian Government from August 2019, regarding the approval of the Strategy for the spa tourism development, contains the objectives of this activity, for both medical and wellness tourism.

In the recent years, spa tourism clusters were developed, and included networks of stakeholders "(i.e. central and local public authorities, treatment bases, hospitals, clinics, physicians, universities of medicine and pharmacy, research institutes in the medical field and balneology, research institutes in tourism, tour operators, hotels, restaurants, equipment and devices suppliers, economic operators, and other organizations). They support and promote the members of the cluster and the Romanian spa tourism. The clusters adopt and promote high standards of ethical and professional medical care, identify attractions, define tourism products, initiate scientific research, facilitate a dialogue between the public and private areas, academics and specialists in healthcare, and develop integrated management and services oriented to tourists/patients" as mentioned by the European Parliament.

MATERIALS AND METHODS

The **purpose of the research** is to identify the profile of the consumer who chooses as a holiday destination the spa resorts in Romania. This research relates to the opinion of young consumers regarding Romanian spa tourism, travel preferences, and habits.

The main challenge of the present research is to identify how attractive are Romanian spa tourism destinations among young people.

Apart from demographic data, in the analysis of the user requirements, it is also important to have information on tourism and travelling characteristics such as: location, length of holidays, main reason for journey, planning of holidays, organization of holidays, type of journey, sources of information, travel partner, average daily budget spent, favourite activities in a spa resort, and the main criteria for selecting a spa resort.

Consequently, **the objectives of the current research** were the following:

O1.Estimation of the average length of stay and frequency of travel in the spa resorts.

O2.Establishing the motivations for choosing a spa destination.

O3.The identification of the favourite activities to be carried out during the holiday in the spa resorts.

O4.Establishing the main criteria used in choosing spa tourist destinations.

O5.Determining the sources of information used in choosing a spa resort as a holiday destination.

The hypotheses of the research are the following:

H1.A significant percentage of respondents are interested in travelling to Romania.

H2.Individuals do not want to travel alone during the holiday.

H3.The main reasons to travel to spa resorts are resting, relaxation, treatment procedures, and health improvement.

H4.The preferable activities during spa holidays are related to nature, culture, and relaxation.

H5.The main criteria used to select a spa destination are: recommendations, attractiveness, and price.

H6.The main source of information used to identify the travel destination is the Internet.

Research coordinates. The research is quantitative (in-depth, conclusive, assuming that the questionnaire is given to a large number of people; the data are accurate and statistically analysed). The research tool was the questionnaire.

Questionnaire. The information was collected through a questionnaire, consisting of 18 questions. The questionnaire was developed with the help of the online survey service; dichotomous closed questions and semantic questions on a scale were used, to determine the priority order given; also, questions with only one possible answer and identification questions were used.

The survey took place online and offline from March to April 2019. The data collection period was three weeks.

Sample. Considering that the scope of the research was to investigate the perceptions of young people about Romanian spa tourism, the sample was selected in order to include a significant number of young people. The distribution of the sample by age groups was: 18-35 years (42.5%), 36-55 years (30%), and over 55 year (27.5%).

A number of 93 questionnaires have been collected, and 80 (86%) were validated. For the validated questionnaires, in 70% of the cases, the respondents were women, and 30% were men, respectively. The results of the survey emphasized a gender imbalance of the sample, given that a majority of women (68.75%), double than the men respondents (31.25%), filled in the questionnaire.

In terms of place of residence, most of the respondents declared that they live in Bucharest (45%), followed by Brăila (3.75%), Arad, Drobeta Turnu Severin, Pitești, Slatina, Slobozia, Târgu Ocna, and Timișoara (2.50%), respectively.

At the beginning of the questionnaire, a filter question was introduced, to identify whether the subject is able to provide the type of information desired (travel visits in a Romanian spa resort, in the last five years).

Questions on the place of residence, gender, age, and education provide information on characteristics likely to influence demographic and health behaviour.

RESULTS AND DISCUSSIONS

The large majority of respondents (74.2%) travelled in a Romanian spa resort **in the last five years.**
Travelling companion' preferences indicated that most respondents prefer trips along with husband/wife/partner (38.75%). People also travel with friends (32.50%), their relatives (21.25%), and only 7.50% are interested in spending their holiday alone.

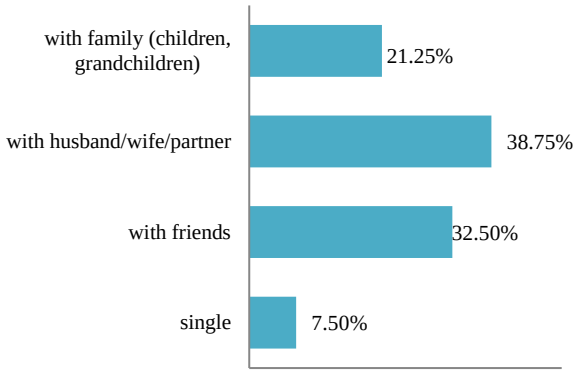

Fig. 3. Travel companions
Source: own calculations.

The respondents indicated in a large proportion (82.5%) that Romania is their favourite destination, and 17.50% declared they prefer to spend their holiday abroad.

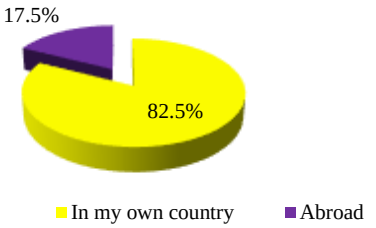

Fig. 4. Holiday destination
Source: own calculations.

The main reasons of the journey mentioned were rest and relaxation (76.25%), culture (60%), health and prevention (35%), leisure (27.5%), and visiting family and friends (13.75%). Religious reasons (1.25%) and other reasons (1.25%) are both not very common.

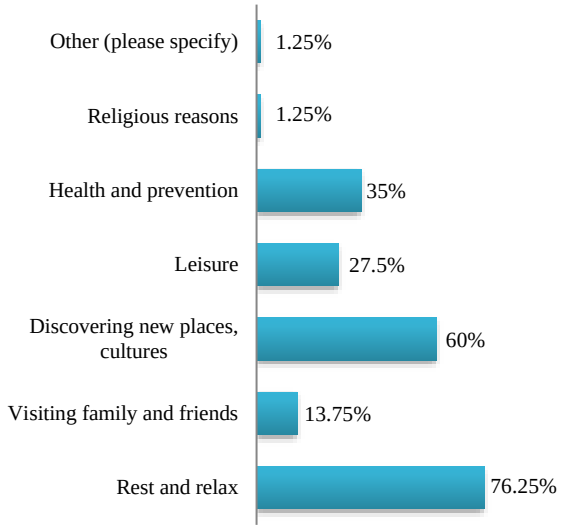

Fig. 5. Motivation for travel
Source: own calculations.

The average length of stay of the respondents in spa destinations were between 4 and 7 overnights (40%), 1-3 overnights (32.5%), 8-13 overnights (16.25%), 2-3 weeks (10%), and a holiday of more than 3 weeks is rather uncommon (1.25%).

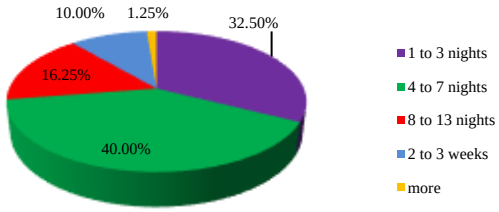

Fig. 6. The average length of stay
Source: own calculations.

Participants were asked to state how often they visited a spa resort. Responses varied from 47.50% going once every few years, 31.25% going once every year, and 21.25% going on a spa resort more than once a year.

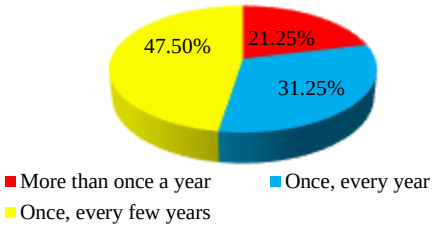

Fig.7. Holiday frequency
Source: own calculations.

Most of the respondents mentioned that the main reason for visiting a spa resort is relaxation (36.6%). The other reasons mentioned are rest (16.9%), treatment (15.5%), and health improvement (14.1%), followed by curiosity and nosiness (2.8% each). The other reasons (discover new places, fresh air, recreation, leisure, visiting friends, and walk) have an insignificant share (1.4%).

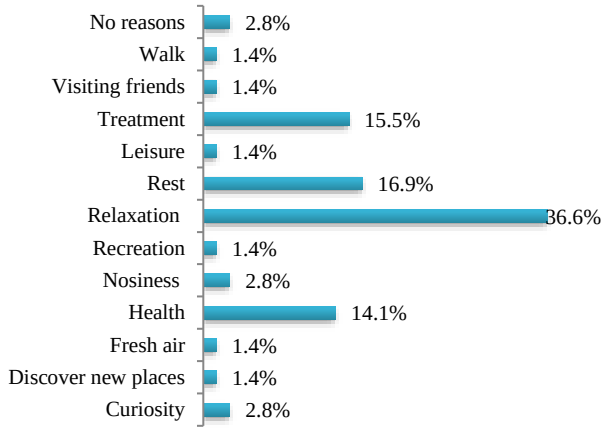

Fig. 8. Motivation to visit a spa resort
Source: own calculations.

The activities preferred by respondents to get involved during their holiday were relaxation in nature (66.25%), visiting new places and cultural objectives (52.5%), spa treatments (42.5%), and swimming and beach (41.25%).

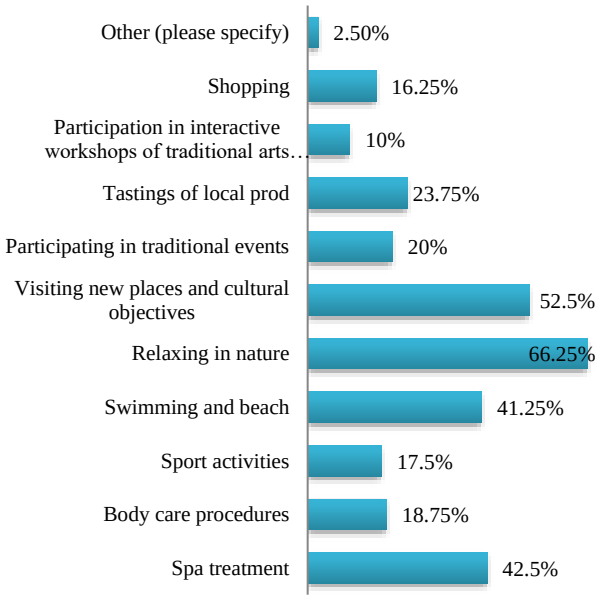

Fig. 9. Favourite activities
Source: own calculations.

Local activities are appreciated, such as tastings the local products (23.75%), participating in traditional events (20%) and participation in interactive workshops of traditional arts and crafts (10%). Last, it seems that spa visitors prefer cultural activities, rather than sports activities (17.5%) and shopping (16.25%).

The criteria mentioned by respondents when to choose a spa resort were the doctor recommendation (4.3), the attractiveness of the area (5.2), the price (4.9), recommendation from friends (3.8), and content of the tour package (3.8).

Table 1. Main criteria influencing decisions

Main criteria	Score
The doctor's recommendation	4.3
The price	4.9
The attractiveness of the area where the tourist destination is located	5.2
The recommendations from friends	3.8
The content of the tour package	3.8
The accessibility	3.2
Other activities that can be carried out in the resort	2.8

Note: 1 - most important, 7 - least important
Source: own calculations.

A high majority of respondents (85%) chose to organize their holidays individually, compared to only 8.75% who rely on a profile organization, like Health Insurance House. Travel agencies are the organizers of holidays for 11.25% of the respondents.

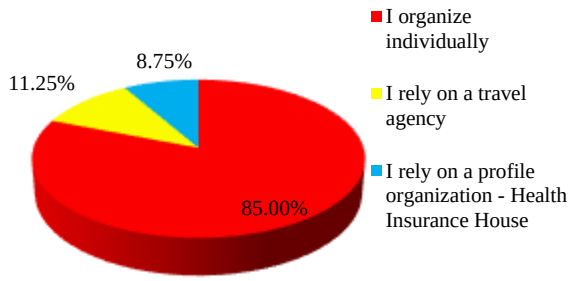

Fig. 10. Travel planning
Source: own calculations.

The respondents used multiple information sources in their attempt to select their holiday destination. The Internet is the main source of information when planning a holiday,

mentioned by 76.25% of the respondents. Next in the list was the information provided by relatives and friends (50%), followed by social media (31.25%), and the own doctor (23.75%). Travel agency, guidebooks, and specialized magazines are the least used sources of information (17.50%) when deciding about a holiday destination.

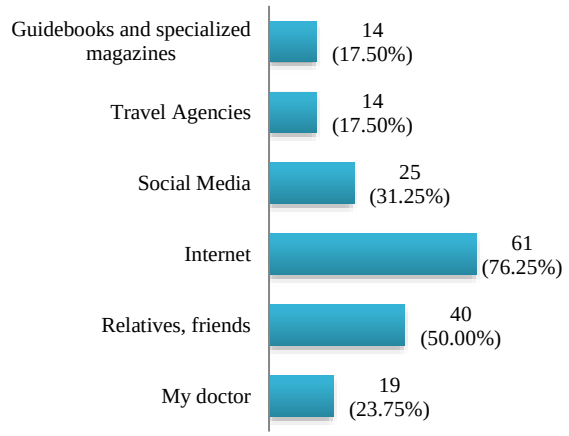

Fig. 11. Sources of information
Source: own calculations.

The daily budget available is less than 50 euro per day for most of the respondents (51.25%); the budget is between 51 euro and 100 euro per day for 38.75% of the respondents, not considering the transport tickets to the destination. A low percentage (2.5%) belongs to a budget between 101-300 euro per day.

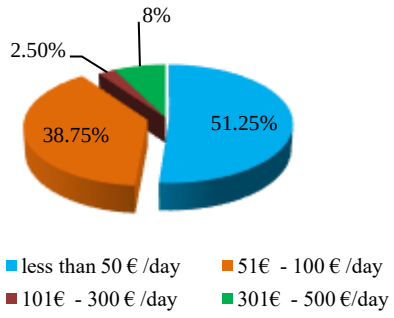

Fig. 12. Holiday's budget
Source: own calculations.

The distribution of respondents considering the educational level indicated that more than half of the respondents (57.50%) have higher education, followed by 27.50% of respondents with high school degrees; only 15% of them reported to have graduated post-university studies.

An overwhelming percentage of respondents have as a first-choice spending holidays in Romania, and just 17.50% of the respondents declared their preference for spending holidays abroad. Most people prefer travelling with a partner: husband/wife/partner (38.75%), or friends (32.50%). The usual length of holidays is predominately for less than one week.

Regarding the reasons for the journey, resting and relaxation are the main reason to travel, followed by culture, and treatment and health improvement. The top five most popular spa resorts for respondents are Băile Herculane, Călimanești - Căciulata, Covasna, Eforie Nord, and Sovata.

The respondents prefer to organize by themselves the holidays and thus, the Internet is the main source of information when choosing a holiday destination, followed by relatives and friends, and social media.

During their holidays, the activities that have been considered the most important are relaxing in nature, visiting new places and cultural objectives, and spa treatments. Together with the great appreciation for nature, other important activities during holidays mentioned by respondents are spending time in local villages, enjoying local activities, meeting people and interact with them, and activities developed to understand local lifestyles (tasting local products, participation to traditional events, and getting involved in interactive traditional arts and crafts workshops).

Regarding the importance of the main criteria that influence respondents' decision when choosing a spa resort, the doctor's recommendation ranks first as an attribute when choosing a spa resort, followed by the attractiveness of the area, and the price.

CONCLUSIONS

The spa resorts have an outdated infrastructure and the products are not yet adapted to the international trends and demands of the tourists, being oriented towards the curative side rather than the prevention/wellness side. The Romanian spa destinations are dependent

on the government grants, throughout treatment vouchers and social insurance system.

Romanian spa resorts failed to invest in the renovation of the infrastructure and the creation of new spa products. Therefore, a huge need for the modernization of the spa and wellness treatments, and the associated infrastructures, exists in several spa destinations. On the other hand, the lack of transport infrastructures and utilities in some resorts makes difficult to invest in new accommodation or treatment /spa therapies.

It is necessary to create a competitive and modern spa-product, based on the discovery of local specificity, the thermal and mineral waters, and the therapies, along with the traditional food and the pure natural environment, where the well-being and relaxation in nature represent the main benefits for tourists.

Romanian spa resorts should enhance and use the local landscape, to promote the location of the resort in a pure, untouched area, while remaining in the area of advantageous prices at European level.

An important challenge for owners and staff in spa treatment facilities is to change the paradigm, from a reactive to a more proactive approach, meaning to focus more on the prevention side, and not on the curative side.

Considering the current profile of tourists visiting Romanian spa resort, especially elderly people who came for curative treatment, the marketing approach needs to be changed. Thus, new target groups need to be tackled, from the younger generation, aged 18 - 25 and 26 to 35 years.

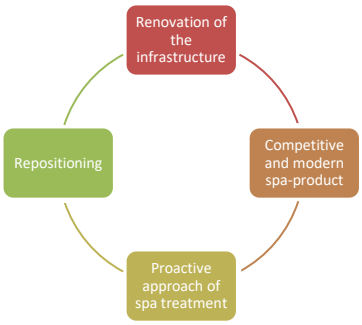

Fig. 13. Recommendation for spa destinations
Source: own calculations.

Consequently, the repositioning of tour operators towards promoting the wellness and prevention potential of spa destinations is important, in a sector dominated by social tourism, which entails risks of a too rapid and strong decrease of revenue.

The most important difficulties that the local public authorities face in accessing the dedicated European funds are the poor administrative capacity, few resources for co-financing, and the unclear situation of the ownership of the spa infrastructure. Moreover, the staff of the wellness & spa field needs better training, and the spa treatment centres require trained medical staff. Also, given the extremely unbalanced seasonality, with relatively high inflows of tourists only for 2-3 months in the summer period, the spa destinations have to adopt measures to attenuate the seasonality and to attract a larger number of tourists throughout the entire year.

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ANALYSIS OF ROMANIA FRUIT AND VEGETABLE SECTOR COMPARED TO OTHER E.U. COUNTRIES DURING THE PERIOD 2007-2018

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Abstract

The fruit-vegetable sector is of major importance in Europe's economy, but is under-exploited, representing only 18% of total agricultural production. Although the beneficial effects of consuming vegetables and fruits are permanently promoted, it is still below the WHO recommended level of 400 grams daily for one person. In Romania things are no different, even if there is an extraordinary potential and a vast supply of fresh vegetables and fruits. On the one hand, the consumer is overwhelmed by the high purchase prices, on the other hand the producers have given up investing to create a competitive market to European standards, discouraged by the massive imports. To create a clearer picture of this sector, in this paper we set out to study the surfaces and productions of vegetables and fruits, the import and export and consumption of these products, in Romania compared to other countries of the European Union between 2007 and 2018.

Key words**:** *vegetables, fruits, consumption, production, surfaces*

INTRODUCTION

In the EU countries, an important role is played by the fruit and vegetable sector, especially in the Mediterranean region and a few countries in Eastern and Northern Europe.
The EU population growth requires a better and high quality supply of fruit and vegetables [3].
The most commonly marketed horticultural products on EU farms are apples and tomatoes. Most farms are small in size and have a high labor force, thus earning average incomes [8].
Despite favorable pedoclimatic conditions for the production of vegetables and fruits, agriculture in Romania does not align with the demands characteristic of the market economy. From the existing statistical data and analyzes from numerous studies, it follows that in this sector, farms with areas of up to 3 ha predominate and over 90% of them are managed by persons, who apply a poor organization of production, the low degree of technology and marketing of products at the farm gate [4].
Romania has a wide range of vegetables and fruits, from domestic and imported products, but consumption still remains below the values recommended by nutritionists.
In order to consolidate the position of this sector in the economy, the operators as well as to increase the consumption of vegetables and fruits, the EU offers to each country a set of support measures ("De minimis aid for the application of the program to support garlic production", "Support scheme for tomato product support program in protected areas ").

MATERIALS AND METHODS

In the paper we used the following indicators: arithmetic mean, standard deviation, coefficient of variation. The formulas used to calculate these indicators are presented below [2].

For the arithmetic mean: $\overline{X} = \frac{\sum xi}{n}$;

where: X = moving arithmetic mean; xi = the values of the productions / areas over a number of years (i); n = number of years considered.
For the annual growth rate [1]:

$$r\,2007\ -2018\ = \sqrt[11]{\prod(p1/p0)} - 1$$

where: r 2007-2018 = the annual rhythm; ∏p1/po = chained growth indicators.

For standard deviation: $\partial = \sqrt{\frac{\sum(\bar{x}-xi)\text{^}2}{n-1}}$;

where: ∂ = standard deviation; xi = the values of the productions / areas over a number of years (i); n = number of years considered.

For the coefficient of variation: $C = \frac{\delta}{\bar{X}} x100$,

where: C = coefficient of variation (expressed as a percentage)

The coefficient of variation can be: between 0-10% - small variation; between 10-20% - medium variation; over 20% - big variation.

The data used had as source: Eurostat, Faostat, National Institute of Statistics and data from the specialized literature.

RESULTS AND DISCUSSIONS

Analyzing the Eurostat database on the area of fruit trees (including the one with berries and nuts) at the European Union level, it is found that in 2018 it was 2.76 million ha, with 20.7% more than in the previous year [5].

The first three places with the largest surface cultivated with fruit trees in 2018 are owned by Spain in the first place with 1,024.42 thousand ha, which owns over 37.1% of the total area of the EU, followed by Italy with 418.4 thousand ha and Poland with 328.54 thousand ha.

Romania owns only 5% of the total area cultivated with fruit trees in the EU, with 137.86 thousand ha in 2018, placing it 7th.

The annual rate of -1.12%, shows us that the areas with trees decreased during the analyzed period in Romania, so that in 2018 we have 11.7% fewer hectares cultivated with fruit trees, compared to 2007.

Decreases in areas cultivated with fruit trees are also recorded in Italy with an annual rate of -1.18% and in France with a rate of -0.56%.

Spain has the highest annual growth rate in this period of 3.17%, the statistical data shows very large fluctuations of the surfaces, with a minimum of 76.71 thousand ha in 2008 and a maximum of 1,024.42 thousand ha in the year 2018. In the case of Spain and Italy, during the analyzed period, an increase of the surfaces with an annual rate of 1.25% and 1.15% is observed.

Table 1. Analysis of fruit tree surfaces and fruit production in the EU between 2007-2018

Fruits (including berrins and nuts)		**Greece**	**Spain**	**France**	**Italy**	**Poland**	**Portugal**	**Romania**	**EU**
Surface (thousand hectares)	Minim	121.72	76.71	155.43	369.16	274.3	149.69	137.86	259.5
	Maxim	142.93	1,024.42	170.41	443.9	337.5	201.95	156.1	2,761.63
	Average	131.55	689.23	162.5	419.64	299.37	172.96	143.5	2,647.95
	STDEV	5.92	423.51	4.95	26.92	22.56	18.41	5.48	106.88
	Cvar (%)	4.5	61.45	3.05	6.42	7.54	10.64	3.82	4.04
	Annual growth rate	1.11	3.17	-0.56	-1.18	1.24	0.94	-1.12	*
	% of the EU at the level of 2018	5.2	37.1	5.8	15.2	11.9	7.3	5	100
Production (thousand tons)	Minim	1,394.8	2,840.9	2,754.5	5,684.6	1,266.6	488.6	1,001.5	25,794.1
	Maxim	1,965.1	4,895.1	3,500.8	5,954.4	4,872.9	787.9	1,754.4	28,146.3
	Average	1,603.3	3,929.8	3,137.7	5,857.4	3,214.7	620.3	1,248.7	26,970.2
	STDEV	195.9	852.2	251.2	107.3	990.7	80.5	202.3	1,663.3
	Cvar (%)	12.2	21.7	8	1.8	30.8	13	16.2	6.2
	Annual growth rate	2.72	6.55	-1.86	-1.15	14.42	2.04	4.69	*
	% of the EU at the level of 2018	6.98	16.67	9.79	20.2	17,31	2.41	6.23	100

Source: [5] Eurostat, [6] Ministry of Agriculture and Rural Development data processed - accessed 17.03.2020 - Cvar (%) <10% very homogeneous data series, the variation is small, the average is significant; 10-20% relatively homogeneous data series; > 20% heterogeneous data series, variation is very large, the average is not representative.

Regarding the fruit production obtained in 2018, Romania held a percentage of 6.23% of the total fruit production at European level, ranking 6th, with a total production of 1.75 million tons, with an annual growth rate of 4.69% and a coefficient of variation of 16.2%

which indicates a relatively homogeneous data series. Even though it holds the largest share of the areas cultivated with fruit trees in the EU, Spain does not have the largest share of fruit production in the EU as a whole, with a percentage of 16.67%, being overtaken by Italy with a share of 20.20% and Poland with 17.31%.

In the case of fruit export, there is an oscillating trend, determined by the total productions obtained, which can influence the selling prices of the fruits for export. The highest value registered in the case of fruit export during the analyzed period was in 2014 of 95,478 thousand euros.

The average growth rate of fruit export registered during 2007-2018 was 5.11%, with an average of the period of 64,268.45 thousand euros and a big coefficient of variation of 30.68%, so the average is insignificant.

The main countries in which Romania exported fruits are Italy (14,805 thousand euros), Germany (11,478 thousand euros) and France (8,878 thousand euros), with annual growth rates of 10.4%, 4.55% and respectively 29.89%.

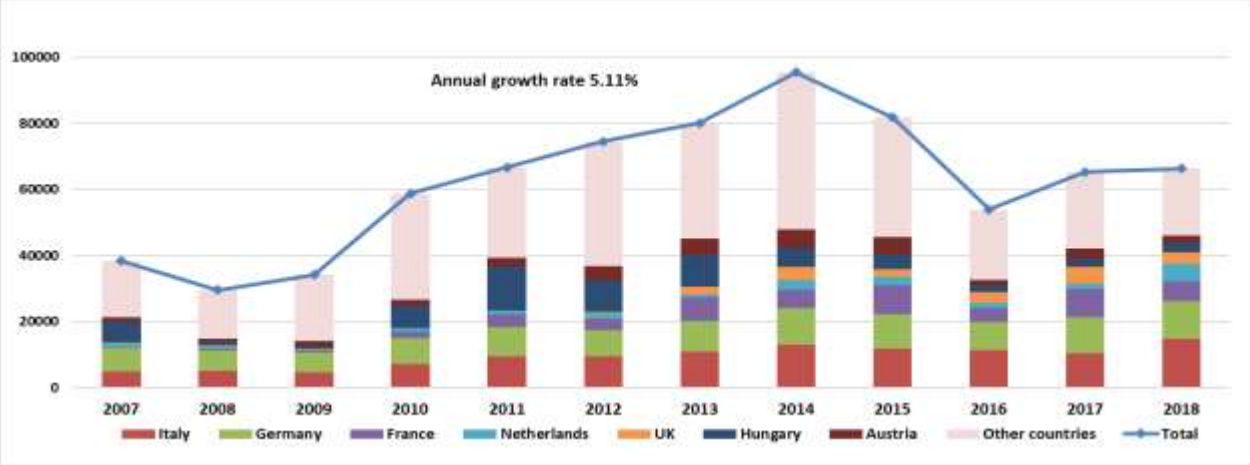

Fig. 1. The value of the fruits exported by Romania (thousands of euros)
Source: Trade Map data [9], Accessed on 17.02.2020.

According to the data in Figure 1, the value of fruit imports followed an increasing trend reaching the amount of 639,428 thousand euros in 2018, due to the non-coverage of consumption from domestic production. It is noteworthy that the value of fruit imports has exceeded three times the value of the reference year 2007.

The average annual rate of increase in the value of fruit imports during the period studied (2007-2018) is 9.27%, the average period being 358,303 thousand euros, with a big coefficient of variation of 52.39%, so the data series is heterogeneous and the average is insignificant (Fig. 2).

Among the main countries from which Romania imported fruits in 2018, are Greece, Turkey, Holland, Germany and Poland with values of 117,215 thousand euros, 78,347 thousand euros, 75,237 thousand euros, 70,418 thousand euros and 65,796 thousand euros with annual growth rates of 10.91%, 5.79%, 17.46%, 20.71% and 27.03% respectively.

Figure 3 shows the trade balance of Romania, which registered an increasing deficit during the analyzed period, especially in the last years of the period, reaching a maximum of -573.09 million euros in 2018.

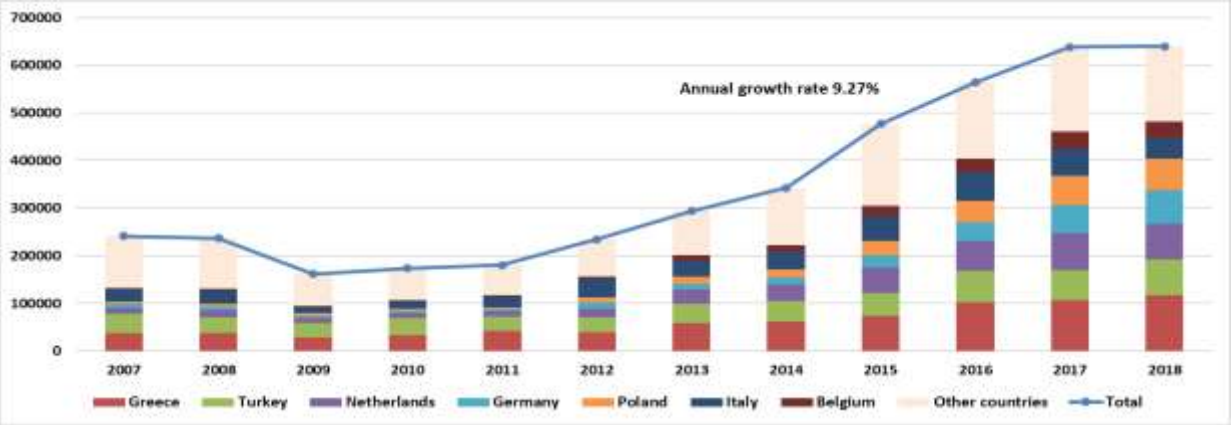

Fig. 2. The value of the fruits imported by Romania (thousands of euros)
Source: Trade Map data [9], Accessed on 17.02.2020.

One reason why the trade balance has negative values is the massive import due to the lower prices of the imported products than the domestic ones as well as the fact that the domestic production cannot cover the consumption and diversity of consumption of the national population [7].

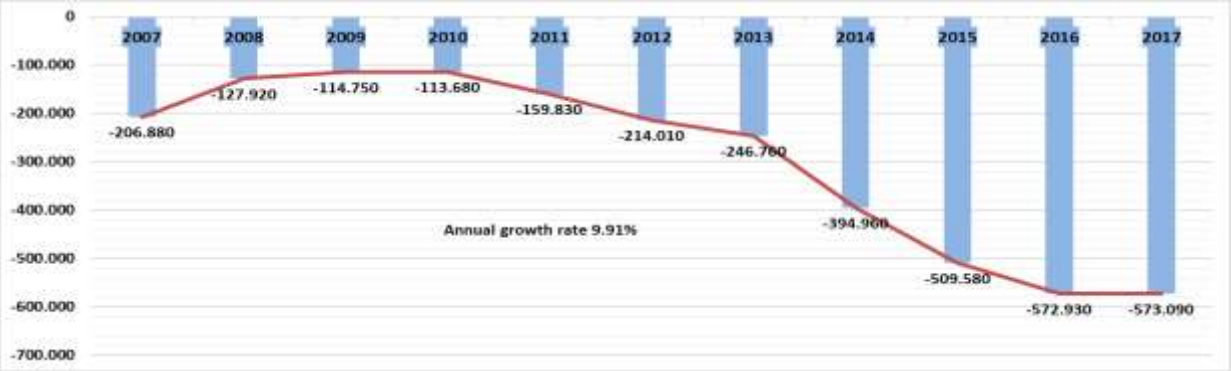

Fig. 3. Fruit trade balance for period 2007-2018 (million euros)
Source: Trade Map data [9], Accessed on 17.02.2020.

In the following, we will analyze the situation at European level of the surfaces and vegetables production during 2007-2018.

It can be seen, from the data in Table 2, that the highest share of the total area cultivated with vegetables in the EU is owned by Italy with a percentage of 18.9%, even if during the analyzed period there is a negative annual growth rate of - 2%, followed by Spain with 17.7%.

Romania ranks 5th, after Poland, with a share of 6.7% of the total area cultivated with vegetables in the EU. In our country during the analyzed period the surfaces with vegetables decreased with an annual rate of -1.45%.

In 2018, the production of vegetables in the EU was 63.9 million tons, 2.7 million tons lower than the previous year, respectively by 4.2%.

Of the total EU production, over 42% is obtained in Spain and Italy with a share of 23.33% and 19.52% respectively. During the analyzed period, the production of vegetables in Romania grows at an annual rate of 1.8% but, at the level of 2018, Romania obtains only 4.2% of the production of vegetables in the EU, ranking 6th, after Germany which obtains 5.54%.

Romania, in order to ensure the need for vegetable products on the domestic market, is forced to resort to significant imports.

Table 2. Analysis of the areas cultivated with vegetables and vegetables production in the EU between 2007 and 2018

Vegetable		Germany	Spain	France	Italy	Poland	Romania	UK	EU
Surface (thousand hectares)	Minim	107.82	254.8	186.53	349.31	170.29	138.56	109.1	2,069.41
	Maxim	124.96	380.08	256.14	497	238.4	178.36	115	2,169.17
	Average	113.42	337.9	242.07	421.59	197.66	160.08	112.32	2,107.68
	STDEV	5.55	34.66	19.63	42.42	21.45	14.95	2.45	41.26
	Cvar (%)	4.89	10.26	8.11	100.06	10.85	9.34	2.18	1.96
	Annual growth rate	1.03	0.7	0.23	-2	0.17	-1.45	0.25	0.44
	% of the EU at the level of 2018	5.8	17.7	12.2	18.9	9	6.7	5.4	100
Production (thousand tons)	Minim	3,290.7	8,859.9	5,297.4	11,668.3	4,278.5	2,151.6	2,445.5	62,296.8
	Maxim	3,952.4	15,040	6,893.6	13,972.9	5,733.9	2,888.1	2,630.7	65,000.5
	Average	3,553.4	12,857.4	5,863.2	12,737.3	5,002.9	2,551.1	2,522.5	53,960.2
	STDEV	198.3	2,529.6	591.1	828.3	555.7	202.8	79.6	1,455.6
	Cvar (%)	5.6	19.7	10.1	6.5	11	8	3.2	2.3
	Annual growth rate	0.2	1.4	-1.8	-1	0.5	1.8	-0.1	-1.8
	% of the EU at the level of 2018	5.54	23.33	9.08	19.52	8.48	4.2	3.96	100

Source: [5] Eurostat, [6] Ministry of Agriculture and Rural Development data processed, Accessed 17.03.2020 - Cvar (%) <10% very homogeneous data series, the variation is small, the average is significant; 10-20% relatively homogeneous data series; > 20% heterogeneous data series, variation is very large, the average is not representative.

Figure 4 shows the upward evolution of the value of vegetable imports in Romania. Thus, if in 2007 the value of vegetable imports was about 141.2 million euros, in 2018 the value exceeded 424.5 million euros, being three times higher than in the reference year.

The annual growth rate of vegetable imports during the study period was 10.53%.

At the level of 2018, among the main countries from which Romania imported vegetables are Turkey (79.9 million euros), Holland (48.2 million euros) and Poland (48.5 million euros), with annual rates of growth for the period 2007-2018 of 5.07%, 16.92% and 13.23%.

In the case of the value of vegetable exports, an oscillating trend is observed for the period 2007-2018, reaching the maximum of the period in 2017, with an export value of 139.7 million euros (Fig. 5).

The annual growth rate of exported value was 7.8%.

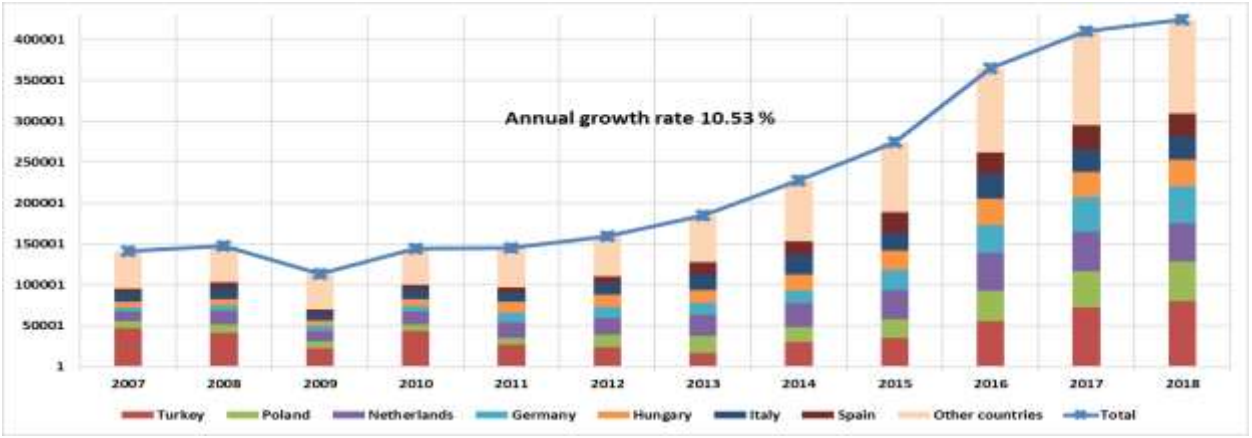

Fig. 4. The value of vegetables imported by Romania (thousands of euros)
Source: Trade Map data [9], Accessed on 17.02.2020.

Among the main countries to which Romania exported vegetables are Italy (48.6 million euros), Spain (15.8 million euros) and Germany (12.3 million euros).

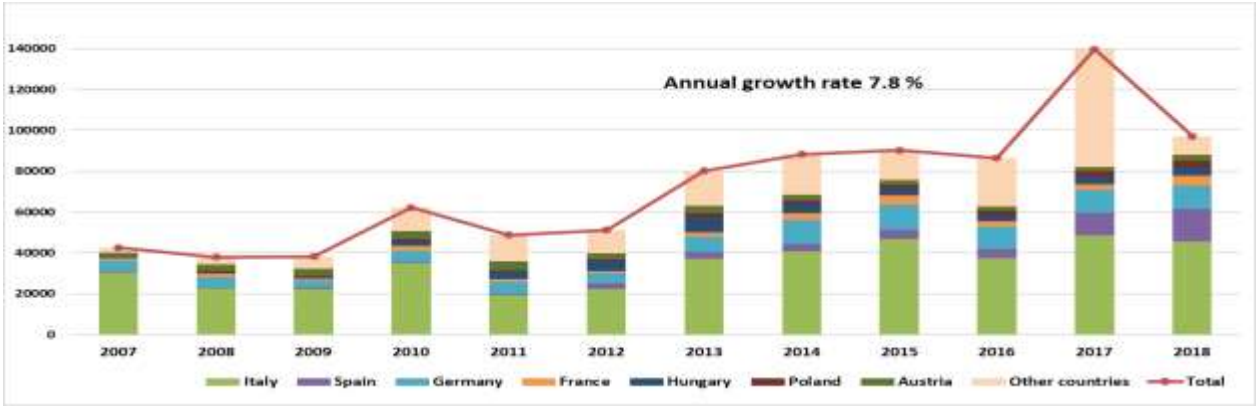

Fig. 5. Value of vegetables exported from Romania (thousands of euros)
Source: Trade Map data [9], Accessed on 17.02.2020.

The trade deficit registered by Romania presents an increasing trend, reaching a maximum of 327.27 million euros in 2018.

The annual growth rate recorded for the analyzed period was 11.52% (Fig. 6).

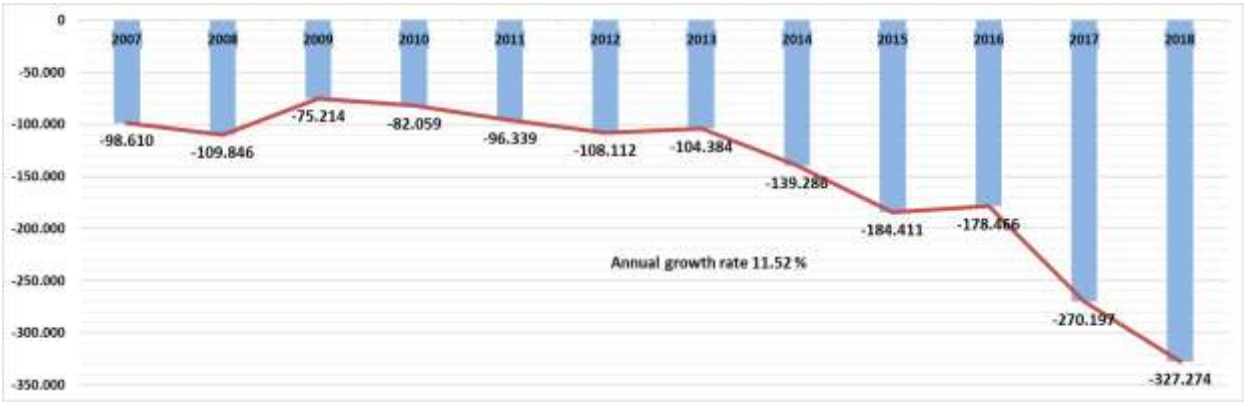

Fig. 6. Vegetable trade balance (million euro)
Source: Trade Map data [9], Accessed on 17.02.2020.

CONCLUSIONS

From the studies and analyzes available so far, it turns out that in our country, in this sector, small farms predominate, with cultivated areas below 3ha. Their administration is done by individuals, without specialized knowledge, which leads to a poor organization of production, a low degree of technology and marketing of products, which are generally valorized at the farm gate.

Although Romania is not yet aligned with the requirements characteristic of the market economy of vegetables and fruits, it occupies an important place within the EU as the share of the areas cultivated with fruit trees and vegetables as well as of the products obtained from fruits and vegetables, ranking in the first ten countries.

Within the Union, the largest area occupied by fruit trees is found in Spain, followed by Italy and Poland. Regarding this surface Romania is ranked 7th.

In terms of fruit production, at the level of 2018, Spain ranks first, while Romania ranks 6th.

Romania has exported fruit to Italy, Germany and France, while Romania's fruit import in 2018 was from Greece, Turkey, Holland, Germany and Poland.

Romania's trade balance registered a deficit as a result of the increase of fruit imports, the need for fruits at national level could not be covered from domestic production.

Regarding the areas cultivated with vegetables, the first place in the EU is owned by Italy, followed by Spain. Romania ranks 5th in this area.

In order to ensure the need for vegetable products on the domestic market, Romania has to resort to significant imports.

The main countries from which Romania imported vegetables in 2018 are: Turkey, Holland and Poland, while exporting to Italy, Spain and Germany.

As in the case of fruits, the trade balance of Romania registered a deficit as a result of the increase of the import of vegetables during the analyzed period.

In order to support the vegetable and fruit sector, the Romanian state has provided support measures for tomatoes and garlic, measures that could be extended to other horticultural products.

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QUALITY OF FLOWERS TO DAFFODILS BASED ON VEGETATIVE AND FLORAL INDICES

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Abstract

The study aimed to evaluate the quality of flowers in daffodils (Narcissus pseudonarcissus L.) in relation to physiological indices and parameters and floral indices. The biological material was represented by five varieties of daffodils: 'Carlton', 'Ice Follies', 'St. Patrick', 'Dick Wilden' and 'Salome'. A series of physiological indices and parameters, and floral indices were evaluated that described the status of plants (plant height - PH, number of leaves - LN, length of leaves - LL), vegetation period (VP), flowering period (FP), and flowers size (FS). The flowering period (FP) expressed in days, recorded the values: FP = 13 days for 'Carlton', FP = 18 days for 'Ice Follies', FP = 9 days for 'St. Patrick', FP = 10 days for 'Dick Wilden', and respectively FP = 11 days for 'Salome'. Correlation analysis revealed very high, positive, correlations between FS and LN (r = 0.968), and between plant height (PH) and leaf length (LL) (r = 0.915). The variation of FS according to LN was described by a polynomial equation of degree 2, under conditions of R^2 = 0.938, p << 0.01. A 3D model of FS variation with respect to LN and FP was obtained, and a graphical representation in the form of isoquant, expressed a possible combination of LN and FP for optimum of FS. Principal Component Analysis (PCA) led to the distribution of the studied varieties in relation to the main quality parameters considered (VP, FP and FS). PC1 explained 43.701% of variance, and PC2 explained 39.003% of variance. Cluster analysis led to the grouping of daffodils varieties based on affinity with respect to flower quality indices (FP and FS) under statistical safety conditions, Coph.corr. = 0.924.

Key words: *daffodils, cluster analysis, flowers quality, isoquant, PCA*

INTRODUCTION

Narcissus is a genus of perennial plants, predominantly spring, which belongs to the Family *Amaryllis*, *Amaryllidaceae* [27]. Daffodils (*Narcissus pseudonarcissus* L.) are one of the most popular ornamental plants in the world [2], [44], [9], [18], [5], [15], [3].

Narcissus species, for the most part, are synanthous, which means that the leaves and flower stems appear at the same time [15], [6]. Some studies have evaluated the characteristics of different varieties of daffodils compared to wild taxa in order to establish the degree of connection between cultivated varieties and wild plants from different areas around the World [37]. Phylogeny studies in Narcissus were also conducted [46].It is known the use of daffodil flowers, but also of other plants of the Family *Amaryllidaceae*, in the popular practice for treating some diseases, and studies and researches have identified a series of compounds with specific pharmaceutical and medicinal action [25]. Studies on a number of active principles and their usefulness in the pharmaceutical field have been carried out on different parts of *Narcissus* plants [34], [22], [36].

Obtaining quality biological material is of interest for the production of ornamental plants of daffodils with aesthetic and economic value, in this sense being carried out studies on the methods of daffodils multiplication [42].

Soil or different growth media are used for the cultivation of ornamental plants, and the relationship of plants with soil or growing media is important for obtaining quality ornamental plants [39]. Some studies have evaluated the relationships of daffodil plants with salinity conditions in order to evaluate the response to saline stress conditions [45]. The relationships of daffodil plants with soil and nutrients were studied under different cultivation conditions as ornamental plants, an important aspect being the period of nitrogen application [6].

The leaves of daffodils have been studied in relation to the level of bulb development, and to the methods and techniques of propagation [28]. The study of the leaves in daffodils was approached in different genotypes in relation to the vegetation and flowering period, in relation to growth bioregulatory substances [7], as well to other aspects [8], for the study of the leaf area being proposed different models and applications [40], [10]. Also the leaves were studied in relation to the vegetation conditions, especially with the variation of the temperatures that had an influence on the elongation of the leaves and the development of the flowers [24]. Some studies at the leaf level have evaluated the relationship with different pathogens and treatment methods [16], the rapid and accurate evaluation of the degree of attack of some pathogens being facilitated by software applications [11].

The quality of flowers and the variation of the flowering period in daffodils was studied in relation to different varieties, cultivation conditions, soil conditions, but also with their pharmaceutical potential [35], [25], [6].

The daffodils were also a model for studying the distribution of carotenoid pigments, involved in determining the color of yellow and orange, because the daffodils are predisposed to the phenomenon of "color break", and in the daffodils the phenomenon of "brocken" in white spots was identified [18].

In natural conditions, daffodils are present in certain favorable areas in the form of large specific plant associations, managed as Protected Areas (Nature Reserves), and imaging analysis is a useful tool for the study and management of such areas [17], [33]. Several Daffodils' Glade are known in Romania, some of them Protected Area and Nature Reserves, such as: "Negrileasa" and "Țecnești" Alba County, "Rovina" and "Susag" Arad County, "Negrași" Argeș County, "Goronișteˮ and "Oșorhei" Bihor County, "Șesul Mogoșenilor" and "Șesul Văii Budacului" Bistrita-Năsăud County, "Dumbrava Vadului" Brașov County, "Zerveștiˮ Caras-Severin County, "Șardu" Cluj County, "Lunca Neajlovului" Dâmbovița County, "Dealul Ciocârlău" Gorj County, "Dumbrava Harghitei" Harghita County, "Nucșoara", Hunedoara County, "Gurghiu" Mures County, "Racâș-Hida" Sălaj County, "Șuvara Sașilor" Sibiu County, "Bătești" Timis County [26]. In the traditional symbolism, the daffodil is considered as a "flower of rebirth", and associated with some Daffodils Nature Reservation, cultural events are held, such as "Daffodils' Festival" (Nature Reservation "Dumbrava Vadului", Brasov County). This also highlights the tourism potential of the respective areas, having as central subject the daffodils. Tourism, in fact, has been the subject of valuable studies that have contributed to the enhancement of some tourist objectives or opened new trends in tourism science [20], [30], [31], [32].

The present study evaluated the quality of flowers in five varieties of daffodils (*Narcissus pseudonarcissus* L.) in relation to the vegetation period, flowering period and flower size.

MATERIALS AND METHODS

The study aimed to evaluate the quality of flowers in daffodils, in relation to physiological indices and floral indices.

The biological material was represented by five varieties of daffodils: 'Carlton', 'Ice Follies', 'St. Patrick', 'Dick Wilden' and 'Salome'. The control variant was represented by trials average value. A series of physiological indices, and parameters and floral indices were evaluated that described the status of plants (plant height - PH, leaf number - LN, length of leaves - LL), vegetation period (VP), flowering period (FP), and flowers size (FS). For analysis and interpretation of experimental data, variant analysis, correlation analysis, regression analysis, principal component analysis (PCA), and cluster analysis (CA) were used.

As the parameters of the statistical safety, the values of the significance limit of differences (LSD), correlation and regression coefficients (r, R^2), the cophenetic coefficient (Coph.corr), similarity and distances indices (SDI) were used.

PAST software [14], and Wolfram Alpha software [49] were used to analyze the experimental data.

RESULTS AND DISCUSSIONS

The five varieties of daffodils were evaluated in terms of vegetation indices and parameters, and floral indices. In terms of vegetation period (VP), expressed in days, the studied varieties recorded the following values: VP = 80 days for 'Carlton', VP = 101 days for 'Ice Follies', VP = 125 days for 'St. Patrick', VP = 98 days for 'Dick Wilden', and respectively VP = 71 days for 'Salome'.

The flowering period (FP) expressed in days, recorded the values: FP = 13 days for 'Carlton', FP = 18 days for 'Ice Follies', FP = 9 days for 'St. Patrick', FP = 10 days for 'Dick Wilden', and respectively FP = 11 days for 'Salome'.

With regard to plant height, the five genotypes showed mean values between 14.75 ± 0.42 cm in the 'Ice Follies' variety and 31.83 ± 1.43 in the 'Carlton' variety, where the differences from the average of the experience showed statistical significance for LSD 0.1%, Table 1.

Table 1. Variation of the plants height in daffodils according to the studied varieties

Cultivars	Average value (cm)	Relative value (%)	Differences
'Carlton'	31.83±1.43	140.03	9.10***
'Ice Follies'	14.75±0.42	64.88	-7.98^{00}
'St. Patrick'	22.00±2.78	96.77	-0.73
'Dick Wilden'	23.25±0.80	102.27	0.52
'Salome'	21.83±0.67	21.83	-0.90
Control	22.73±0.62	100.00	-
LSD values	LSD 5%=4.733; LSD 1%=6.410; LSD 0.1%=8.569		

Source: original data, resulted from our experiments.

The number of leaves, as an index and parameter of vegetation, showed average values between 4.20 ± 0.71 cm in the 'Carlton' variety and 6.40 ± 0.75 in the 'Dick Wilden' variety, where the differences from the average of the experience showed statistical significance for LSD 0.1%, Table 2.

Table 2. Variation in the leaves number per plant in daffodils depending on the studied varieties

Cultivars	Average value (no)	Relative value (%)	Differences
'Carlton'	4.20±0.71	81.08	-0.98
'Ice Follies'	5.00±0.71	96.53	-0.18
'St. Patrick'	4.80±0.58	92.66	-0.38
'Dick Wilden'	6.40±0.75	123.55	1.22*
'Salome'	5.50±0.68	106.18	0.32
Control	5.18±0.18	100.00	-
LSD values	LSD 5%=1.210; LSD 1%=1.656; LSD 0.1%=2.245		

Source: original data, resulted from our experiments.

The length of the leaves, as a vegetation index, showed average values between 17.48 ± 2.00 cm in 'Ice Follies' variety, and 30.08 ± 1.79 cm in 'Carlton' variety. There were positive differences compared to the control in the 'Carlton' variety, in conditions of statistical significance for LSD 0.1%, and in the case of the 'Ice Follies' variety, there were negative differences compared to the control variant, in statistical safety conditions for LSD 5%, Table 3.

Table 3. Variation of leaf length per plant in daffodils depending on the studied varieties

Cultivars	Average value (cm)	Relative value (%)	Differences
'Carlton'	30.08±1.79	134.10	7.65**
'Ice Follies'	17.48±2.00	77.93	-4.95^{0}
'St. Patrick'	21.33±1.95	95.10	-1.10
'Dick Wilden'	19.73±1.75	87.96	-2.70
'Salome'	23.68±0.86	105.57	1.25
Control	22.43±0.71	100.00	-
LSD values	LSD 5%=4.557; LSD 1%=6.172; LSD 0.1%=8.252		

Source: original data, resulted from our experiments.

The size of the flowers, as a quality floral index, showed average values between 5.47 ± 0.44 cm in the 'Carlton' variety and 6.88 ± 0.36 in the 'Dick Wilden' variety, where the difference from the average of the experience showed statistical significance for LSD 5 %, Table 4.

The correlation analysis revealed very high correlations between FS and LN, r = 0.968, and between plant height (PH) and leaf length (LL), r = 0.915.

The variation of FS according to LN was described by a polynomial equation of degree 2, equation (1), under conditions of R^2=0.938, $p << 0.01$.

Table 4. Variation of flower size in daffodils depending on the studied varieties

Cultivars	Average value (cm)	Relative value (%)	Differences
'Carlton'	5.47±0.44	89.67	-0.63
'Ice Follies'	5.92±0.40	97.05	-0.18
'St. Patrick'	5.67±0.32	92.95	-0.43
'Dick Wilden'	6.88±0.36	112.79	0.78*
'Salome'	6.55±0.18	107.38	0.45
Control	6.10±0.12	100.00	-
LSD values	LSD 5%=0.771; LSD 1%=1.045; LSD 0.1%=1.397		

Source: original data, resulted from our experiments.

$$FS = -0.0373LN^2 + 1.0979LN + 1.4327 \quad (1)$$

The size of the flowers is a character

determined by the genotype and variety, but influenced to a certain extent by the vegetation conditions, as well as by physiological indices that express the state of nutrition and vegetation of the plants.

For the five daffodils studied varieties, the variation of FS according to the number of leaves (LN) and the flowering period (FP), was described by equation (2), in condition of R^2= 0.998, p<0.01, F=1052.53.

The graphical distribution of FS variation in relation to LN and FP is presented in Figs. 1 and 2.

$$FS = ax^2 + by^2 + cx + dy + exy + f \quad (2)$$

where: x – LN, y – FP;
a, b, c, d, e, f - the equation (2) coefficients;
a=-0.0387082896905585;
b=-0.0114516062373491;
c=0.977471228080841;
d= 0.240217612718943;
e=0.0153681411034134;
f=0.

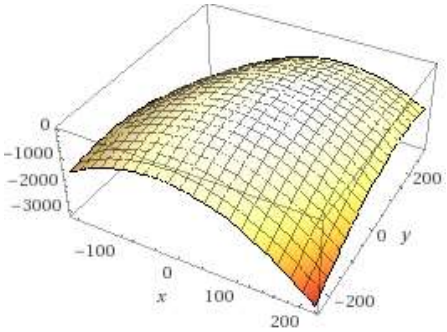

Fig. 1. Graphical distribution of FS values in relation to LN and FP; a - 3D graph for FS distribution in relation to LN and FP (x=LN; y=FP)
Source: original graph, based on our experimental data; graph was generated using Wolfram Alpha software (49).

A 3D model of variation of FS with respect to LN and FP was obtained (Fig. 1), and a graphical representation in the form of an isoquant, expressed a possible combination of LN and FP for optimum values of FS (Fig. 2).

Principal Component Analysis (PCA) led to the diagram in Fig. 3, in which the studied daffodils varieties were distributed in relation to the main quality parameters analyzed (VP, FP and FS).

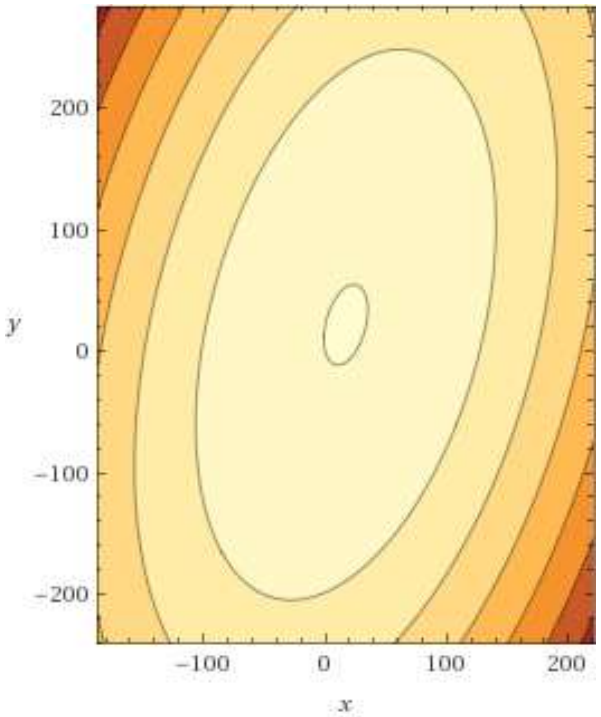

Fig. 2. Graphical distribution of FS values in relation to LN and FP; Isoquant distribution model for FS optimum value in relation to LN and FP (x=LN; y=FP)
Source: original graph, based on our experimental data; graph was generated using Wolfram Alpha software (49).

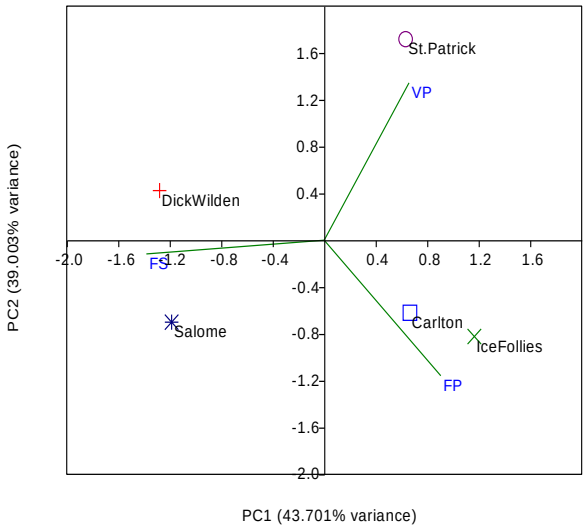

Fig. 3. PCA distribution diagram of daffodil varieties in relation to VP, FS and FP (VP – vegetation period; FS – flower size; FP – flower period)
Source: original graph, based on our experimental data; graph was generated using PAST software (14).

PC1 explained 43.701% of variance, and PC2 explained 39.003% of variance. The 'St. Patrick' variety was associated with biplot VP, this variety having the highest vegetation period (125 days).

The varieties 'Dick Wilden' and 'Salome' were

associated with the biplot FS (flower size), being the genotypes with the largest flower sizes (6.88 at 'Dick Wilden' and 6.55 cm respectively at 'Salome').
The varieties 'Ice Follies' and 'Carlton' were associated with the biplot FP, the respective varieties having the highest flowering period (18 days in the 'Ice Follies' variety, respectively 13 days in the 'Carlton' variety).
Cluster analysis resulted in the dendrogram in Fig. 4, under statistical safety conditions, Coph.corr = 0.924. The five varieties of daffodils were distributed in relation to the most important quality parameters taken into consideration, FS and FP, and two clusters were formed.
A cluster containing the variety 'Ice Follies', in a solitary position, with the highest value for flowering period, FP = 18 days. In the second cluster were associated, with high affinity, the varieties 'Salome' and 'Dick Wilden', with the value of similarity and distances indices (SDI), SDI = 1.053, table 5.

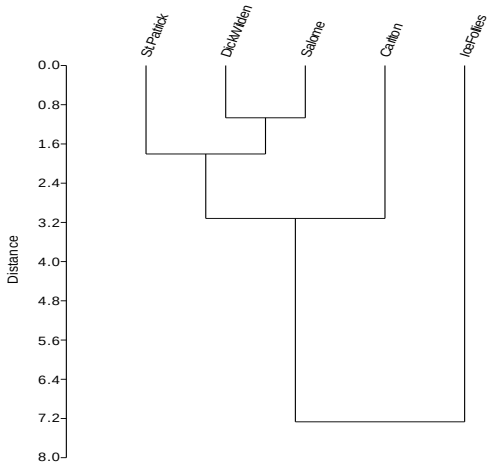

Fig. 4. Cluster diagram of daffodil varieties according to studied parameters (FS and FP)
Source: original graph, based on our experimental data; graph was generated using PAST software (14).

In the grouping of the two varieties, the 'St. Patrick' variety was associated, who presented the value SDI = 1.5697 in relation to the 'Dick Wilden' variety, and respectively the value SDI = 2.185 in relation to 'Salome' variety. With a more distant position to this subcluster was attached the 'Carlton' variety (SDI = 2.273 in relation to 'Salome'). The data for similarity and distances index for the five varieties are presented in Table 5.

Table 5. Similarity and distances indices between the daffodils genotypes in relation to FS and FP

	Carlton	IceFollies	St.Patrick	Dick Wilden	Salome
Carlton		5.0202	4.005	3.3148	2.273
IceFollies	5.0202		9.0035	8.0574	7.0283
St.Patrick	4.005	9.0035		1.5697	2.185
DickWilden	3.3148	8.0574	1.5697		1.053
Salome	2.273	7.0283	2.185	1.053	

Source: original data, resulted from our experimental results calculation.

Studies on the quality of flowers in narcissus are justified in relation to different factors, such as genotype, cultivation conditions, form of use (flowers in pots, cut flowers, in the field, spontaneous flora, etc.), and for some of these aspects many approaches are still needed [1], [4].
Variation of flower size and number of flowers were studied in daffodils in relation to different species, populations and plants at individual level [47].
The obtained results showed the correlation of the size of the flowers (FS) with the number of leaves (LN), possibly due to the fact that a larger number of leaves ensure the accumulation of a greater quantity of reserve substances in bulbs and more vigorous bulbs. Positive correlations between leaf number and size, bulbs size and flower quality were recorded in lachenalia cultivars [21]. Comparative studies on leaves and flowers at different ornamental plants with different symbolic values were also carried out by [19].
The vegetation period did not significantly influence the size of the flowers, but contributed to the accumulation of bulb reserve substances for the next vegetation cycle. Relations of interdependence between bulbs and flowers in daffodils were communicated by [29]. They found a positive correlation between bulb size and flowering period.
At *Narcissus tazetta* quality parameters for cut flowers (RFW - relative fresh weight, and WU - water uptake) were obtained by using a solution of 300 μL l^{-1} 8-HQC and 2% sucrose, and the lifetime of cut flowers extended from 6 to 9 days [1]. Thus, the commercial potential of flowers cut into *Narcissus tazetta* was emphasized through the use of appropriate

nutritional solutions. The study of cut flowers in relation to different substances in water (glutamine, essential oil, salicylic acid, silver nanoparticles) has been studied in other species [23], the influence of nanoparticles in metabolic and physiological processes in plants being known [38], [41].

Some studies have evaluated the quality of flowers in narcissus in relation to the mineral elements, the most studied being nitrogen, phosphorus and potassium, provided by different assortments of fertilizers [12], [48], [13].

Also the quality of flowers in narcissus has been studied in relation to different pathogens and protective methods [43].

The results regarding the quality of the flowers in the five daffodils varieties studied are in accordance with the references literature consulted and which was the basis of the present study.

The models of the flower size variation (FS) in relation to the leaf number (LN) and the flowering period (FP), are useful in adjustment some elements of daffodils growing technology in order to ensure the quality of the flowers.

CONCLUSIONS

The comparative analysis of the quality of flowers in the five varieties of daffodils highlighted the qualities of flowers for each variety in relation to specific physiological and vegetation indices and parameters.

A polynomial equation of degree 2 to, as a model to describe the variation of flower sise (FS) according to the number of leaves (LN) was obtained, under statistical security conditions.

A model was found that described the variation of FS depending on LN and FP in terms of statistical safety, and facilitated the representation of the optimal range of these parameters in order to reach the optimal FS, in the form of a 3D graph, and in the form of isoquant representation.

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FOOD FRAUD INCIDENTS: FINDINGS FROM THE LATEST RAPID ALERT SYSTEM FOR FOOD AND FEED (RASFF) REPORT

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Abstract

Food fraud remains an ever-existing issue, and especially in the context of the current COVID-19 crisis. Along with the recession that followed this pandemics, as well as lacking food supplies in some regions, criminal organizations around the world are trying to further expand their financial gains by means of various forms of food fraud, either counterfeiting, labeling or lack of adequate documentation. The present paper begins with a short theorization on food fraud and finishes with an analysis of the latest Rapid Alert System for Food and Feed report, in order to capture the essence of food fraud incidents that have occurred since May 2019 until present: the most frequent subject of incidents and degree of impact, their nature, along with the products mostly affected. Our results show that food fraud incidents consisted mostly of lacking documentation pertaining to each food product. While animal hides and certain poisonous substances have been detected only in certain cases, their importance is not be ignored in terms of public health.

Key words**:** *food fraud, RASFF, illegal import, animal hides*

INTRODUCTION

The issue of food fraud continues to be one of global implications, with acknowledged effects in what concerns both the human health and the burden placed on the global economy. Recent estimations on the financial impact of food fraud show that even one shipment of unfit for consumption food can generate losses dozens of thousands of dollars [15]. Among the direct consequences of food fraud, severe forms of food poisoning are mostly mentioned in the established literature [1], [12], [13], as well as intolerances [3].

While most definitions of food fraud emphasize the contents of food and the direct of influence of public health for instance, [11], [18], other perspectives stress that the products' description, labeling, as well as other aspects concerning the pursuing documents count as food fraud in the same manner [14], [16]. Ultimately, food fraud does not necessarily mean affecting the contents of products; but consists of implying that the product is fit for consumption or use. Equally, other food experts have indicated that the overwhelming majority of food incidents do not have any direct impact on economy whatsoever [18]. Still, this does not imply that food incidents are to be dealt with less seriously, as their influence on the long run can have significant effects. Food fraud generally refers to the "deliberate and intentional substitution, addition, tampering or misrepresentation of food, food ingredients, or food packaging; or false or misleading statements made about a product for economic gain" [1]. Following the scandal on the identification of undeclared horsemeat in beef products, the European Parliament's Report on the Food Crisis, Food Chain Fraud and Control has summoned the European Commission to "provide the issue of the food fraud the full attention to it deserves and to take all necessary

measures to make the prevention and combating food fraud integrals part of the EU policy" [4]. The EU member states and the European Commission have agreed on 19 exact measures to strengthen EU action against food fraud. These measures were presented to the Council for Agriculture and Fisheries (AGRIFISH) on October 9th, 2017. The measures included a commitment to improve the interaction between the Rapid Alert System for Food and Feed (RASFF) and the Administrative Assistance and Cooperation System (AAC), along with the creation of a common contact points [8]. The EU has restated its official agri-food chain control policies to increase its overall efficiency and promote citizens' trust. As stated in the Communication "The Single Market: Europe's best asset in a changing world", the European Commission considers that "protecting consumers against fraudulent practices by unethical organizations is a challenge that requires increased cross-border cooperation between administrations" [5]. The fight against fraud should not only concern crisis management, but also a proactive attitude in preventing, detecting and exchanging information between operators and authorities [6]

Currently, although the literature on food fraud is flourishing, there is no harmonized definition of food fraud in the EU level [17]. To distinguish whether a case should be considered fraud or non-compliance, four key criteria are considered and if a case meets all four criteria, it is considered suspected fraud. These criteria correspond to the current rules in EU countries for reporting fraud:

(i) a breach of EU law: involves a breach of one or more existing regulations in EU agri-food chain law;

(ii) an intent: certain non-conformities do not occur accidentally (e.g. replacement of a high quality ingredient with a lower quality one);

(iii) an economic gain: implies a form of direct or indirect economic advantage;

(iv) a customer deceiving: involves some form of customer/ consumer misleading (for example: modified labels, which do not illustrate the true quality or, in more serious cases, even the nature of a product). The misleading element can also appear in the form of a risk to public health, if some real properties of the product are hidden (for instance, undeclared allergens) [7].

Recent evidence shows that the current COVID-19 has deepened the existent food fraud phenomenon, with ordinary cheese ready to be sold as parmesan, lacking proper documentation, cases of food baskets that were distributed to families in need during the pandemic, lacking health marks and with deceiving labeling concerning their weight, and many others [9]. All of the illegal imports during this period were attributed to criminal organizations around the world, who are attempting to gain financial means in this manner, since they are losing terrain in other areas of their activity [2].

In the light of this broad context, the purpose of our empirical analysis is to assess the frequency, forms and severity of food fraud incidents nowadays, in addition to all their pertaining variables: the items subject of fraud, their country of origin, country of destination. We argue that such an undertaking will fill some gaps concerning the (re)current food dangers in present times.

MATERIALS AND METHODS

As outlined above, the broad purpose of our study is to explore the frequency, nature and degree of food incidents throughout the entire European Union within the past year.

The particular objectives of the analysis were:

-to assess what food incidents were present and how frequently

-to locate the source and forms of food incidents

-to explore which food products were attempted to be sold illegally and where

-to illustrate how they were evaluated by each national customs' office and what measures were proposed if any breach was observed

Our study is based on the most recent Rapid Alert System for Food and Feed report, with food incidents reported from May 2019 to May 2020 [10]. In this period, a total of 100 incidents, with multiple subjects of food fraud per incident were present. The following subjects of food incidents were observed based

on the RASFF report, and were thenceforth narrowed down and coded in Microsoft Excel and SPSS (Statistical Package for Social Sciences):
-the presence of illegal import (Yes/ No)
-if illegal imports were present, in what form were they evaluated (suspected, attempted or confirmed)
-the presence of issues with the products' health certificate (Yes/ No)
-if any issues with the products' health certificate were observed, which were they? (Absence of health certificates/ Improper health certificate/ Fraudulent health certificate)
-the presence of the analytical report (Yes/ No)
-the presence of food hazards (Yes/ No). Here, a food hazard is to be understood either as a breach of numerical values implicit to a product, or as the presence of a poisonous substance. For the sake specificity, animal hides are not included here, but as a different, explicit variable in our study.
-the risk decision (serious/ not serious/ undecided)
-the product(s)' hygienic state
-the presence of a health mark (Yes/ No)
-the presence of the Common Entry Document
-if the Common Entry Document was present, was it proper? (Yes/ No/ N/A)
-the presence of animal hides (Yes/ No/ N/A)
The other variables introduced in the analysis were, as follows:
-the month and year of occurrence
-the country notifying the food incident
-the location from which the products were imported (Argentina/ China/ Ethiopia/ Ghana/ India/ Indonesia/ Iran/ Morocco/ Myanmar/ Nigeria/ Pakistan/ Philippines/ Senegal/ Serbia/ Thailand/ Turkey/ United Arab Emirates/ United States of America). One food incident regarded an online sale.
-the product category subject to food fraud (cereals and bakery products / confectionery / crustaceans and products thereof / dietetic foods, food supplements, fortified foods /fats and oils / fish and fish products / fruits and vegetables / herbs and spices / honey and royal jelly / meat and meat products (other than poultry) / milk and milk products/ nuts, nut products and seeds / other food product or mixed / poultry meat and poultry meat products / prepared dishes and snacks/ soups, broths, sauces and condiments)
-the classification of measures to be taken (border rejection/ information for follow-up/ information for attention/ none specified)

RESULTS AND DISCUSSIONS

The results of our statistical analysis show that the overwhelming majority of food incidents are related to the documentation that should follow the food products, and rarely in cases pertaining to the products' intrinsic quality. Furthermore, few incidents have been marked as serious.
56% of all incidents concerned forms of illegal import (Fig. 1), 52% of which were attempts, 3% suspicions and 1% a confirmed import (n=100, Fig. 2).

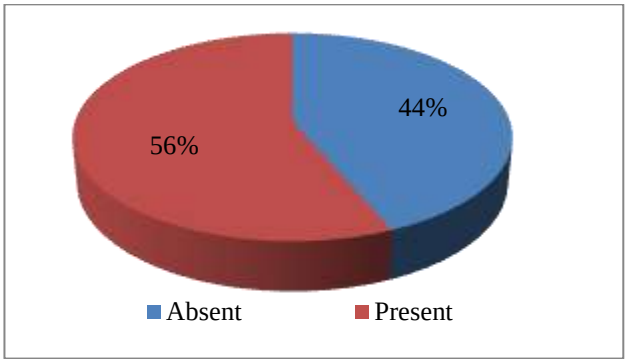

Fig. 1. Presence of illegal imports (either suspected or confirmed) in analyzed dataset (2019-2020)
Source: Statistics based on the last RASFF Report.

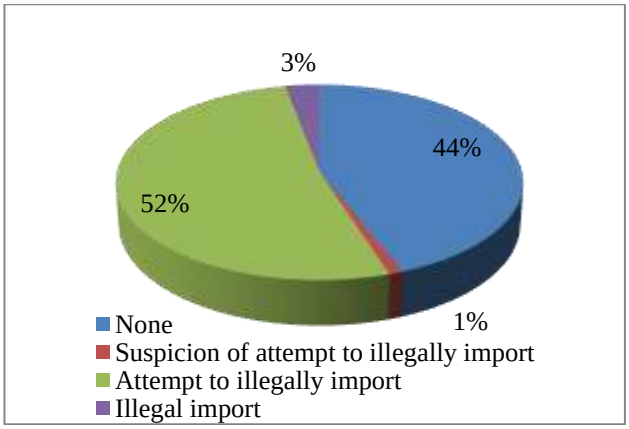

Fig. 2. Forms of illegal imports in the analyzed dataset (2019-2020)
Source: Statistics based on the last RASFF Report.

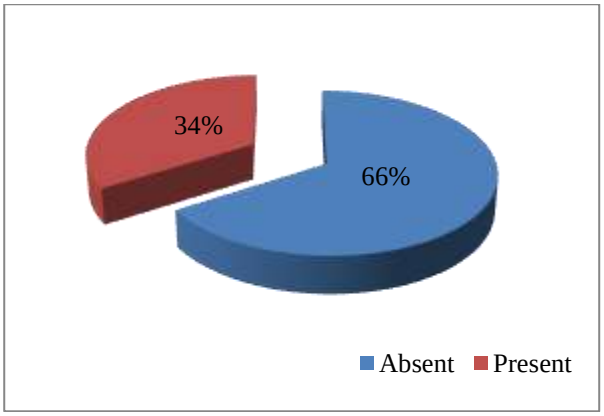

Fig. 3. Issues with health certificates in food incidents dataset (2019-2020)
Source: Statistics based on the last RASFF Report.

From the dataset, 34% of the incidents reported various issues with health certificates (Fig. 3), 1% of which concerned a fraudulent certificate, 9% were improper and 24% absent altogether (Fig. 4).
Analytical reports were found missing in 17% of the total food incidents.

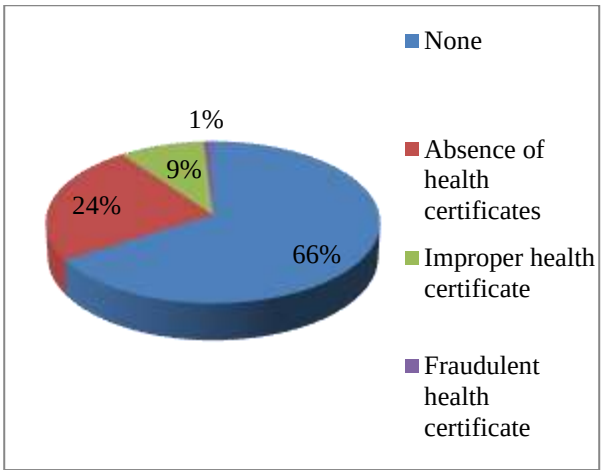

Fig. 4. Forms of issues with health certificates in the analyzed dataset (2019-2020)
Source: Statistics based on the last RASFF Report.

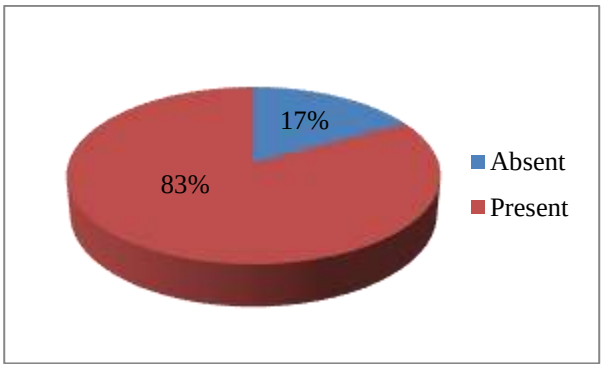

Fig. 5. Presence of the analytical reports pertaining to products
Source: Statistics based on the last RASFF Report.

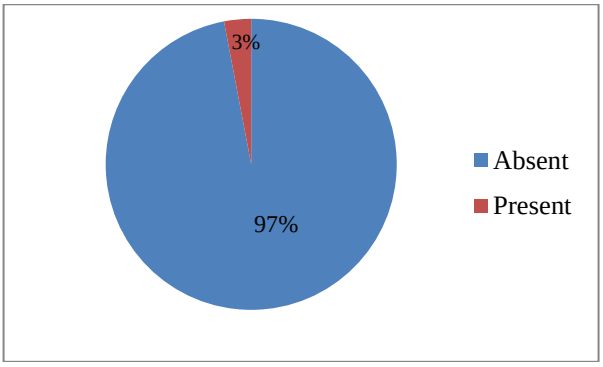

Fig. 5. Presence of food hazards
Source: Statistics based on the last RASFF Report.

Table 1. Risk decision per each food product category for all food incidents during May 2019-May 2020 in the analyzed dataset

	Risk decision			
Product category	**Undecided**	**Not serious**	**Serious**	**Total**
Cereals and bakery products	2%	5%	0	7%
Confectionery	0	1%	0	1%
Crustaceans and products thereof	0	3%	0	3%
Dietetic foods, food supplements, fortified foods	0	0	1%	1%
Fats and oils	0	7%	0	7%
Fish and fish products	0	15%	1%	16%
Fruits and vegetables	0	11%	0	11%
Herbs and spices	0	9%	0	9%
Honey and royal jelly	0	1%	0	1%
Meat and meat products (other than poultry)	0	2%	0	2%
Milk and milk products	0	0	1%	1%
Nuts, nut products and seeds	0	34%	0	34%
Other food product / mixed	0	2%	0	2%
Poultry meat and poultry meat products	0	2%	1%	3%
Prepared dishes and snacks	0	1%	0	1%
Soups, broths, sauces and condiments	0	1%	0	1%
Total	2%	94%	4%	100%

Source: Statistics based on the last RASFF Report.

Food hazards were found in 3% of all cases, were labelled as serious, and consisted of the following:
-benzo(a)pyrene (28.7 µg/kg - ppb) and polycyclic aromatic hydrocarbons (165.6, 266.1 µg/kg - ppb) in smoked poultry from

Ghana, to be imported in the UK (1%, Table 1).
-benzo(a)pyrene (62 µg/kg - ppb) and polycyclic aromatic hydrocarbons (374.6; 592.8 µg/kg - ppb) in sardines from Ghana, to be imported in the UK (1%, Table 1) [10]
-2.4-dinitrophenol (DNP- a poisonous substance usually known for its weight-loss effects) offered online for sale in the United Kingdom of Great Britain. The product's category is dietetic foods, food supplements, fortified foods (1%, Table 1).
The last serious food incident concerned the illegal import of powder milk from the United Arab Emirates to Norway (1%, Table 1).
As Table 1 outlines, 94% food incidents were considered not serious and only 4% serious – described above the Table.

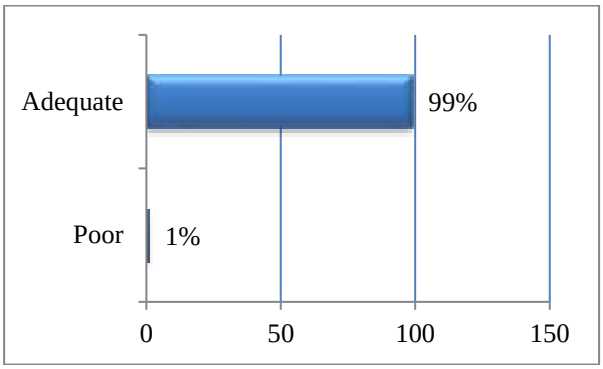

Fig. 6. The products' hygienic state
Source: Statistics based on the last RASFF Report.

The one case of a food item in a poor hygienic state concerned a product from Morocco, from the category „crustaceans and products thereof".

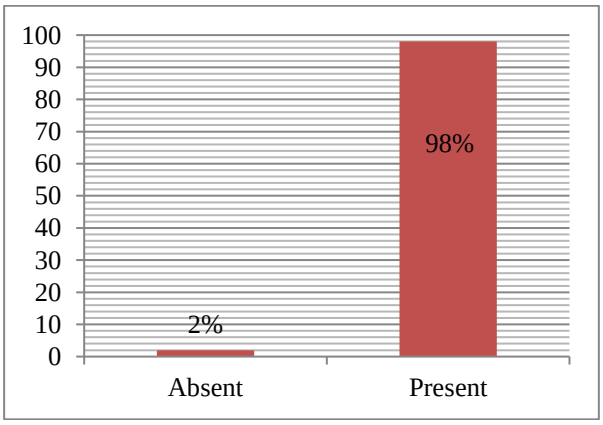

Fig. 7. Presence of health marks on the products
Source: Statistics based on the last RASFF Report.

Only 2 % of food incidents regarded products with no health mark (Fig. 7).

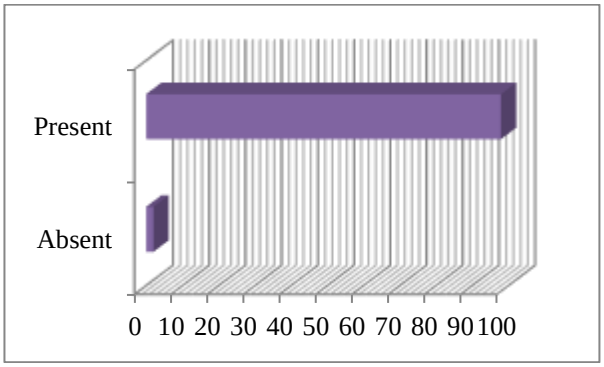

Fig. 8. The presence of the Common Entry Document
Source: Statistics based on the last RASFF Report.

The Common Entry Document was found missing only in 1 case (Fig. 8) and another case regarded an improper such document.

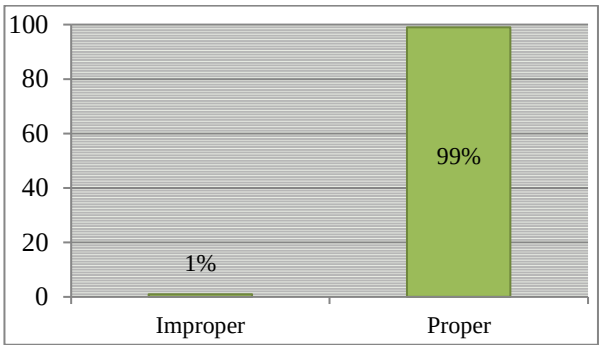

Fig.9. Properness of the Common Entry Document
Source: Statistics based on the last RASFF Report.

Animal hides were found in 6% of all food incidents (Fig. 10), 3% in the fats and oils category, and 3% in nuts, nut products and seeds. All products with animal hides originated from Ghana, were about to be imported in the United Kingdom of Great Britain and were categorized as not serious.

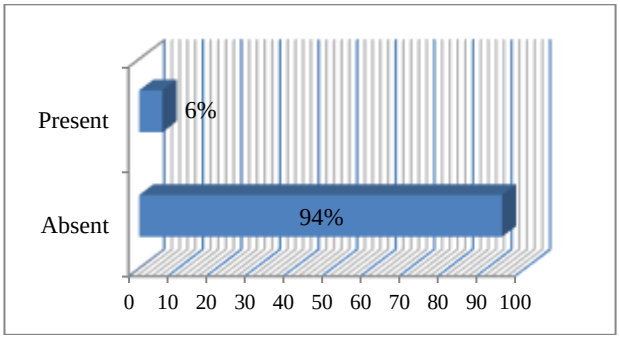

Fig. 10. Presence of animal hides
Source: Statistics based on the last RASFF Report.

Border rejection represented the main measure and classification for food incidents (96%), with Ghana (40%), India (14%) and Nigeria (12%) as most prevalent countries of import with food incidents (Table 2).

Table 2. Classification of food incidents per import country and overall, in the dataset (2019-2020

Location of import/ sale	Clasification			Total
	information for follow-up	information for attention	border rejection	
Argentina	0	0	1%	1%
China	1%	0	5%	6%
Ethiopia	0	0	1%	1%
Ghana	0	0	40%	40%
India	0	0	14%	14%
Indonesia	0	0	2%	2%
Iran	0	0	3%	3%
Morocco	0	0	1%	1%
Myanmar	0	0	2%	2%
Online	0	1%	0	1%
Pakistan	0	0	1%	1%
Philippines	0	1%	0	1%
Senegal	0	0	2%	2%
Serbia	0	0	1%	1%
Thailand	0	0	1%	1%
Turkey	0	0	7%	7%
U. Arab Emirates	0	0	1%	1%
USA	0	1%	1%	2%
none specified	0	0	1%	1%
Total	1	3%	96%	100%

Source: Statistics based on the last RASFF Report.

The product categories most frequently attempted to be sold illegally were "nuts, nut products and seeds" (27%), „fish and fish products" (13%), as well as „fruits and vegetables" (8%) with UK as the destination country (Table 3). Every each other product category could be found in 1 or 2% of the dataset, in each of the countries included in the report. The UK also represented the country with most food incidents in the analyzed period.

Summarizing, the main food incidents observed during the past year were mostly a result of illegal imports and improper or lacking documentation:

-56% of all incidents concerned forms of illegal import: 52% - attempts, 3% - suspicions, 1% - a confirmed import

-34% of the incidents reported various issues with health certificates: 24 - absent, 9 – improper, 1- fraudulent certificate

-17% of the total food incidents concerned lacking analytical reports

-2% of food incidents regarded products with no health mark

-2% of food incidents regarded issues with the Common E.ntry Document: 1 lacking, and 1 improper.

Table 3. Product categories attempted to be sold illegally in each of EU countries reported by RASFF

Product category	Countries notifying the food incidents										
	UK	*France*	*Slovenia*	*Latvia*	*Italy*	*Cyprus*	*Norway*	*Sweden*	*Poland*	*Greece*	*Spain*
cereals and bakery products	2%	1%	1%	0	0	0	0	0	3%	0	0
confectionery	1%	0	0	0	0	0	0	0	0	0	0
crustaceans and products thereof	2%	0	0	0	0	0	0	1%	0	0	0
dietetic foods, food supplements, fortified foods	1%	0	0	0	0	0	0	0	0	0	0
fats and oils	7%	0	0	0	0	0	0	0	0	0	0
fish and fish products	13%	0	0	0	1%	2%	0	0	0	0	0
fruits and vegetables	8%	1%	0	0	0	0	0	0	1%	1%	0
herbs and spices	5%	0	1%	0	2%	0	0	0	1%	0	0
honey and royal jelly	0	0	0	0	0	1%	0	0	0	0	0
meat and meat products (other than poultry)	0	0	0	0	2%	0	0	0	0	0	0
milk and milk products	0	0	0	0	0	0	1%	0	0	0	0
nuts, nut products and seeds	27%	3%	0	1%	0	0	0	0	1%	2%	0
other food product / mixed	1%	0	0	0	0	0	1%	0	0	0	0
poultry meat and poultry meat products	3%	0	0	0	0	0	0	0	0	0	0
prepared dishes and snacks	0	0	0	0	0	0	0	0	0	0	1%
soups, broths, sauces and condiments	0	0	0	0	1%	0	0	0	0	0	0
Total	70%	5%	2%	1%	6%	3%	2%	1%	6%	3%	1%

Source: Statistics based on the last RASFF Report.

Issues with the inner composition of products were found in a lesser extent, as follows:

-94% food incidents were considered not serious and only 4% serious: food hazards were found in 3% of all cases, labelled as serious

-animal hides were found in 6% of all food incidents, 3% in the fats and oils category, and 3% in nuts, nut products and seeds. All products with animal hides originated from Ghana, were about to be imported in the United Kingdom of Great Britain and were categorized as not serious.
-1 case of a food item in a poor hygienic state concerned a product from Morocco, from the category „crustaceans and products thereof".
Border rejection represented the main measure and classification for food incidents (96%), with Ghana (40%), India (14%) and Nigeria (12%) as most prevalent countries of import with food incidents.
The product categories most frequently attempted to be sold illegally were "nuts, nut products and seeds" (27%), „fish and fish products" (13%), as well as „fruits and vegetables" (8%) with UK as the destination country.

CONCLUSIONS

The results of this research indicates that products of all types were the subject of food fraud, with "nuts, nut products and seeds", „fish and fish products", "fruits and vegetables" as most visible product categories. Most food incidents concerned forms of illegal imports and improper or lacking documentation, all of which were considered not serious. Very few reports concerned serious food hazards, as well as animal hides and lacking proper hygiene conditions. Most products attempted to be sold illegally originated from Ghana, India and Nigeria and the vast majority of their destination was the UK. Border rejection represented the main measure and classification for food incidents.
What comes as striking is that only 18 countries and 1 online sale reported various attempts of food fraud. Surely, the results of this research would be different if more cases would be reported or if more online scanning of fraudulent activity would be performed. While the algorithm of country reporting to the RASFF is unknown, future studies should assess better ways for citizens to identify and flag online food fraud. This would definitely enhance the finding and sanctioning of more cases of food fraud worldwide.

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DISTRIBUTION OF DIRECT PAYMENTS IN BULGARIA - POLICY LESSONS AND PROSPECTS BEYOND 2020

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Abstract

Direct payments are an essential element of the Common Agricultural Policy Budget. Pillar I plays an important role for Bulgarian farmers` income stabilization and support. The aim of the study is to analyse the direct payments distribution in Bulgaria and on this base to formulate recommendation regarding future policy development. In the paper Lorenz curve is applied as widely used measure of inequality. The results indicate significant disparities among farmers and uneven distribution of the financial support. The allocation of aid under Pillar I leads to serious imbalances in Bulgarian agriculture. There is a substantial transformation in production and trade patterns. The new architecture of direct payments and the greater flexibility of the instrument post 2020 can address some of the existing challenges.

Key words**:** *inequality, capping, structural changes*

INTRODUCTION

The Common agricultural policy is one of the main policies in the EU. It is a subject of serious debate and consideration for the next Multiannual Financial Framework. The direct payments are one of the most discussed instruments and account for over 73% of the CAP budget [23].

In 2018, direct payments in Bulgaria are 784 million EUR, 83.5 % of which decoupled [23]. The direct aid plays an important role for income support and stabilization in the country. On the other hand, it is leading to major transformations and generates imbalances in the agricultural sector.

Changes in the CAP after 2020 draw the attention of farmers, policy makers and other stakeholders. The allocation of the financial resources and the uneven distribution are often pointed as a major issue in the European Agricultural Policy. There is a new architecture of Pillar I and proposals for convergence and better targeting. Therefore, the policy lessons from previous programming periods are important to outline Bulgarian strategic plan and implementation of the new CAP.

The aim of the study is to analyse the distribution of direct payments in Bulgaria and, on that basis, to formulate a recommendation for future policy development.

The paper is structured as follow: The study materials and methods are presented first. A review of surveys on the distribution of direct payments and their impact on farmers' income in EU Member States has also been carried out. Second, the distribution of direct payments is analysed. A comparison is made between Bulgaria and the EU-28. Third, the new architecture of Pillar I is discussed. Based on the analyses, some conclusions and recommendation are highlighted.

MATERIALS AND METHODS

Agricultural subsidies are implemented to support farmers' low and highly variable income. The main reason for legislative action is the discrepancy between the income of agricultural and non-agricultural households [35]. Ciliberti and Frascarelli [3] have stressed that the agricultural policies, rarely lead to of equal distribution of financial aid. On the other hand, there are several major reforms in the direct payments architecture in the EU to overcome these issues.

There is a number of studies that analyse the effect of the distribution of direct payments on farm income and its dimensions [3, 24, 44]. In

addition, based on a thorough literature review, Ciliberti and Frascarelli [3] have indicated that there is no clear consensus on the impact of direct payments to overcome income inequality - some studies [28, 41, 42, 43] consider that direct payments lead to a reduction in income inequality, while other authors believe that financial support increases the concentration of income [1, 4, 40].

Various reports of EU institutions [5, 8, 14, 21] also provide studies on the effects of direct payments on the EU agricultural sector. Lorenz curve and Gini coefficient are widely applied measures of inequality. The Lorenz curve illustrates income distributions as proposed by Lorenz (1905) [30]. The distribution of direct payments is analysed by using the Lorenz curve [3, 44].

Functional relation presented by Rasche et al. [38] is used in the survey to estimate Lorenz curves. The equation 1 show the explicit functional form:

$$y = [1 - (1 - x)\ \alpha]\ 1/\beta \quad (1)$$

where: $0<\alpha\leq 1$, $0<\beta\leq 1$.

The study is based on the data provided by European Commission reports and indicative figures [6, 7, 10, 11, 12, 17,18, 19, 23]. There are twelve classes of farms (x) and they have received direct payments (y). Farms that do not receive direct aid are not included in the assessment. The cumulative proportions are calculated on that base.

RESULTS AND DISCUSSIONS

Direct payments under Pillar I are important for Bulgarian farmers. After the accession to the EU, direct support accounts for a significant share of agricultural farm income (Fig. 1).

According to the European Commission, the total number of beneficiaries of the CAP income support in 2018 is 67, 890.The share of holdings receiving direct payments in Bulgaria is 33.5% compared to 60.9% in EU-28 [18]. The results indicate that the country does not benefit enough from the opportunities present by the CAP.

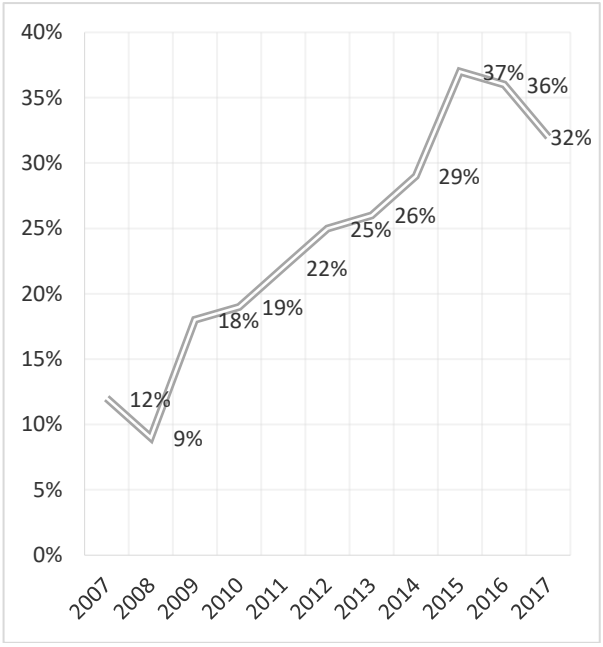

Fig. 1. Share of direct support in Bulgarian agricultural factor income (%)
Source: Own calculation based on Agri-food data portal, CAP indicators, Farming income support [20].

The lowest share of beneficiaries is in Romania (24.4%), while in Denmark, Czech Republic, Finland and Germany all registered holdings have received direct support. The results are in parallel with farm structure evolution in Bulgaria and Romania. In these countries, the share of small farms under 5 ha is significant. According to Farm Structure Survey 2016 [34], these holdings account for 82.6% of all holdings in Bulgaria and 91.8% of those in Romania.

Some of the small farms do not meet the requirements of the EU for receiving direct payments. However, these structures play an important role in Bulgarian agriculture and generate employment and income in rural areas.

According to Agri-Food portal (CAP indicators) [20], in Bulgaria the share of supported hectares in the utilized agricultural area (UAA) is 75%, which is far from EU-28 average (84%).

Based on the data, it can be concluded that the Bulgarian farms use only partially the potential of the CAP funding, and the main beneficiaries are medium and large-sized holding.

Figure 1 presents the importance of the direct payments to Bulgarian farmers. The data

shows an upward trend, with an increase of 20 percent points. Over the last two years there has been a slight decrease in the importance of direct payments. However, farmers' income in the country is highly dependent on the direct aid.

Bulgaria is not close to the EU-28 average levels (24%). It should be noted that the share of direct payments in agricultural factor income is lower than in some of the EU Member-States (Slovakia 50%, Latvia 42 %, Lithuania 41%, Sweden 39%, The Czech Republic 38%, and Finland 37%). By contrast, in Malta and The Netherland only 8% and 9%of the agricultural income is formed by direct payments.

The main conclusion based on the analysis is that not only Bulgaria, but also a significant part of the EU Member-Statesis highly depended on the direct aid. The key question is whether these holdings can be competitive and viable without the financial support of the CAP? Another important challenge is the allocation of direct payments to lower-income farms.

Figure 2 presents a comparison of the distribution of direct payments over the last 10 years. Financial years 2008, 2013, 2015, and 2018 are calendar years 2007, 2012, 2014, and 2018.

The data shows major changes in the financial support distribution in Bulgaria. The period 2008-2013 marks negative trends. Since the country's accession to the EU, structural changes have exacerbated inequality.

In 2008, 93% of the beneficiaries receive 22% of the support and only 0.2% of the holdings accumulate around 20% of the direct aid. For the period 2008-2013 the level of land concentration increased significantly [25]. In 2013, 70.46% of the holding receive only 4.57% of the support. On the other hand, 1.4% of the farms concentrate 47% of the direct payments. In the transition year 2014, which is 2015 financial year, there are positive changes. However, the distribution of direct payments in Bulgaria is still very unequal. In 2015, 63.69% of the holdings received only 4.32% of direct support. On the other hand, more than 43% of the direct payments were oriented to less than 1.3% of the farms. The difference between 2013 and 2015 is negligible, although the financial support is better distributed in medium-sized farms. The analysis of last year of the period shows several trends. The share of farms below 1,250 euro decreases to 34.78% of all holding. They receive negligible share of the support (1.93%).

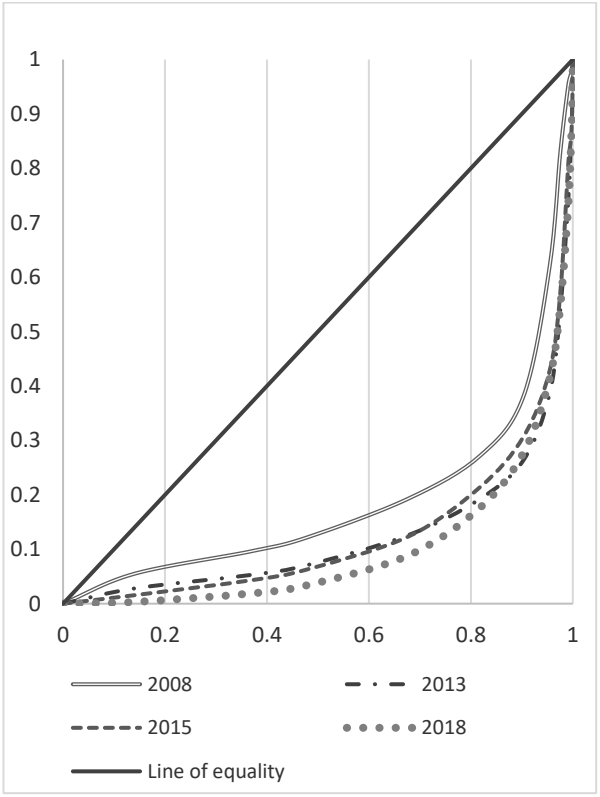

Fig. 2. Direct payments distribution in Bulgaria 2008-2018

Source: Own calculation based on European Commission [6, 7, 10, 11, 12, 17, 18, 19].

Smaller farms are disappearing and medium-sized holdings could not play important role in the number of holding and received financial support. By contrast, the large holdings continue to expand and accumulate more financial support. These are the key challenges facing the Bulgarian agricultural structure and the main reasons for the inequality and imbalance among the beneficiaries.

Figure 3 presents a comparison between Bulgaria and the EU-28 for the financial year 2018. According to European Commission [17], direct payments are EUR 41.5 billion and benefit 6.4 million farms in the European Union. The number of beneficiaries of direct payments is declining in the last two year after the increase between 2008 and 2014. The

reduction could be explained with structural adjustments in agricultural sector and the new eligibility conditions in the current programming period.

According to European Commission [17] the direct payments support is relatively constant in nominal terms which causes increase the average payment per beneficiary.

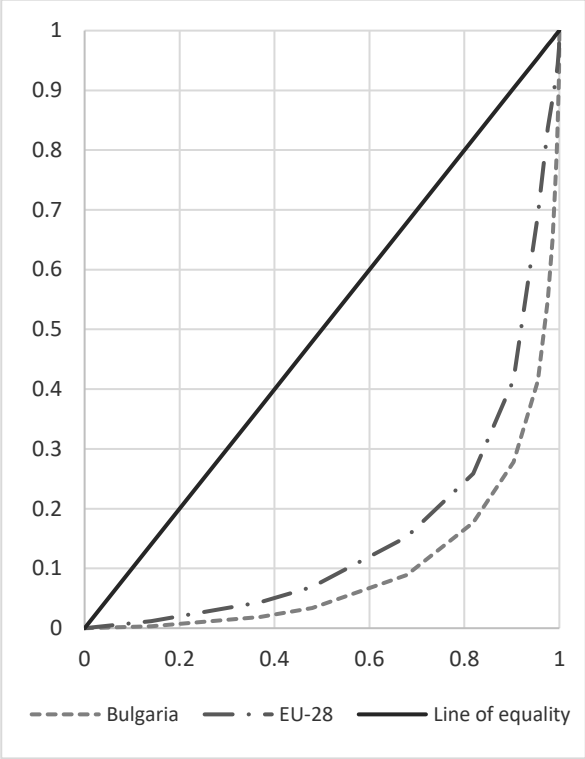

Fig. 3. Direct payments distribution in Bulgaria and EU-28, for 2018

Source: Own calculation based on [17, 18].

The Lorentz curve shows a relatively significant difference between Bulgaria and EU average. In Bulgaria almost 50% of the farms receive 4.66% of the support. On the other hand, in the EU-28, only 5% of the support is received by 43% of the beneficiaries. The highest share of support (58%) is oriented towards payments of EUR 10,000 to EUR 100,000. These holdings represent around 15% of all EU beneficiaries. For comparison, in Bulgaria these holdings are only 13% and obtain 35.42% of the funds. By contrast, 2.45% of the farms accumulate 46.58% of the envelope. In the EU-28, only 0.5% of all beneficiaries receive more than EUR 100,000 and concentrate 16% of the total direct payment envelope. This distribution represents the main difference between EU-28 and Bulgaria.

Despite the opportunities after the CAP implementation, the study shows the main challenges in Bulgarian agriculture. The farm structure in the country is characterised by unbalanced distribution and serious dominance of large holdings. By contrast, small holdings are disappearing. They struggle to ensure financial support [26].

The distribution of direct payments in the period 2007-2013 is leading to uneven orientation of financial support and the negative tendencies are continuing in the current programming period.

Although the distribution of the support is more equal in EU-28 compared to Bulgaria, it should be noted that the allocation of the financial aid is still uneven. As it is often stated, 80% of all beneficiaries receive roughly 20% of the total direct payments [17]. The distribution of the direct aid is linked to the specific nature of the support which is based on the area. This type of measures leads to overconcentration of land. The accumulation of the financial resources in large and commercial farms is object of debate by number of studies [22, 37]. The concern related to the efficiency and orientation of the support led to new measures and options in the CAP post 2013. In the period 2014-2020 there are several new instruments aimed to ensure convergence and social cohesion [9]. The new elements in the Pillar I were the reduction of payment and capping. According to Regulation 1307/2013 the reduction of payments applies only to the basic payment and the rate is set at a very low level - 5% reduction from EUR 150,000 of payment [39]. The percent of the reduction is based on the choices of the Member-States and is not optional.

European Commission [14] indicates that the reduction (including capping) in 2015 is EUR 98 Million (only 0.44% of the basic payment envelope). For 2016, the amount is even lower - EUR 79 Million or only 0.36% of the basic payment expenditure. In Hungary, which have similar farm structure to Bulgaria, is registered the highest share of reduction payment in the expenditure (6.6% - 2015 and 5.6% in 2016). In Bulgaria the share is about 1% in 2016 and

is lower than in 2015 mainly due to the increase in the basic payment envelope. The capping and reduction payment are similar (around 1% of the envelope) in Poland, The Czech Republic and Slovakia [14].

Based on the results it can be concluded that the reduction payment and capping do not lead to the expected results. The level of reduction is very low and some of the countries or regions do not implemented the measure at all. In the light of these arguments, reduction payments and capping could improve fairness of the direct payments if the measure includes higher rate or if the capping is more ambitious.

Pillar I Post 2020 - Policy lessons and prospects

According to some researchers Pillar I remains one of the most discussed and assessed instruments of the CAP, which allocates more than 70% of the budget. Several studies [2, 22, 27, 31, 37] have analysed the main challenges related to the Pillar I implementation.

In this regard, the major issues could be divided into three groups:

Income support. According to Terluin and Verhoog [45], EU support for farmers' income is unevenly distributed and misdirected - relatively high-income farmers receive higher payments. It is emphasized that this is contrary to the basic principles of support and lead to inefficient use of public resources. In addition, authors state that the direct payments cause an increase in land prices and prevents the development of young farmer's holdings.

Price variation. European Commission [15] stresses that European agriculture is facing volatile prices, natural disasters and diseases. According to the report policy reforms that aimed to increase market orientation have created opportunities for farmers from global markets, as well as made the sector more vulnerable to international shocks and market imbalances. It is mentioned also that very year, at least 20% of farmers lose more than 30% of their income compared to the average for the last three years [15].

Environment, Climate Change and Biodiversity. According to Thompson [46], the product orientation of the CAP increases productivity and competitiveness, but on the other hand causes environmental stress. In this regard, European Court of Auditors [21] points out that despite the existence of biodiversity conservation measures, the latter are not sufficiently effective and are often criticized.

The proposed Pillar I changes, regulation and implementation beyond 2020 are still under consideration. The new design of Pillar I is related to five priorities- simplification, modernization, flexibility, new model and budget respectively. There are options linked to the specific objectives like support of small farms, generation renewal, stronger retribution, eco-schemes [16].

There are several instruments aimed to equalise the direct payments distribution. The 2014-2020 voluntary redistribution payments will be compulsory for the Member States. Each country may decide the amount of the additional payments as well as the maximum applied hectares [33].

In order to overcome the imbalances in farmers` support, more serious capping is proposed. However, the deduction of labor costs questioned the effectiveness of the instrument. Although the reduction and capping are not optional, Member States play significant role in their design and implementation. Several studies [29, 36] conclude that Pillar I support plays a positive role in retaining farmers in agriculture, but postpones structural changes and viability.

The proposed capping is likely to be not effective due to the higher labor costs deduction [32]. The capping measure could have better results if the deduction is option rather than mandatory.

CONCLUSIONS

Based on the analysis some conclusions and recommendation can be drawn:

- The new CAP 2021-2027 proposals are oriented to improve targeting on several directions – greening and young farmers. On the other hand, the convergence among farmers' income support and the external converges among Member-states is lagging behind. In this regard, more ambitious capping and higher reduction payments are recommended. Redistributive payments also need to be more efficient and better targeted.

- The eco-schemes have been introduced as a new intervention, but their content, requirements and impact are still unclear to some stakeholders.
- The flexibility and subsidiarity proposed by the new CAP, as well as the short terms for developing strategic documents could have a negative impact on Bulgaria.
- The lack of serious change in the basic payments and other elements of Pillar I is a prerequisite for unequal distribution and further polarization of Bulgarian farm structure.
- The capabilities, priorities and ambitions of Bulgarian agricultural policy will determine the efficiency of the CAP implementation.
- The new model and responsibilities of the Member-States, could help Bulgarian agriculture to overcome major issues related to the direct payments and farm income distribution.

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THE COMMON AGRICULTURAL POLICY POST 2020 - FARMERS` PERCEPTION AND POLICY IMPLICATION

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Abstract

The Common agricultural policy post 2020 is still under consideration and discussion among Member-states, farmers' organizations and other stakeholders. The purpose of the survey is to analyse Bulgarian farmers' perceptions and attitudes towards the CAP and to outline the prospects for national implementation in the 2021-2027 budgetary period. The paper is based on a survey covering 74 Bulgarian farmers from all regions of the country. The study applies the comparative, historical and statistical methods of analysis. The results indicate high expectation for income stabilization and support in bigger farms, while there are some variations and negative trends in smaller holdings. The national priorities for 2014-2020 period are directed in favour of high value-added crops and livestock sector. Bulgaria also implements measures as Redistributive payments, Coupled support and Small farmers' scheme. However, the financial support allocation is not giving the expected results and the structural imbalances remains. The national policies should be revised and the implementation of the CAP post 2020 in Bulgaria should have better targeting and more equal distribution.

Key words**:** *income support, agricultural holdings, agricultural policy*

INTRODUCTION

The Common agricultural policy post 2020 is still under consideration and discussion among Member-states, farmers' organizations and other stakeholders. The CAP post 2020 is redesigned and new priorities related to innovation and green growth are addressed. The financial support under Pillar I and Pillar II is important for farmers and contributes for their income stabilization and business development. Therefore, they are affected directly by the CAP as key stakeholders, and both farmers and institutions should express their opinion on the new options and measures. The flexibly and subsidiarity are in the centre of the new programming period agenda. The better understanding of farmers' attitudes and perceptions toward the CAP framework are important for designing the national strategy and priorities [41].

The aim of the survey is to analyse Bulgarian farmers' perceptions and attitudes towards the CAP and to outline prospect for national implementation in the new budgetary period.

The study is structured as follows: First section presents the materials and methods of the survey. Second, the characteristics of the farmers and agricultural holding are observed. The study focuses on farmers` opinion on 2014-2020 period support and comparison to the expectations and perceptions for the new programming period. In the third section some opportunities for national implementation of the CAP are outlined.

MATERIALS AND METHODS

The attitudes and perceptions have long been considered as important determinants of behaviour [4]. According to Beedel and Rehman [5], the research on farmers attitudes and motivations in the past tended to be subjective, and, theoretically, imprecise. However, there are number of studies related to the topic applying Theory of Planned Behaviour [7, 12, 25, 28, 33, 37].

Drews and Van den Bergh [13] have carried out a literature review and registered many explanatory variables for policy support, among which the knowledge of correct information, both with regards to the effectiveness of the policy, and to the topic of the policy. Several of the recent studies

examine the climate and environmental aspects of CAP and reveal the importance of trust in political actors who create and enforce the policies [13, 21, 26].

Previous researches have shown that farmers are afraid of increased policy restrictions on production processes [9], or already feel restricted by agricultural policy [24]. Another issue related to the CAP is so called "administrative burden". It is observed that farmers conceive most policies as over-regulation [1, 8, 22]. Therefore, it is important to analyse farmers` expectations and perceptions in order to design the national policy. The direction of the priorities and results could affect Bulgarian agriculture and lead to various outcome and consequences.

The analysis is based on a survey conducted in the period 2018-2019 among 74 agricultural producers. The methodology is adapted to the agricultural sector following the example of [27, 34, 40]. Farmers were asked to rate statements on a scale from 1 to 5 (1 = strongly agree to 5 = strongly disagree). The importance of agriculture, is ranked from 1 to 3 (1- major occupation, 3- subsidiary occupation).

The survey is based on Regulation (EC) №1059/2003 of the European Parliament and of the Council of 26 May 2003 [32] on the establishment of a common classification of territorial units for statistics (NUTS). The study covers all NUTS2 regions of Bulgaria. However, it focuses on South Central Planning Region, where over 70% of the interviewed farmers are located. According to the Farm Structure Survey 2016 [30], South Central Region accounts for 30% of the total number of farms and 31% of the workforce in Bulgarian agriculture. Another important feature of the South-Central Planning Region is that it presents all types of crops and animals in Bulgaria. The results of the study include three main directions. The first one is related to the analysis of the characteristics of the farmers. The second is linked to the characteristics of the agricultural holding. The third direction is orientated to the financial support allocation and farmers' perceptions.

RESULTS AND DISCUSSIONS

The first direction of the analysis is linked to the farmers` characteristics. The majority of the farmers are men (71.63%). The share of women among the farm managers is relatively low and corresponds to the data on a national level. Based on the Farm Structure Survey in 2016, the registered ratio of male to female farmers is 40:60 [31]. The role of women in agriculture and rural areas of Bulgaria, although not the subject of this study, is a key topic and a challenge for the country's regional policy.

The increased potential of women in decision-making as well as overcoming stereotypes are important steps towards more balanced and sustainable regional development [36].

Descriptive statistics on the characteristics of the farmers is presented in Table 1.

Table 1. Descriptive statistics – farmers' characteristics

Indicators	Age	Education	Experience	Level of cooperation
Mean	44.27	2.32	15.58	0.19
Standard Deviation	12.87	0.47	10.91	0.39
Minimum	23.00	2.00	1.00	0.00
Maximum	73.00	3.00	50.00	1.00
Count	74.00	74.00	74.00	74.00

Source: Own survey.

The farmers in the survey are relatively young, with average age of 44 years. The oldest producer is 73 and the youngest one is 23 years old. The age structure in the country is associated with less than 14% of farmers below 40. On the other hand, more than 36% are above 65 years [29, 30]. Bulgaria has better age structure compared to EU-28 average levels [17, 20].

Many retires in the country are engaged in agricultural production, as an additional income to their pensions. In the study however, only two farmers are part of this group.

The educational structure of farmers is another major challenge for the rural development in Bulgaria. The lack of agricultural education and the high proportion of people relying on practical experience are barriers for improvement of agricultural productivity and competitiveness.

Education of the farmers in the survey is predominantly secondary, with none of them with a primary or lower education. In addition, their average agricultural experience is relatively high - over 15 years. It varies within a very wide range of a maximum of 50 and a minimum of 1 year.

On the basis of this data it can be concluded that most of the farmers have started their business activities relatively young. One of the reasons for that can be associated with the agricultural generation renewal. The latter is of crucial importance and is one of the nine objectives of CAP 2021-2027. According to some researchers, generational renewal can have a positive effect on the implementation of innovation [42].

Another characteristic is related to the level of cooperation. The data reveal low level of cooperation activities with other farmers. These results are not surprising and are similar to the trends in the level of social capital in Bulgaria [35]. The majority of the producers do not participate in cooperatives or any other agricultural associations. This characteristic is a significant challenge for Bulgarian agriculture. The lack of well-functioning producercs' organizations is an important issue for farmer's access to markets and their position in the value chain.

Based on all of the above, we can summarize that the producers in the survey are relatively young, with higher education, decent agricultural experience, and low level of cooperation.

The second direction of the study is linked to the characteristics of agricultural holdings. (Table 2).

Table 2. Descriptive statistics – farms` characteristics

	UAA, ha	Importance of agriculture	Persons working on the holding		
			Family members	Full time	Seasonal
Mean	96.49	1.76	2.64	9.36	22.27
Standard Deviation	117.06	0.76	1.99	51.19	82.21
Minimum	0.10	10.00	0.00	0.00	0.00
Maximum	900.00	3.00	10.00	430.00	500.00
Count	69	74	74	74	74

Source: Own survey.

The majority of the farms in the survey is specialized in crop production (59%), which corresponds to the structure of Bulgarian agriculture. On the other hand, over 35% of the farmers have a mixed crop and livestock specialization. The data highlights some trends of diversification in the holdings. The average size of the farms is higher compared to the average in the country [30]. The number of holdings with UAA is 69 of 74 observations.

Agriculture is of significant importance to the families in the survey. For 47% of farmers in agriculture is the only occupation, while 36% of holdings consider it as the main activity. Agriculture is an additional source of income for 13% of producers.

In terms of workforce in the farms, 2-3 family members are involved in the business. There is considerable variation in the full-time employment due to the different types of holdings. There are several companies and sole trades that have a large number of workers, which increases the average number of full-time employees.

The crop specialization in the majority of the interviewed farms and the features of Central South region associated with vegetable and fruit production can explain the observed trends of greater number seasonal workers. Therefore, there is serious variation from a maximum of 500 workers to 0 in the smaller holdings.

Based on the study 97% of the farms are market-oriented, while only 2.7% produce for their own consumption. The farmers who sell their production to markets or proceeding factories are 72%. Only 13.5% are processing their own production (mainly farms in the dairy sector and permanent crops).

The results show low level of vertical and horizontal integration in the value chain. The majority of farms do not add value in their production. The integration and diversification are important for balanced rural development [2].

The third direction of the study is related to the farmers' perceptions. It highlights the impact of the CAP support on holdings activity and individual aspects of farming.

Over 79% of the farmers in the survey receive basic payments per hectare under Pillar I. Results are not surprising due to the predominant crop specialization and greater

average size. The data show high level of support and farmers' awareness on the possibilities for financial aid.

Direct payments are crucial for Bulgarian agriculture. However, financial support has been the subject of debate not only among farmers but also among scientific and political circles. The distribution of these payments and their size by sector create imbalances in the regional development [6].

Unlike the direct payments, only 40.5% of the interviewed farmers receive financial support under Pillar II (mainly for modernization and investments in physical assets). The latter can be explained with the higher administrative burden related to the application process. There is a number of procedures and serious paperwork that require expensive consultancy services.

Farmers` opinion on the effect of the CAP support on their activities in the planning period 2014-2020 is presented in Fig. 1.

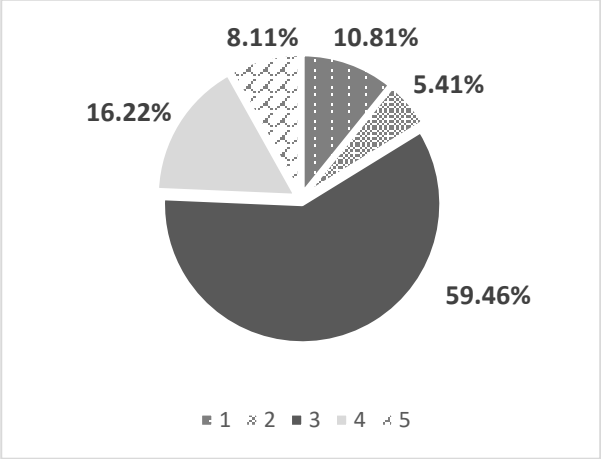

Fig. 1. Impact of the CAP support on the overall activity of agricultural holdings 2014-2020
Source: Own survey.

The data show significant differences between the producers' opinion for the current period and the expectations for the future.

In the 2014-2020 period, the majority of farmers do not see any real change in their activities. In their point of view, the financial support of the CAP has not contributed to a significant improvement in the economic results of the farms. Another interesting finding is that there is no strong negative assessment of the agricultural policy instruments.

Only 15% of interviewed farmers have experienced negative changes in their activities. On the other hand, 24% of the farmers consider that financial support had a positive impact on their activities in planning period 2014-2020.

Comparison with the expectation of farmers for the post 2020 period is made (Fig. 2).

The expectations for the new programming period are predominately positive. Fig. 2 presents different observations in farmers` opinion. More than 78% of the farmers conceive that the new programming period will have a positive impact on their business, while only 6% think that the effect will be negative.

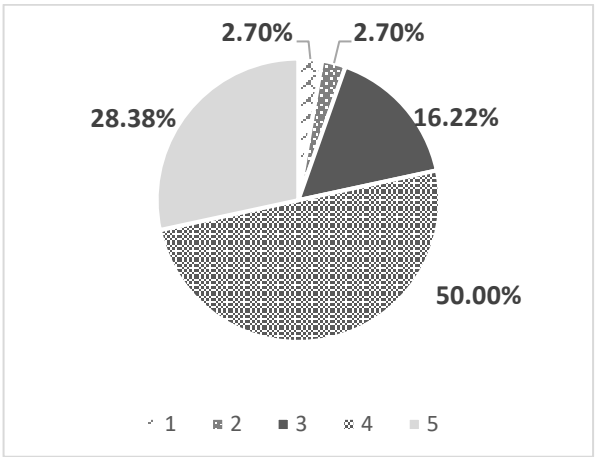

Fig. 2. Perceptions and expectation for the impact of the CAP support on the overall activity of agricultural holdings 2021-2027
Source: Own survey.

Based on the data several basic conclusions might be drawn. Firstly, the farmers do not consider that the CAP support has influenced their activities. However, they expect a positive impact during the new programming period.

Based on farm structure in the survey, larger holdings have more positive perceptions, while smaller farms are with predominantly negative views. It should be emphasized that farmers over 60 years old have negative assessment on the post 2020 CAP.

Larger structures are of the opinion that the CAP support will have greater effect on their business. On the other hand, some studies show

that the younger farmers are more positive and innovative [38, 43].

Considering the young average age structure of the farms in the survey, it is not surprising that the perceptions and the expectations are more positive.

Important aspects of the farmers' activities are observed for wider analysis of their behaviour (Table 3 and Table 4). Based on the farmers' opinion, the agricultural policy in 2014-2020 period had a positive impact on their income.

Table 3. Impact of the CAP support 2014-2020 (%)

Indicators	Strongly positive	Positive	No changes	Negative	Strongly negative
Impact on income	13.51	40.54	25.68	10.81	9.46
Impact on investments	13.51	25.68	36.49	13.51	10.81
Impact on employment	10.81	45.95	31.08	6.76	5.41

Source: Own survey.

On the other hand, farmers do not consider that changes in the policy stimulate the investment activities. However, it should be noted that there are not significant negative comments.

In regards to the employment the results are more positive. Nearly 46% of the farmers in the survey increased the number of employees in their holdings. The survey is not directed to a specific group of employees (family workers, full-time or seasonal workers). The results, however correspond with the high number of full-time and seasonal workers in the surveyed holdings.

Table 4. Perceptions and expectation for the impact of the CAP support 2021-2027 (%)

Indicators	Strongly positive	Positive	No changes	Negative	Strongly negative
Impact on income	31.08	48.65	14.86	2.70	2.70
Impact on investments	20.27	47.30	24.32	5.41	2.70
Impact on employment	10.81	45.95	31.08	6.76	5.41

Source: Own survey.

Based on the results, it can be concluded that the CAP support in 2014-2020 period has mainly positive impact on all aspects of farmers` activity except the investments. The findings are in parallel with national tendencies [3].

The lack of investments and innovations, is hindering the development in precision agriculture, and therefore is one of the major challenges for Bulgarian agriculture.

By contrast, farmers expectation for the post 2020 period related to the investment activities are more optimistic. They anticipate to adopt new technologies and to improve their production potential.

In terms of employment, the expectations of farmers for the new programming period vary. The lack of skilled workers and the challenging demographic situation are issues for Bulgarian farmers.

The expectations of the farmers in the survey for the new programming period post 2020 are generally positive. However, these results are surprising. Based on different studies in Bulgaria related to the attitudes in the country [19], Bulgarians are less likely to have positive assessments.

In the present study related to the farmers` perceptions there is not a negativism or overwhelmingly positive evaluations.

The observed trends can be explained with the younger age structure, as well as the higher level of education of the surveyed farmers.

On the other hand, several studies [6] pointed out that the implementation of the CAP in Bulgaria led to transformation and sectorial and structural changes. The allocation of direct payment caused serious imbalances and polarization in Bulgarian agriculture. The financial support under the CAP could not help the sector to overcome major challenges as misbalances among farmers and sectors [23].

Policy implication and implementation of CAP Post 2020

Based on the survey some conclusions can be highlighted and some policy lessons outlined. First, the CAP financial support is very important for Bulgarian farmers. The majority of the surveyed holdings receive direct support under Pillar I. On the other hand, less than 50% of the interviewed farms benefit from Pillar II measures. It can be concluded that the rural development program is associated with more procedures and requirements. These difficulties lead to limited access and greater

administrative burden. The requirement to plan the rural development expenditure in order to achieve the identified priorities, although generally considered positive, has been criticized as insufficiently focused on results [18].

The application of the direct payments is easier for the farmers. However, this type of support is area-based. Therefore, it is concentrated in larger structures specialized in extensive crops. The direct payments are also unequally distributed among farmers and sectors and ineffectively targeted. In 2016 in the EU-28, 81% of farmers received 20% of direct payments. About 75% of farmers receive up to € 5,000, while about 16,000 farmers (0.2%) receive funding in excess of € 150,000 [14, 15]. The income support is progressive - farmers with high income receive higher payments, which do not correspond with the basic principles of the CAP [39].

By contrast, farmers do not use the full potential of the main interventions under Pillar II. The Rural Development Program can help to overcome some of the challenges in Bulgarian agriculture. According to Copus et al. [10] rural policy instruments have broader scope and potential that affects socio-economic development and opportunities in rural areas. Some authors consider that the Regulation under Pillar II does not address the challenges in the rural areas of the new Member States [24]. OECD report has highlighted the necessity of progress in various aspects that can increase the contribution of rural areas to national growth [31].

Other main conclusion is related to the investment activities and innovations. Based on the farmers` opinion the CAP support is not orientated to investments and modernization. The results are in parallel with some other surveys [11] which indicate that negligible share of the support in directed to investment support. The new CAP after 2020 could address some of these challenges and the proposal of the European Commission include few major directions: (1) Simplification (2) Modernisation of CAP (3) New budget and new model. The main features of the new model are subsidiarity and the adaptation based on the local conditions and needs [16].

CONCLUSIONS

The new CAP post 2020 has more flexibility and Bulgaria should benefit from the new opportunities and overcome some of the issues and imbalances. The study implies several basic recommendations for the implementation of national policy:

-In order to increase the effectiveness of a policy, it must be more focused.

- Several questions arise in connection with the Commission proposal for a Pillar II budget reduction. The relative burden of RDPs within the budget can be increased by transferring funds from the Pillar I. With regards to priorities like fostering sustainability and promoting the long-term viability, it is not logical to reduce the Pillar II budget. Options for transferring funds between the Pillars are voluntary and object of serious debate. However, if Bulgaria chooses to strengthen the support under Pillar II, the rules and procedures for farmers' participation need to be seriously revised and simplified.

- Other challenges of particular importance to Bulgaria are knowledge transfer, innovation and cooperation, as well as LEADER (CLLD) activities. The latter should be of particular interest, as they are essential for raising the level of social capital at local and national level, and consequently, for accelerating the processes of achieving sustainable rural development. In the new programming period, the CAP opportunities vary considerably. In order to achieve balanced and sustainable development of the Bulgarian agricultural sector, the role of direct payments should be reduced. Secondly, the RDP funding should be effectively directed to each region based on its characteristics. Third, the investments, research and innovation should be prioritized.

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TRAINING NEEDS IN SOCIAL ENTREPRENEURSHIP: MEASURES AND EXPERIENCE OF BULGARIA

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Abstract

The social economy model is one of the key tools for achieving socially significant goals within the frames of a sustainable and including growth. The social entrepreneurship and social economy, as concepts, allow the creation of alternative models for conducting business. They are market-oriented and at the same time integrate all of the free market participants - employees, employers, investors, consumers and others. Social enterprises have a key role in regeneration and economic development and in the promotion of social inclusion. The aim of this article is to explore the training needs in social entrepreneurship: measures and experience of Bulgaria and skills and qualifications of business advisors to provide the necessary consulting services to social intermediaries and social enterprises. The results of a pilot study under the Erasmus+ project "Social enterprise skills for business advisors" are used. The collection of the primary data included a questionnaire survey to collect information and data by using a face-to-face interview. 104 representatives of different types of organizations from the South Central Region, administrative district of Plovdiv were interviewed.

Key words**:** *social entrepreneurship, social enterprise, development*

INTRODUCTION

The social economy model is one of the key tools for achieving socially significant goals within the frames of a sustainable and including growth. The social entrepreneurship and social economy, as concepts, allow the creation of alternative models for conducting business. They are market-oriented and at the same time integrate all of the free market participants - employees, employers, investors, consumers and others.

Social entrepreneurship is one of the most innovative ways to achieve a better quality of life, independence and inclusion in society of persons from vulnerable groups. Need to be taken key legislative changes in order set in strategic and political national documents measures to become real mechanisms to support social entrepreneurship in Bulgaria, as well as the successful development of social enterprises, requires the creation of sustainable partnerships between business, NGOs and the public sector - partnerships in which each of these actors recognizes its role to achieve socially important objectives and is willing to invest resources in that [1].

Bulgaria develops various forms of social entrepreneurship - social enterprises, non-governmental organizations, cooperatives, business consultant organizations and others. The country has developed a legal framework containing several important strategic documents, such as the Law on Enterprises for the Social and Solidarity Economy. A National Concept for the Development of the Social Economy by 2019 has been developed. The concept is fully geared to achieving the Europe 2020 goals - a strategy for smart, sustainable and inclusive growth that offers a vision for the social market economy of Europe for the 21st century.

MATERIALS AND METHODS

The methodology of the research is based on is based on analyses of existing regulations, strategic documents and analysis of the development of social entrepreneurship in Bulgaria.

The results of a pilot study under the Erasmus+ project "Social enterprise skills for business advisors" are used. The collection of the primary data included a questionnaire survey

to collect information and data by using a face-to-face interview. 104 representatives of different types of organizations from the South Central Region, administrative district of Plovdiv were interviewed. The survey included representatives of small and medium-sized enterprises, social enterprises, training and non-governmental organizations which support social entrepreneurs or provide consultancy services on the following issues:
(1)Types of organizations providing consulting to social entrepreneurs
(2)Business advisory offered to social entrepreneurs
(3)Supporting frame for social entrepreneurship start up
(4)Social entrepreneurs needs for advisory.

RESULTS AND DISCUSSIONS

For the conditions in Bulgaria the investment in social entrepreneurship may become a key factor in providing employment and development of entrepreneurial initiatives leading to sustainable development [2].
Tools to promote employment are creating programs and measures are developed and implemented in compliance with the requirements of the Law on Employment Promotion and regulations for its implementation. The financing of active policies to promote employment becomes annually by the State Budget Act. Every year it prepares a National Action Plan for Employment, taken by the Cabinet of the Minister of Labour and Social Policy. In the national plan shall specify the programs that will be implemented during the year, the target groups that will be targeted priority active employment policy during the planning year, and bet size of financial subsidies that will benefit employers involved in measures and programs employment promotion [5].
Financial incentives to promote employment
As intended the funds to be provided for the implementation of programs and measures for employment are shared among employers, unemployed and training organizations. Incentives and preferences for employers in several directions in order Task Force recruitment of young long-term unemployed, people with disabilities, war invalids, single parents and other vulnerable groups, education and vocational training for newly recruited people to develop entrepreneurship of unemployed persons [8].
Each year National Action Plan for Employment determine the size of the funds allocated for implementation of programs and measures to promote employment. The modalities and criteria for the use of incentives to implement incentives are determined by the implementing regulation of the law.
The law and regulations provide the general framework of the regime for the use of preferences. In the individual programs may provide for additional conditions and requirements for the candidates employers.
The funds are provided based on the contract between the territorial division of the Employment Agency and employers, the contract must specify the type of program or measure to promote employment [7].
Survey of social enterprises in Bulgaria started in 2013 and has an annual periodicity.
The research is all non-financial corporations and non-profit organizations in the country that have developed activities during the reporting year. The main source of information are the annual accounts of non-financial enterprises, compiling and compiling balance sheet and annual report of the non-profit enterprises [7]. (Fig.1).

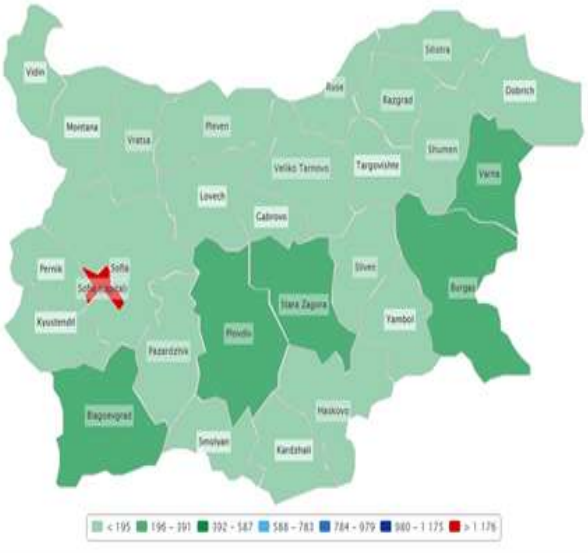

Fig.1. Survey of social enterprises in Bulgaria
Source: National Database of MLSP for social enterprises in Bulgaria - NSI, 2012 [5].

Training in social entrepreneurship

Training in social entrepreneurship are available in varying degrees in the formal education system according to curricula developed for different levels and educational levels - primary, secondary, vocational and tertiary education. Vocational training centers, vocational colleges and organizations operating in the field of trainings provide much greater options and flexibility by conducting informal training.

Priorities of the National Strategy for lifelong learning are (National Strategy for lifelong learning - 2014-2020) [6]:

-A step towards a new educational approach and innovation in education and training;

-Improving the quality of education and training;

-Provide educational environment for equal access to lifelong learning for active social inclusion and active citizenship;

-Promotion of education and training to meet the needs of the economy and changes in the labor market [4].

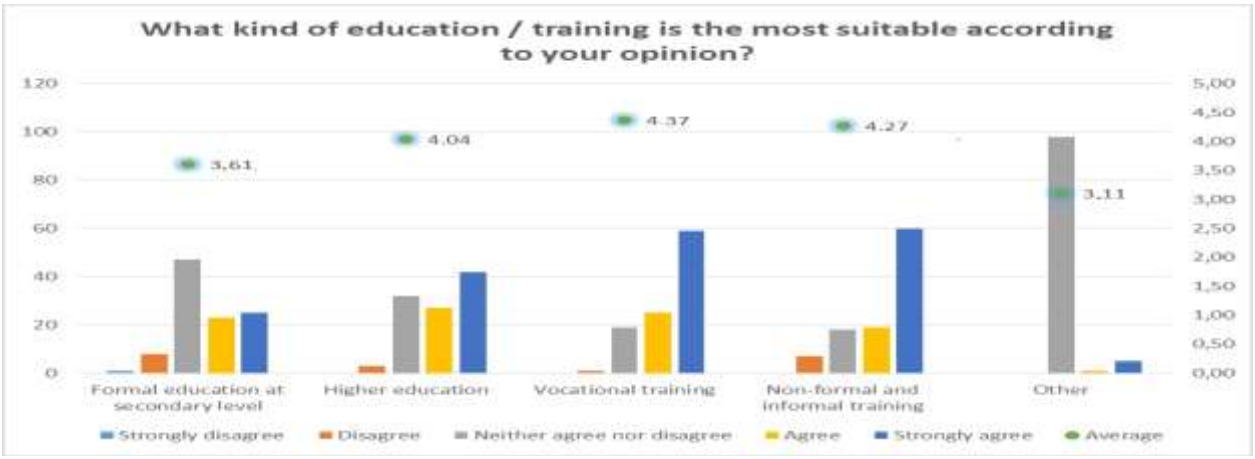

Fig. 2. Needs of training in social entrepreneurship
Source: Own calculation.

All areas of impact support the acquisition and continued development of nine key competences for lifelong learning in a single process: communication skills in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning skills; social and civic competences; initiative and entrepreneurship; cultural awareness and expression through creativity; skills to support sustainability and a healthy lifestyle [7].

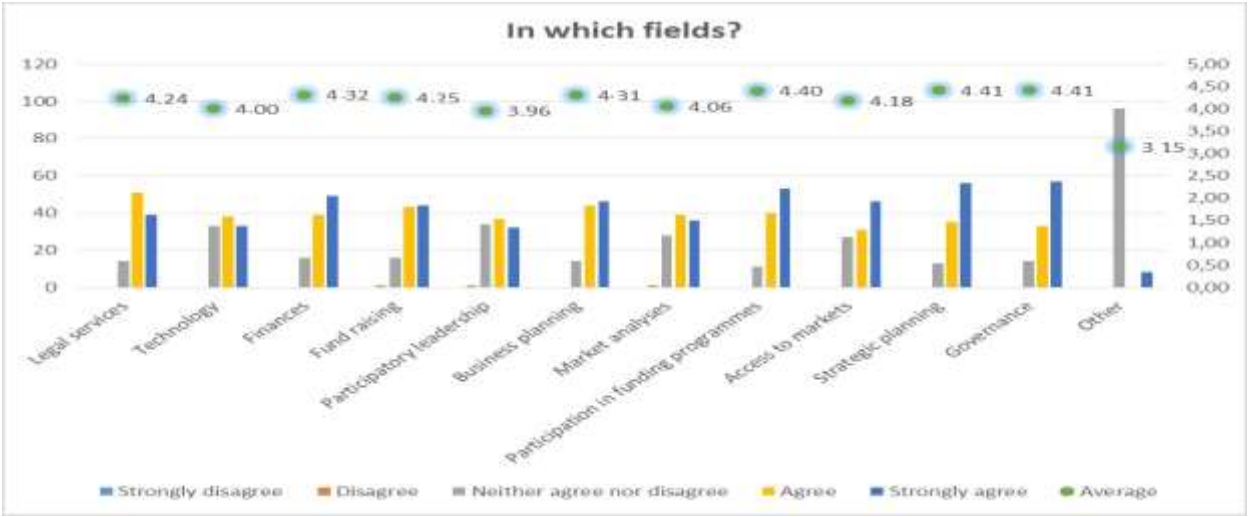

Fig. 3. Fields of training in social entrepreneurship
Source: Own calculation.

Although the importance of entrepreneurship is mentioned in a number of programmatic and strategic documents concerning training and education, extracting data on the opportunities provided is very difficult to achieve, not to mention the results achieved (Fig. 4).

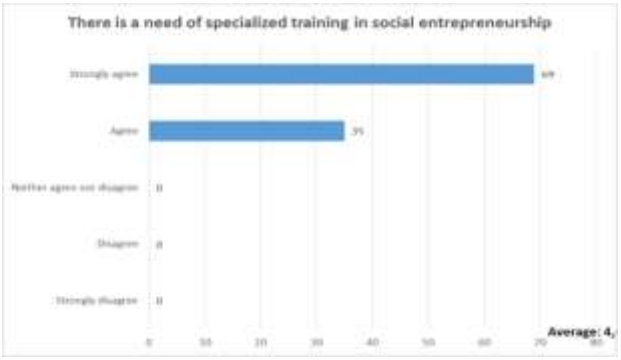

Fig. 4. Need of specialized training in social entrepreneurship
Source: Own calculation.

However, it is a fact that more and more projects and programs are oriented towards entrepreneurship, in particular social entrepreneurship as a particular focus, and include training of target groups as a compulsory component, for example: social entrepreneurship program for non-profit organizations of the Bulgarian Center for Not-for-Profit Law (Fig. 2). In addition, the research set out the role of advisors in the training of employees in social enterprises, the realization of contacts and lasting relationships with social partners as well as the opportunities for development of social activities and communication [3]. The main content of the training is to understand the role of the business advisor in identifying the opportunities for improvement of services for social enterprises, development of professional networks in the field of social entrepreneurship. This will contribute to a better understanding of the expectations of social enterprises and will decide how these expectations need to be met [9].

CONCLUSIONS

Social enterprises have a key role in regeneration and economic development and in the promotion of social inclusion. The main conclusions are related to the fact that social enterprises have the capacity to become one of the most reliable partners of the central and/or local authorities to tackle the social sphere and to promote inclusion into society of persons of different vulnerable groups.

As a major opportunity for the development of the social economy sector in Bulgaria can be defined the need to promote the social added value of the products of social enterprises.

The challenge for Bulgaria regarding the training needs in social entrepreneurship can be formulated as follows:

•Broad understanding of the social enterprise

Bulgaria at that time has a broad legal framework, or rather lack of explicit one, and this allows free self-determination. At the same time, it should be noted that the broad criteria for the definition does not offer a real opportunity for encouraging policy oriented towards concrete results.

•Need for sectoral reforms

Social enterprises operate in Bulgaria and developed traditionally as a means of providing employment and in the fields of education, social services and in rare cases, education, health and culture.

•Prioritizing a target group.

Social enterprises need mainly support and advice provided by well-trained practicing business advisors who possess the necessary key skills, qualifications and competencies to provide quality advice for the development of social enterprises.

Specialized trainings in social entrepreneurship and consultancy tools provided to business advisors should be oriented towards the acquisition of knowledge, skills and competencies in the field of management and communication, with a special emphasis on social entrepreneurship and social innovation.

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STUDY ON THE INFLUENCE OF LONG-TERM MONOCULTURE AND OF THREE TYPES OF CROP ROTATIONS ON WHEAT YIELD IN BURNAS PLAIN (ROMANIA)

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Abstract

In sylvo-steppe conditions, on a leached chernozem with around 3.5% humus, 10 years experiments (2005-2014) were carried out on the yield of Josef premium wheat variety in monoculture (W-W-W-W), in crop rotation with two plants (W-W-M-M), in crop rotation with four different plants, but without ameliorative plant (W-R-M-SF) and crop rotation with peas as an ameliorative plant (P-W-R-W). After 10 years, wheat monoculture reduced production by 22 q/ha, i.e. 35% compared to the starting year. In the W-W-M-M crop rotation system, the yield loss was reduced by half (18.6%), while in the case of W-R-M-SF, wheat production remained constant throughout the entire experimentation period. The crop rotation system with peas (P-W-R-W) brought a very significant harvest increase after 10 years – 8.58 q/ha (12.1%). It is especially recommended the crop rotation system with the ameliorative plant, which obtains the highest yield (70.38 q/ha), followed by the one with different plants, which doesn't reduce the production, but doesn't raise it either. Under no circumstances, wheat monoculture mustn't exceed 2-3 years.

Key words**:** *wheat, monoculture, crop rotation system, yield, Burnas Plain*

INTRODUCTION

The papers presented at the Global Forum on Food and Agriculture 2020, held in Berlin (January 16-18, 2020), have debated a perpetual problem, that of ensuring food safety and security under sustainable conditions for all inhabitants of the planet (Berca, 2020) [2]. The goal is noble, but difficult to achieve as long as over 800 million people die of hunger each year and over one billion are overweight (FAO, 2019) [6], causing huge costs to the planet. A third billion inhabitants of the planet suffer from chronic hunger. Under such conditions, the World Health Organization (WHO), the European Union, but also other institutions believe that any innovations, any solutions that bring quantity and quality enhancements to the main food products will be taken over by the international heritage of science.

Modern agricultural science has created an agriculture very close to the goals of sustainability, but this is not the case all over the world. In many agricultural areas, the technologies still have large gaps, which influence both the quantity and the quality of yields, as well as the quality of the environment. A deficient factor of agricultural technologies that is still practiced due to the conjuncture of the agricultural product markets is monoculture and rotation, that is, isolation (Strauss, 2017) [15]. Monoculture, especially in cereals, had been developed in the decades 6-7 of the last century, when by obtaining and using large quantities of fertilizers (especially with nitrogen) and pesticides it was thought that the negative effects could be blurred, especially to wheat (Berca and Horoiaș, 2019) [1].

Research and observations in the field have shown that after 3-4 years of monoculture, the obtained yields dropped out almost exponentially, the losses over a period of 10 years reaching about 40% in Romania (Ionescu-Șișești and Staicu, 1958; Staicu,

1969; Sin, 2007; Popescu, 2017 and others) [9, 14, 13, 11], as well as in many other countries (Boguslawski, 1981; Charles et al., 2011; Christen, 2001; Félix, 2015; Hennessy, 2006; Marais et al., 2012; Schneider et al., 2010; Wahbi et al., 2016; Zimmer et al., 2016, etc.) [3, 4, 5, 7, 8, 10, 12, 16, 17].

The presented results intended to demonstrate how a relatively new wheat variety (Josef), a premium one, reacts under 10-year monoculture conditions, compared with three crop rotations of 4 years each, consisting of 2, 3 or 4 crops. The research aims to cover an information gap for the specialists, who continue to excessively use wheat monoculture, but also to highlight the role of the improving plants (peas) in increasing the yield level and the quality of the environment.

MATERIALS AND METHODS

The researches were carried out in the east of the Burnas Plain, on a chernozem type soil with 3.3-3.5% humus (medium to normal supply) and on a loam-clay texture.

A field experience has been organized under yield conditions on plots of 24 x 200 m, in order to work with production equipment. The dimensions of the plots were 24 x 200 m = 4,800 sqm. Observations and harvests have been made on 100 sqm plots obtained randomly, by cutting from the large plot, in 4 repetitions. The harvesting has been done with a special mini-combine for experimental plots. The experimental variants have been the following:

(1)Wheat monoculture for 10 years (autumn 2004 - autumn 2013);

(2)Wheat - wheat - maize - maize (W-W-M-M) crop rotation system;

(3)Wheat - rapeseed - maize - sunflower (W-R-M-SF) crop rotation system;

(4)Peas - wheat - rapeseed - wheat (P-W-R-W) - with the ameliorative plant interspersed between the wheat crops.

The soil works and the preparation of the germinal bed have been carried out according to the farm technology.

All variants have been evenly fertilized, with $N_{100}P_{70}K_{40}$, phosphorus and potassium being applied in the autumn, before sowing. Nitrogen has been applied 20% in autumn and the rest in two stages in spring-summer. The treatments performed have been those specific to the farm for weeds, as well as for diseases and pests. Harvesting has been done at 13% humidity. The analysis of variance, regressions and correlations in 2D and 3D has been used. The results have been interpreted in the form of tables and graphs.

RESULTS AND DISCUSSIONS

The climatic zone corresponds to a modified sylvo-steppe, characterized by the following parameters for the period 1997-2006:

- the average annual temperature, which was 11.65°C;
- the average annual rainfall, which were 549 mm.

For the years of experimentation, the climatic parameters are presented in Figure 1 and Figure 2. In Figure 1 is shown the evolution of the average monthly temperatures for the 10 agricultural years of the study, including the scheme with the evolution of the heat regime, expressed through the annual averages. It turns out that the warmest year have been 2006-2007, with an average of almost 14°C, followed by 2012-2013, 2013-2014, 2011-2012 and 2008-2009, with average temperatures around 12°C, higher than the multiannual standard average. Less warm years have been 2010-2011 and 2005-2006, slightly below average.

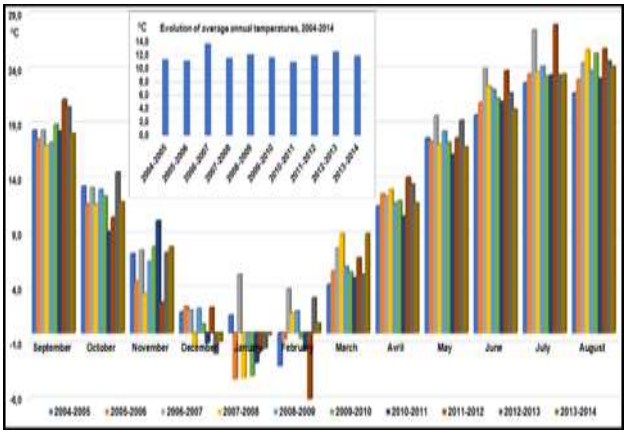

Fig. 1. Graphs of the evolution of monthly and annual temperatures for the period 2004-2014 (Alexandria area) Source: own data.

The warmest month was July, especially in 2011-2012 and 2006-2007, when the average monthly temperatures approached 28-29°C, followed by August and June. January was the coldest, but extremely cold was February 2011-2012 (-6.1°C). September, as the month before sowing, was warm and dry during almost all the years of experimentation, except for 2011-2012 and 2012-2013.

The rainiest months of the analyzed period were July 2013, September and May 2005 (with values between 160 and 225 mm). On the other hand, there were months when the rains were almost completely absent. As annual amounts, the rainiest year was 2004-2005, with over 900 mm of rainfall, followed by 2010-2011, 2013-2014 and 2005-2006, with 650-680 mm each (Figure 2). Very dry, with precipitation below 400 mm, were the years 2011-2012 and 2006-2007. Drought was also 2012-2013, with about 460 mm of rainfall.

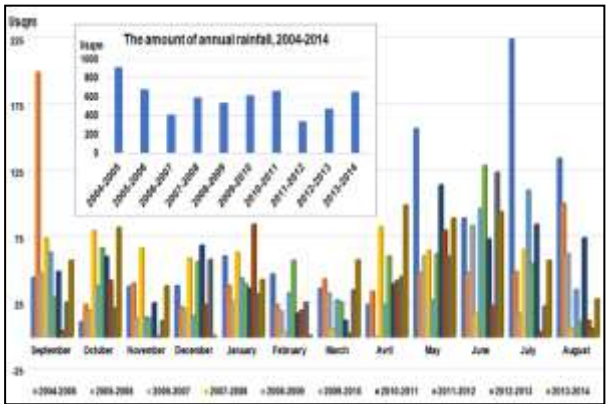

Fig. 2. Graphs of the evolution of monthly and annual rainfall for the period 2004-2014 (Alexandria area)
Source: own data.

This analysis shows us that for the wheat crop, of the Josef variety in particular, the climatic conditions were favourable to the culture, there being favourable trade-offs between the autumn and the spring-summer months, which allowed a good vegetation of the culture, without shock-like stresses.

The evolution of yields during the 10 years, according to the four suns, is shown in Fig. 3. We emphasize that in the first year of measurements all the production starts at 61.8 q/ha. In monoculture, during the first 3 years, we do not see significant decreases in production. Starting with year 4, production decreases progressively and very significantly, from –7.22 q/ha (year 5), to –21,7 q/ha (year 10). During the whole experimental period we have a loss of 35% compared to the starting year (the red line in the graph in Fig. 3).

In the second crop rotation system (W-W-M-M) there are losses, but they are insignificant. In the 5th year we have a significant decrease, so that a year later it will be three times higher, i.e. very significant. In the last year of research, the loss reaches 12 q/ha, more than half compared to monoculture (about –19%).

In the third crop rotation system (W-R-M-SF), made up of different crops, but without an improvement plant, the yield variation is smaller. It manifests itself within the limits of the errors, a very significant negative deviation registering in the 6th year (–5.7 q/ha = 10%). We can say that this is a constant crop rotation, which maintains the yield durability throughout the studied decade.

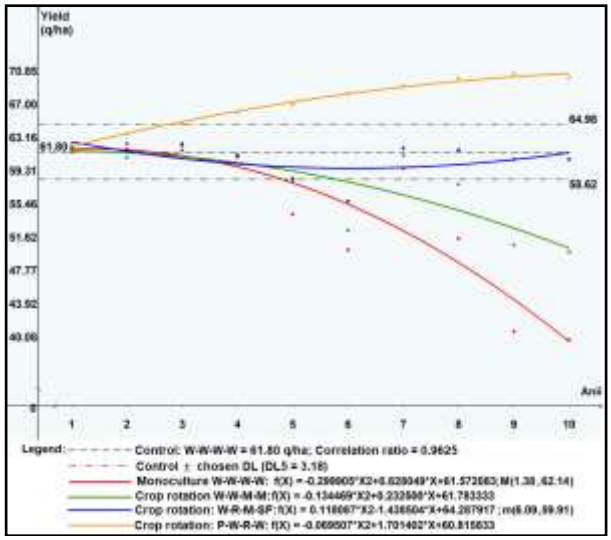

Fig. 3. Evolution of Josef wheat variety yields according to monoculture and three crop rotation systems, over a period of 10 years (2005-2014)
Source: own data.

The fourth crop rotation system (P-W-R-W), which include a leguminous crop, an ameliorative one, represented by peas, has been offered the best crop structure, the yields being ordered in continuous growth, from significantly positive in the 3rd year (+5.3%) to very significant over the last three years, with increases of 8.5-9.0 q/ha, i.e. over 12%. It is the ideal variant recommended for agricultural practice in the area (yellow line in Fig. 3).

The synthesis Table 1 it presents the basis of the functions showed in Fig. 3, which are

assured by a correlation ratio of R = 0.9625 (very significant) and, consequently, are reproducible for every situation.

Table 1. Josef variety yields in four crop rotation systems, in our study (2005-2014)

Crop rotation	Years	Average yields (q/ha)	Control ratio (%)	Control difference (q/ha)	Sign
W-W-W-W	2005	61.80	100.00	–	Martor
	2006	62.75	101.54	0.95	
	2007	62.00	100.32	0.20	
	2008	61.48	99.47	-0.32	
	2009	54.58	88.31	-7.22	o o o
	2010	50.45	81.63	-11.34	o o o
	2011	59.90	96.93	-1.89	
	2012	51.75	83.74	-10.04	o o o
	2013	41.02	66.38	-20.77	o o o
	2014	40.08	64.85	**-21.72**	o o o
W-W-M-M	2005	61.98	100.28	0.18	
	2006	61.15	98.95	-0.65	
	2007	62.80	101.62	1.00	
	2008	61.17	98.99	-0.62	
	2009	58.40	94.50	-3.39	o
	2010	52.70	85.28	-9.09	o o o
	2011	61.38	99.31	-0.42	
	2012	58.05	93.93	-3.75	o
	2013	51.03	82.56	-10.77	o o o
	2014	50.20	81.23	**-11.59**	o o o
W-R-M-SF	2005	62.33	100.85	0.53	
	2006	62.08	100.44	0.28	
	2007	62.58	101.25	0.78	
	2008	61.30	99.19	-0.50	
	2009	58.72	95.02	-3.07	
	2010	56.10	90.78	-5.70	o o o
	2011	62.23	100.69	0.43	
	2012	62.02	100.36	0.23	
	2013	60.92	98.58	-0.87	
	2014	60.95	98.62	-0.84	
P-W-R-W	2005	62.75	101.54	0.95	
	2006	63.85	103.32	2.05	
	2007	65.07	105.30	3.27	*
	2008	66.38	107.40	4.58	* *
	2009	67.27	108.86	5.47	* * *
	2010	68.63	111.04	6.83	* * *
	2011	69.45	112.38	7.65	* * *
	2012	70.35	113.83	8.55	* * *
	2013	70.85	114.64	9.05	* * *
	2014	70.38	113.88	8.58	* * *
DL5% = 3.18		DL1% = 4.20		DL0,1% = 5.41	

Source: own data.

In relation to the yields average obtained in these ten years, the behavioral top is presented in Table 2. It clearly indicates the priority in which their use in the local agricultural production would be necessary. The respective data can also be found in Fig. 4.

Table 2. Crop rotations behaviors (average for 10 years) in our experience in Teleorman County (2005-2014)

Crop rotation	Average yields (q/ha)	Control ratio (%)	Control difference (q/ha)	Sign
W-W-W-W	54,58	100,00	–	Martor
W-W-M-M	57,88	106,06	3,30	* *
W-R-M-SF	60,92	111,62	6,34	* * *
P-W-R-W	67,50	123,67	12,92	* * *
			DL5% = 2,23	
			DL1% = 2,94	
			DL0,1% = 3,79	

Source: own data.

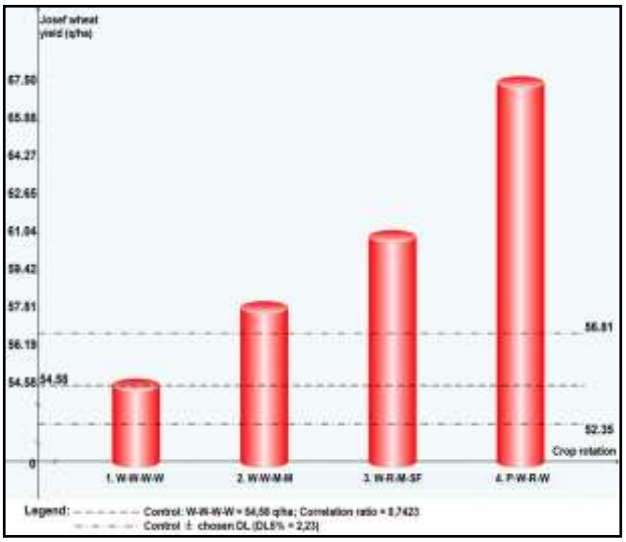

Fig. 4. Crop rotations top (average for 10 years) in the research from Teleorman County (2005-2014)
Source: own data.

The behavioral function of Josef wheat yield in relation to the crop rotation system and the years of experimentation is represented in 3D in Fig. 5. It is confirmed by a correlation ratio close to the determination, being a complex polynomial function. The largest productions are obtained, after 10 years, with the fourth crop rotation system (P-W-R-W), and the smallest ones with monoculture, almost from single to double.

Numerous researches carried out all over the world show that wheat monoculture brings significant losses everywhere. The losses can't be compensated by chemical or even organic fertilizers (see the results in the literature). The causes are various, some of them being studied in our own experiences.

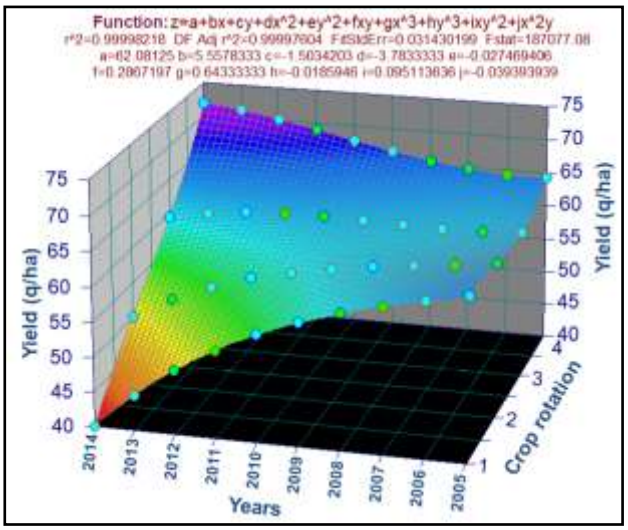

Fig. 5. Dynamics of Josef wheat yield according to the crop rotation, Teleorman County, 2005-2014 (synthesis) Source: own data.

We emphasize the monoculture effects on the growth of soil infestation with weeds and spores of the numerous foliar and spike diseases. There has also been a reduction in humus content, as well as other nutrients and, thus, a general decrease in soil fertility. There have been reported and determined negative changes in soil biology and microbiology, the disappearance of mycorrhizae, of useful bacteria and rhizomes. The soil gets tired and loses its ability to give the wheat crop the vital force which it needs in order to produce efficiently and sustainably. Monoculture induces the lack of sustainability of the agricultural system and is very necessary to be avoided. Combating the harmful effects of monoculture has only proved to be partially effective (50%) and is also more expensive. The efficiency and durability of wheat cultivation can be obtained by practicing crop rotation systems with 2-4 plants and especially by using leguminous ameliorative plants. In the researched area, peas proved to be the most suitable.

CONCLUSIONS

In the conditions of the research area, after 10 years of experiments with monoculture and various crop rotation systems including wheat, the following conclusions have been reached:
(1)Josef wheat doesn't support monoculture more than 2-4 years, after which the harvest losses are exponentially negative, reaching -22 q/ha = 35% after 10 years, compared to the starting year.
(2)W-W-M-M crop rotation system had also proved to be inefficient, even though the crop loss has been reduced to half compared to monoculture (–18.6%).
(3)In the case of crop rotation system with four plants (W-R-M-SF), wheat yield has remained constant throughout the entire experimentation period.
(4)The crop rotation system with improvement plant (P-W-R-W) interspersed between the wheat crops, after 10 years brought a very significant harvest increase, namely 8.58 q/ha (+12.1%). It is the culture variant that ensures the highest durability, satisfying the requirements of European Commission.

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MARKET MECHANISMS OF SPACIOUS ORGANIZATION OF LAND RESOURCES - A CASE STUDY IN CHERNIVTSI DISTRICT, UKRAINE

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Abstract

The purpose of this research is to study the market mechanisms of spatial organization of land resources on the basis of the development and implementation of a system of crop rotation on arable land, and ways of forming plant communities on forage lands.The systematic approach to sustainable development is the leading methodology of territorial organization of land use and environmental protection. The technique of creating a sustainable agro-landscape through the formation of an ecologically adapted organization of agricultural land is proposed. The mechanism of spatial organization of land resources is carried out in accordance with the pro-posed methodologies: the composition of crop rotations and grass mixtures is correlated with the corresponding agro-economic group. The technique was tested on the territory of Chernivtsi district of Vinnytsia region. The article provides an overview of the historical development and state of implementation of concepts and tools for land-use planning and land-use management for land resources and landscapes, and pro-vides recommendations for future action. These issues are especially relevant for agricultural land, as well as for other categories of land subject to anthropogenic loading in the conditions of agrarian production extensification and modern globalization challenges. It is proposed to define the spatial system of organization of land resources as a functional, structural transformation, which implies a certain placement of components of the natural, social and economic environment in space and its spatial indivisibility. In this case, the main role is given to land resources, namely agricultural land.

It has been proven that agricultural land use planning and, more broadly, land planning are tools for achieving sustainable and efficient use of resources, taking into account biophysical and socio-economic dimensions. In order to solve this problem, mechanisms of spatial organization of land resources have been developed using the example of Chernivtsi district. The ecologically adapted area of crops'sowing of Chernivtsi district, Vinnitsa region is calculated.

Key words**:** *land resources, spatial planning, landscape, efficiency, land-use optimization, agricultural land*

INTRODUCTION

Land, as a space for living and productive activity, is an extremely valuable resource and an important component of the environment. Territorial organization of agriculture land use and environmental protection include the organization of land use in multi-sectoral relations that com-bine economic development with environmental protection [5]. The implementation of the territorial organization of land use is necessary in order to optimize the natural and socio-economic potentials of efficient, environmentally-safe use of available resources while preventing environmental pollution. The urgency of this is increasing in the face of today's global challenges, namely changes in the world market. Accordingly, market mechanisms significantly affect the spatial organization of land resources of agriculture.

In order to evaluate the market mechanisms of of the territorial organization of land resources, various domestic and foreign methods have been developed and applied, based on taking into account the influence of external and internal factors. We considered that each of these techniques takes into account the ability to assess the various components of land transformation, the most common among which are economic, environmental and social factors. Achieving an effective balance between them is an extremely difficult process that requires continuous improvement.

The scientific works of many domestic and foreign scientists [1; 3; 4; 9; 10; 19] are devoted to the issues of development of land-use planning and influence of market tendencies on these processes. There are

different scientific approaches to understanding the nature of spatial land planning, the interaction of its components, both at the regional level and beyond [6]. A considerable number of scientists have dedicated their own researches to these issues. Scientists' attention is focused on agricultural land use planning and greening of land use. Thus, Antonets S.S. investigated the regional aspect of agricultural biology: research directions, achievements and prospects [1]. Atamanyuk O.P. carried out the analysis of land management in the village council during the completion of the land reform [2]. Boyko L.M. explored the specifics of regulation of land relations in agriculture [3]. Haydutsky P.I. studied the balanced development of the agro-sphere: an environmental dimension of the impact of public consciousness [9]. Galushkin T.P. investigated the role of land resources in economics and ecology [7]. Gutorov O.I. studied the problems of sustainable land use in agriculture [8]. Kalenska O.V. explored the features of the use of low-productive and degraded land: problems and prospects; agro-landscapes: concepts, subjects and factors of transformation [10]. Kravchenko M.S. investigated spatial planning in agriculture and market mechanisms of spatial organization of land resources [11]. Zubets V.M. developed the scientific foundations of agro-industrial production in the Polesie region and the western region of Ukraine [14]. Sabluk D.T. developed approaches to the greening of agro-industrial production – the defining component of modern agrarian policy [13]. Sinyakevych I. explored the concept of greening the development and planning of the territory [15]. Stepenko O.V. studied market mechanisms of spatial organization of land resources [18]. Voityuk V.D. investigated the organizational mechanism of agricultural production with limited land resources [20].

Most approaches to spatial planning are based on the fact that any system is in a constant state of interaction within its own environment. The system is considered as a complex of interacting elements [6]. The territorial system is a collection of specially combined elements and structural interrelations that have a spatial character [3].

In spatial organization of land resources, attention should also be paid to the interdependence of the complex elements of regional spatial development and rational land use, emphasizing the purpose of their functioning in the process of ensuring their balanced growth [6]. The study of domestic and foreign studies suggests that the spatial system of land resources should be understood as a functionally-complex, structural transformation, which involves a certain placement of components of the natural, social and economic environment in space, its spatial indivisibility [10]. The main role is given to land resources, namely agricultural land.

At the same time, a considerable number of issues related to market mechanisms for spatial organization of land resources need further investigation.

Destinguishing previously unsolved parts of the general problem.

Taking into account that leading positions among Ukraine's land resources occupy agricultural land, it has been, it is and will be very important to develop the constituent mechanisms for the spatial organization of agricultural land resources [7].

The goals of our article are the next: to study of the basic market mechanisms of spatial organization of agricultural land; to identificate of the influence of positive and negative external factors on the spatial organization of agricultural land resources.

MATERIALS AND METHODS

In this paper, the following methods, particularly the method of comparative analysis, abstract-logical, statistical-economic method have been used.

Creation of sustainable agro-landscape and spatial organization of land resources is carried out at the expense of ecologically adapted organization of agricultural land. Its main components are the development and implementation of a system of crop rotation on arable land and ways of forming plant groups – on forage lands.

The marginal area of sowing of a particular crop is calculated by the formula:

$$P = \frac{Ptotal}{T},$$

where:
P - boundary area of crop;
Ptotal - the total area of arable land suitable for cultivation;
T - is the period of return of the crop to the previous place.
Investigating the spatial organization of land resources, it was found that the main methods of research include: field surveys; analysis of samples of environmental components; mapping, remote sensing and GIS. Integrated and interdisciplinary surveys were conducted along passageways between major relief types and characteristic production areas. Soil, water and air samples are analyzed to assess the state, spatial and temporal changes in the quality of the environment in the study area or region.
Display, remote sensing and GIS methods have been used at various stages of the research process to represent the distribution and relationship between natural and socio-economic components.

RESULTS AND DISCUSSIONS

The spatial organization covers a wide range of issues related to the territorial division of labor, the location of production forces, the place of the region in the national and international division of labor, regional differences in economic relations, socio-economic and environmental development [6].
Spatial development of the country and available land resources is carried out through regional policy, the implementation of which is aimed at solving problems of local self-government on economic, social, environmental, administrative, organizational and other issues that take into account national and local interests [19]. Considering territorial development through the prism of interconnection of components of the regional spatial land and economic system, scientific literature focuses on the combination of priority prerequisites for its development [6]. And so, some scientists point out the interdependence and integrity of economic and environmental objects in this territory, taking into account natural resources and labor potential [9].
The environmental component in the conservation, restoration and protection of natural ecosystems makes an important contribution to the balanced development of regional spatial and economic land use systems [6]. The available resources of the territory, according to scientists, form a valuable reserve, which is used when it is needed to solve problematic issues. At the same time, resources as well as prerequisites for the development of the regional spatial and economic system are divided into natural-historical, cultural, demographic, socio-economic, which should be considered through the prism of the geographical location of the territory, which is a universal resource and whose importance increases over time, especially in view of the usefulness of local location [1; 3].
A systematic approach to sustainable development is a leading methodology for territorial organization of land use and environmental protection. A system is a set of factors that interact with one another and with the environment [8]. Any system is part of a higher-level system. There is a mutual connection between these systems. Each system is structurally complete and unified. Therefore, when acting on a system component, its other components also change, leading to changes in the system as a whole. Analyzing geo-systems, it should be noted that they are formed by the interrelationship between natural factors (geological, climatic, biological, etc.), socio-economic factors and forms of exploitation and use of natural resources (industrial and agricultural). Each natural system is fully and functionally unified, performing economic, administrative, environmental, social and other functions.
The approach to sustainable development and the spatial organization of land resources requires a harmonious combination between socio-economic development and environmental protection [6], in particular to achieve the following goals: effective economic development, addressing existing food problems; raising living standards;

pollution prevention and environmental friendliness.

Exploring the spatial organization of land resources, it is important to divide the territory into sub-regions with special natural, socio-economic and environmental characteristics.

A sub-region is a territorial unit that is considered to be a geo-system consisting of relatively homogeneous natural conditions, interacting socio-economic activities that create specific characteristics that allow it to focus on the exploitation and use of natural resources. The research and evaluation of these sub-territories create the scientific basis for economic development planning, which is related to the rational exploitation and use of natural resources, environmental protection in the direction of sustainable development [6]. This is especially true taking into account the rapid change in market conditions [5] and the need to adapt the existing resources to the ever-changing needs.

Each sub-area is defined on the basis of the following characteristics: relative homogeneity in natural conditions (geology, climate, soil, vegetation); degree of urbanization and industrial development. The isolated components of the mechanism of spatial organization of land resources are presented in Fig. 1 [6].

Components of the mechanism of spatial organization of land resources are to determine the public needs of agriculture, to establish the resource potential of agricultural land, to study the production potential of existing producers, and so on.

It should be noted that the need for decision-makers to solve problems, change drivers and facilitate effective and sustainable responses requires an updated set of tools and approaches to participate in the spatial organization of land resources [5].

Such a set of tools should take into account biophysical, economic, socio-cultural and managerial dimensions [10], and should facilitate integrated management of agricultural landscapes to meet the needs of many stakeholders and the implementation of various national strategies and commitments.

In order to improve the spatial organization of land resources, it is now important to carry out a consultation process involving a wide range of stakeholders [2; 8; 10] working in different fields, to align lessons and experience in spatial planning tools and approaches, and to identify major gaps and opportunities.

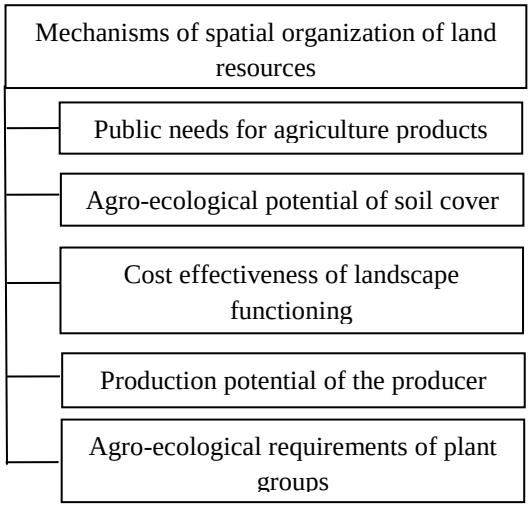

Fig. 1. Components of the mechanism of spatial organization of land resources*

*Source: Completed by the author according to the data [6].

The study considered the spatial organization of land resources of a certain territorial system, in particular the Chernivtsi district of Vinnytsia region. In addition, the emphasis is placed on the importance of the environmental component in ensuring a balanced development of the regional spatial and economic system [7].

Analyzing the state of land use in Vinnytsia region it should be noted that the highest degree of agricultural land development is noted in Bershad (81%), Kozyatyn (86%), Lipovets (88%), Orativ (84%), Teplitsk (87%), Pogrebyshche (83%)), Tivrivtsi (80%), Khmelnitsk (82%) and Chernivtsi (84%) districts. The environmental sustainability of land resources is characterized by the degree of land plowing [8].

One of the main criteria for assessing the ecological status of agricultural land is the level of soil fertility as a basis for the functioning of this category of land. The combination of natural factors (natural vegetation in the past, climate) contributed to the formation of different soil properties and fertility. The use of soils for a long time under

crops with unbalanced fertilizer application leads to an acute shortage of a nutrient, ie a decrease in fertility [12].

A more detailed analysis of land use planning is made on the example of the agricultural landscape of the Chernivtsi district of Vinnytsia region. Chernivtsi district is located in the southwestern part of Vinnytsia region. It borders on the west with Mogilev-Podilsky, in the north – Shargorod, in the east - Tomashpol, in the south – Yampil districts of the region. Geographically, the territory of the Chernivtsi district belongs to Transnistria. The climate of the area is temperate continental and according to agro-climatic zoning belongs to the second agro-climatic region.

Table 1. Structure of agricultural landscaping in Chernivtsi district, Vinnytsia region

Type of land	Area	
	ha	%
Total land	59,161.00	100.00
Agricultural land	50,243.25	84.93
including arable land	43,541.08	73.60
Forests and other wooded areas	5,186.62	8.77
Built land	2,557.16	4.32
Including under residential development	388.16	0.66
Industry land	88.24	0.15
Wetlands open	248.29	0.42
Dry covered land with a special vegetation cover	0.00	0.00
Open land without vegetation	533.55	0,90
In land waters	392.13	0,66

Source: based according to [16; 17].

The natural and climatic conditions of the area are favorable for the development of agricultural production [10]. The structure of the agricultural landscape of the Chernivtsi district of Vinnytsia region is presented in Table 1.

The ecologically adapted area of cropssowing of Chernivtsi district, Vinnytsia region is presented in Table 2.

In the course of the research, according to the degree of agricultural development, all districts of Vinnytsia region are divided into three groups: I. up to 70%; II. 71 – 80% and III. > 80%. The proposed ecologically adapted crop sowing area of Chernivtsi district of Vinnytsia region will help optimize land use taking into account both economic and environmental factors.

Table 2. Ecologically adapted area of crops sowing of Chernivtsi district, Vinnytsia region

Crop	Total crop area, ha	Return period, years	Boundary crop area, ha
Winter wheat	23,419.30	4	5,855
Winter rye	23,419.30	3	7,806
Spring barley, wheat	23,419.30	4	5,855
Oat	43,541.08	3	14,514
Buckwheat*	20,992.61	4	5,248
Millet*	3,123.35	4	781
Legumes	43,541.08	5	8,708
Linen (fiber)	20,760.39	7	2,966
Potato	22,943.25	4	5,736
Forage root crops	43,065.03	3	14,355
Rape (seeds)	3,123.35	5	625
Clover	23,419.30	4	5,855
Annual herbs (mixtures)	43,541.08	3	14,514
Maize	22,943.25	3	7,648

Source: based according to [16].

Currently, it is important for a spatial organization of land resources to strike a balance between market needs, the desire to increase profits and the rational use of land.

The current market conditions and population trends have a significant impact on global food demand. Demand for food is increasing, it makes the pressure on natural resources. Significant changes are needed to address current trends and move to sustainable food and agriculture production. So, FAO has identified five interconnected principles for the transition to sustainable nutrition and agriculture [15]:

1) improving resource efficiency;
2) conservation of natural resources;
3) improving rural livelihoods;
4) increase of stability;
5) management.

FAO recognizes that the spatial organization of land resources, the adoption of sustainable land use strategies and land management are important to achieve the sustainability and economic development of each region and country as a whole [8].

In the context of changing market conditions, a modern agro-landscape balancing assessment system, including land valuation and land-use planning, should be used in land use management - a systematic assessment of land potential and alternatives for optimal land use and improvement of economic and social conditions [5] through multi-sectoral participatory processes, multilateral, and scale-dependent. The agro-landscape balancing assessment should be carried out throughout the land use system.

CONCLUSIONS

Components of the mechanism of spatial organization of land resources are to determine the public needs of agriculture, to establish the resource potential of agricultural land, to study the production potential of existing producers, and so on.

The mechanism of spatial organization of land resources is developed on the example of one of the districts of Vinnytsia region. The proposed ecologically adapted crop sowing area of Chernivtsi district of Vinnytsia region will help optimize land use taking into account both economic and environmental factors.

It is substantiated that it is important for the spatial organization of land resources to strike a balance between market needs, the desire to increase profits and rational land use.

Land-use planning tools and methods should encourage and assist diverse and often competing land users in selecting land-use and management options that increase their productivity, support stable agricultural and food systems, and promote land and water management.

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MODELING THE USE OF WORKING CAPITAL IN ORDER TO ENSURE STABILIZATION OF THE REPRODUCTION PROCESS IN AGRICULTURE

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Abstract

The article deals with the effective use of working capital in reproductive process of agriculture and in ensuring its sustainable development, which ensures the growth of the final product production, the improvement of its quality, cost reduction and, as a consequence, increases profits. Entire and timely provision of agricultural commodity producers with material resources and their effective use are necessary conditions for maintaining the production process and increasing its efficiency. However, in reality, the reproduction of the main types of material resources is violated and carried out on a "narrowed" basis. In order to stabilize the reproductive process in agriculture, the authors suggest a model for the efficient use of working capital in agricultural production, based on the use of a multi-stage algorithm that implements an integrated approach to determining the level of efficiency of working capital use in specific conditions.

Key words**:** *working capital, reproduction process, agriculture*

INTRODUCTION

The solution of strategically important tasks to increase the efficiency of agricultural production and the degree of satisfaction of food needs through the products of domestic producers under the conditions of sanctions and the course on import substitution assumes a sufficient supply of material resources to the agricultural sector [1].

Many authors consider the problems of rational use of material resources in agriculture under conditions of relative economic stability, however, the new economic conditions for management are characterized by increased dynamism and require a special approach to gain the increasing efficiency of material resources reproduction [5].

There is a need to systematize the key factors in the efficiency of agricultural production, regarding the role of working capital organization in its provision, developing a methodology for a comprehensive assessment on the efficiency of working capital use and priority areas for improving the mechanism of formation and use of material reserves of agricultural companies [3].

MATERIALS AND METHODS

The effective use of working capital in the organization is of great importance, since it has a significant impact on the overall efficiency of the use all financial resources attracted by the organization. Working capital, its composition and structure, turnover rate and efficiency of use largely determine the financial condition of the enterprise and the stability of its position in the market, the main indicators of which are: solvency (the ability to repay external debt obligations in time); liquidity (ability to cover current debts at any time); the possibility of further mobilization of financial resources. The effective use of working capital plays a large role in ensuring the normalization of the enterprise, increasing the level of production profitability and depends on many factors [4].

To study the cumulative effect of internal factors on the efficiency of working capital use, the regression analysis techniques were taken into consideration in the framework of our research [9]. When conducting a regression analysis, factors were used that reflected various aspects of the use of working capital: the structure of working capital (the amount of material resources, receivables per 100 rubles

of working capital); security with working capital and their sources (working capital per 100 rubles of fixed assets, working capital per 100 ha of agricultural land, own working capital, borrowed funds per 1 ruble of working capital, the ratio of payables and receivables); the effectiveness of the use of individual elements within the working capital (the duration of one turnover of material resources and receivables); factors reflecting the activities of the organization as a whole (revenue from sales of products, total cost of sales and the amount of profit (loss) per 100 rubles of the working capital [2].

As an effective indicator (dependent variable), the turnover ratio of the working capital was chosen. The analysis was carried out using the SPSS software package using the step-by-step method based on data from 153 agricultural organizations of the Penza region (Russia).

Indicators of working capital turnover reflect the impact on the use of working capital of all aspects to the organization. The speed movement of working capital is one of the most important economic indicators, which is not inferior in terms of importance to the indicators of cost and profitability. These are the only total indicators of the effectiveness of the use of enterprise resources in time [6].

RESULTS AND DISCUSSIONS

The current research and improvement of the mechanism for managing the working capital of organizations is one of the main factors in increasing the economic efficiency of agricultural production at the present stage of the Russian economy development. The rational use of the working capital is one of the priority areas of activity of any agricultural organization [7]. The algorithm for implementing the mechanism of the developed model for the effective use of working capital includes several stages.

The criterion of economic efficiency of using the production potential of the agricultural sector, including working capital, is to obtain the maximum possible excess of income over expenses in volumes that ensure expanded reproduction of agricultural products [8]. The efficiency of the use of working capital, its quantitative parameters should be determined by a set of interrelated evaluative performance indicators [10]. This methodological approach, which allows you to objectively assess the effectiveness of the use of working capital at all stages of the circulation of advanced capital, was the basis for a model to ensure stabilization of the reproduction process through the efficient use of the working capital.

The first stage:

determination using the methods of regression analysis of the main internal factors that affect the speed of turnover of the working capital and reflect various aspects of their use. The analysis was carried out on the basis of a synthesis of the obtained data from 153 agricultural organizations of the I (first) economic zone of the Penza region (Russia).

Identify and express the quantitative relationship between the system of factors affecting the turnover of funds in agriculture, allows the obtained model of multiple regression, represented by the equation:

$$\mathbf{Y = 0.127 + 0.011x_1 + 0.001\ x_2 - 0.001\ x_3 - 0.005\ x_4},$$

Where: Y - current assets turnover ratio; x_1 - revenue from the sale of agricultural products to 100 rubles of current assets, rubles; x_2 - profit (loss) per 100 rubles of current assets, rubles; x_3 - the value of material resources per 100 rubles of current assets, rubles; x_4 - the amount of receivables per 100 rubles of the working capital, rubles.

In the obtained regression equation, the tightness of the relationship between the indicators is characterized by high values of the multiple correlation coefficients (R = 0.981) and determination (R2 = 0.962). Note that during the analysis of the total number of factors considered, the most significant ones were selected, and the relationship between the effective indicator and the last two of these factors is the opposite. It was concluded that one of the priority areas for increasing the economic efficiency of using the working capital in agriculture in modern conditions could be considered the optimization of their structure by clarifying the size of material resources and receivables in the total amount of working capital.

The second stage:
The research is based on the method of statistical groupings, and the factors themselves are determined as grouping characteristics, the influence of which on the turnover rate of funds is most significant.
Of particular importance in solving the problem of the rational and efficient use of the working capital is the first stage of the circuit, at which the formation of inventories of material resources takes up a significant share in the value of current assets and acts as a necessary condition for the consistent resumption of the reproduction process. We could recommend to increase the amount of funds advanced for the formation of inventories of material resources to 256.3 - 582.8 rubles per 1 thousand rubles working capital (Table 1).

Table 1. Grouping of agricultural organizations of the Penza region (Russia) at the cost of material resources per 1 thousand rubles of the working capital

Indicators	**Groups of organizations at the cost of material resources per 1 thousand rubles working capital, RUB**				**Total average**
	Less than 250	251–500	501–750	More than 750	
-The number of organizations in the group	68	69	12	4	153
-Accounted for material resources for 1 thousand rubles of the working capital, rubles	102.2	256.3	582.8	782.0	228.7
-Average annual inventory value per 1 group economy, thousand rubles, including average annual cost of the material resources, thousand rubles	6,594.1	5,836.0	5,280.1	2,169.0	5,484.4
-It accounts for 1 rube of the material resources, rubles:	1,371.4	3,006.0	3,354.3	1,845.8	2,276.5
*revenue	7.24	3.10	1.67	0.82	3.91
*profit (+), loss (-)	0.02	0.37	0.34	–0.34	0.26
*borrowed funds – total	12.43	2.78	2.05	4.59	5.11
*of which payables	5.76	1.29	0.67	4.26	2.38
*Turnover ratio of the working capital	0.86	1.20	1.05	0.57	1.02

*Compiled by the authors according to the financial statements from agricultural organizations of the Penza region

We could see that one of the main levers of influence on the efficiency of the working capital use is a competent policy in the field of receivables management. The researchers came to the conclusion that the most optimal way for agricultural organizations in the Penza region (Russia) is the amount of receivables at which it would divert from 106.0 to 216.3 rubles per 1 thousand rubles of the working capital. It is this ratio that provides the most efficient use of the working capital.
The third stage:
In the course of our study, the optimal limits of the speed and duration of one turnover of the funds were determined, which ensure the greatest efficiency of agricultural production in the Penza region (Table 2). Thus, given the specialization of production of the bulk of agricultural organizations in the Penza region (Russia) as the most predominantly grain-growing with developed dairy and processed products, the optimal rate of turnover of the funds is characterized by a turnover ratio of 1.83 (normative value). The duration of one turnover should be no more than 196 days (IV group of farms). Note that for this group, the sizes of both material resources and receivables correspond to the optimal proportions established earlier in the study. The period of circulation of material resources should be no more than 56, and accounts receivable - no more than 42 days.
The fourth stage:
the calculation of the reserve for accelerating the turnover of the working capital in groups of farms with different levels of efficiency of their use (Table 3) by clarifying and bringing to the optimal value of the size of material resources and receivables, with other unchanged factors.

To calculate the reserve, we used the obtained model of multiple regression and the optimal values of the considered factors established for each group. The objects of testing the developed model were agricultural organizations of the Penza district within the Penza region (Russia).

Table 2. Grouping of agricultural organizations the Penza region (Russia) on the efficiency of the working capital

Indicators	**Groups of organizations by turnover rate working capital, times (according to the turnover ratio)**					**Total average**
	There was no turnover	Less than 0.7	0.71–1.4	1.41–2.1	More than 2.1	
-The number of organizations in the group	11	44	57	30	11	153
-Working capital turnover rate, times	–	0.40	1.09	1.83	2.91	1.02
-The duration of one turnover of working capital, days	–	901	330	196	124	353
-Accounted for material resources per 100 rubles of the working capital, RUB	17.0	14.9	25.5	28.6	7.1	22.9
-Accounts receivable per 100 rubles. working capital, RUB	36.4	27.9	24.5	20.2	59.8	23.5
-Duration of one turnover days:						
*material resources	–	143	85	56	13	74
*accounts receivable	–	309	87	42	60	96
-It accounts for 100 rubles of the working capital, RUB:						
*revenue	–	32.5	101.3	165.6	259.4	100.7
*profit (+), loss (-)	–24.3	–2.9	10.5	23.4	–59.5	4.6
-Accounted for own working capital for 1 ruble of the material resources, RUB	–52.86	–0.75	–0.59	0.55	–2.56	–0.70
-The level of profitability (+), loss ratio (-) of all activities,%	–	–9.0	11.4	14.8	–14.1	4.9
-Return on current assets	–0.20	–0.04	0.11	0.14	–0.48	0.04

*Compiled by the authors according to the financial statements from agricultural organizations of the Penza region

Thus, from the second group, characterized by a low level of efficiency in the use of working capital, the Joint-Stock Company was taken for the research, the turnover ratio of which at the end of 2018 was 0.68. As the analysis showed, bringing the size of material resources to the level of 25.6 rubles and accounts receivable - to 10.8 rubles for 100 rubles of the working capital would accelerate turnover by 0.12 points. The turnover period would be reduced by 79 days, which, in turn, would further release funds from the turnover in the amount of 1,564.2 thousand rubles.

In the third group of farms, where the level of efficiency of the working capital is quite high, the calculation of the reserve was made on the example of the Closed Joint-Stock Company. In 2018, the actual value of the turnover ratio in this farm was 0.98. According to the results of the analysis, it was found that optimization of the level of the factors under consideration will allow to accelerate the turnover by 0.04 points and accordingly reduce the period of turnover by 14 days, which should result in the release of 1,381.8 thousand rubles from the turnover.

Of the "best" fourth group, the Open Joint-Stock Company was selected for research. So, the level of factors considered, established as optimal for this group of farms (material resources - 28.6 rubles, accounts receivable - 20.2 rubles per 100 rubles of the working capital) would have a turnover ratio of 1.50, which is 0.06 points higher than its actual value in 2018. The duration of one revolution will be reduced by 10 days, which would correspond to the release from circulation of 1,066.0 thousand rubles.

To sum up it should be mentioned that in the Penza region (Russia), the reserve for accelerating turnover by clarifying the values of key factors that determine the level of efficiency of the working capital use.

It is 0.08 points, which corresponds to a reduction in the turnover period for 18 days. The amount of funds released from circulation in this case will amount to 247,410.0 thousand rubles, which is 2.2 times the amount of all budget funds received by agricultural organizations of the region in 2018. It should be

kept in mind that the use of average data in assessing the composition of key factors may necessitate the adjustment of the proposed model in the context of specific agricultural enterprises.

CONCLUSIONS

The authors of the current research came to the conclusion that one of the priorities for ensuring the stability of the process of reproduction of material resources in agriculture is to increase the efficiency of the use of working capital, characterized primarily by the acceleration of their turnover.

The developed model for the efficient use of working capital in agriculture, tested at agricultural organizations in the Penza region, suggests that the optimization of their structure, achieved through scientifically based control of the values of key factors determining the level of efficiency of their use in specific conditions, be considered as the main factor in accelerating the turnover of working capital.

It was considered that the effective use of working capital in reproductive process of agriculture and in ensuring its sustainable development, which ensures the growth of the final product production, the improvement of its quality, cost reduction and, as a consequence, increases profits. Entire and timely provision of agricultural commodity producers with material resources and their effective use are necessary conditions for maintaining the production process and increasing its efficiency. However, in reality, the reproduction of the main types of material resources is violated and carried out on a "narrowed" basis. In order to stabilize the reproductive process in agriculture, the authors suggest a model for the efficient use of working capital in agricultural production, based on the use of a multi-stage algorithm that implements an integrated approach to determining the level of efficiency of working capital use in specific conditions.

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SEEDS GERMINATION AND SEEDLINGS GROWTH OF MAIZE IN RESPONSES TO COGERMINATION, AQUEOUS EXTRACTS AND RESIDUES OF BASIL

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Abstract

Aromatic plants are intensely explored for their potential use as allelopatically active crops. The current series of laboratory experiments was conducted to assess the allelopathic potential of basil on maize. The effect of plants was evaluated through: seed cogermination in Petri dishes, effect of aqueous extracts from fresh and dry plant biomass in three concentrations (5; 10 and 20%) in Petri dishes, and effect of dry plant residues in rates of 10; 20 and 30 g/kg of soil in the pots. The cogermination of basil seeds had non- significant effect on germination and seedlings length of maize. The aqueous extracts of basil had various effects, in higher concentration (20%) significantly reduced, while lower concentrations extracts (5 and 10%) showed stimulatory effect on maize root and shoot length. The effect of incorporation of basil residues was stimulatory effect for root length of maize.

Key words**:** *allelopathic effect, cogermination, basil (Ocimum basilicum L.), maize (Zea mays L.)*

INTRODUCTION

Allelopathy is an interference mechanism between receptor and donor plants and may exert either positive or negative effects [6]. The interactions that are mediated by allelochemicals and signalling chemicals take place both belowground and aboveground [14]. These activities are concentration dependent and might inhibit the growth of one plant at one concentration and might stimulate the growth at other concentration [2].

Recently, many researches around the world show their keen interest on aromatic and medicinal plants for searching new novel compounds [2, 9, 20].

Species of the family Labiatae possess strong allelopathic activity against other plant species [17].

Ocimum basilicum L. is an annual plant, member of family Labiatae (Lamiaceae), popular known as common basil or sweet basil and belongs to worldwide cultivated aromatic and medicinal plants. It contains several chemical constituents such as polyphenols, flavonoids and terpenes [24].

The main phenolic compounds in basil are rosmarinic acid, vanillic acid, lithospermic acid, coumarinic acid, caffeic acid, hydroksibenzoacid, syringic acid, ferulic acid, protocatheuic acid [13]. According to [16], phenolic compounds are but one category of the many secondary metabolites implicated in plant allelopathy.

Many workers reported allelopathic activity of *O. basilicum*. [8] found that seed germination of hoary cress was reduced when it germinated with seeds of basil, but germination of quack grass (*Agropyron repens*) was stimulated. [10] reported that water extract of *O. basilicum* up to 100 g/l inhibited dry weight of *Centaurea depressa*, *Abutilon theopharasti* and *Chenopodium album*.

Maize (*Zea mays* L.) is one the most important cereal crops grown in Romania and it is used as food, fodder and also utilized as a raw material in industries.

The inclusion of species with allelopathic activity in crop rotation systems, intercropping or for mulching may have benefits for crop management.

Utilization of allelopathy in cropping systems, however, will depend on better understanding of the chemical or chemicals involved and their behaviour in natural and agricultural ecosystems [17].

Due to the economic value of maize, this study was undertaken to evaluate the allelopathic effects of *O. basilicum* on *Z. maize* through seed cogermination, use of aqueous extracts and plant residues.

MATERIALS AND METHODS

Laboratory experiments were carried out the Faculty of Agronomy, University of Craiova, in 2019.

Seeds of basil (Company AGROSEL, Romania) and seeds of maize hybrid Olt (NARDI Fundulea, Romania) were used in the experiments.

All seeds were sterilized according to [23].

The effect of cogermination was investigated according to [8], in the first laboratory experiment.

Thirty seeds of basil and thirty seeds of maize (V2) were placed in Petri dishes lined with double layer of filter soaked with distilled water. Control treatments (V1) consisted of seeds of a single species (thirty seeds of maize). The Petri dishes were kept at laboratory temperature (23 °C ± 2) for 7 days.

In the second laboratory experiment, in order to obtain the basil aqueous extracts, fresh and dry aboveground biomass was ground and then mixed with distilled water according to the modified formula of [19]. This extract was filtered and diluted with distilled water to give three final concentrations of 5%, 10% and 20% (V2, V3 and V4).

Twenty seeds of maize were placed in Petri dishes lined with double layer of filter soaked with these aqueous extracts, while distilled water was used as the control (V1).

Petri dishes were maintained under laboratory conditions (temperature 23 °C ± 2) for 7 days. This laboratory experiment was composed of four variant treatments with three replications.

In order to evaluate the effect of basil residues on maize, the third laboratory experiment was carried according to the modified method of [19].

Dry plant residues of basil in rates of 10; 20 and 30 g/kg of the soil were incorporated into the commercial substrate (V2, V3, and V4). The soil free basil residues were used as control (V1). Thirty maize seeds were sown in the each pot filled with soil.

This experiment was arranged in a randomized design with four variant treatments in three replicates, and was maintained under laboratory temperature (23 °C ± 2) for 15 days. The roots and shoots growth elongations (cm) were recorded at the end of each experiment.

The germination percentage G (%) was calculated as:

$$G\% = \text{Germinated seeds}/\text{Total seeds X } 100$$

The inhibitory or stimulatory percent (IR) was found according to the adapted formula of Williamson and Richardson (1988):

$$\text{IR } (\%) = \frac{C - T}{C} \text{ X } 100$$

where: C – the mean value of control; T – the mean value of treatment.

IR < 0 indicates inhibition, IR > 0 indicates stimulation, and the magnitude of IR values reflects the intensity of the allelopathic effect.

All collected data was analysed statistically with ANOVA and means were compared at significant 5% level by Duncan's multiple range test.

RESULTS AND DISCUSSIONS

Statistical analysis of the data showed that the cogermination of basil and maize seeds had non-significantly affect ($p \leq 0.05$) on the studied parameters (Table 1).

The aqueous extract of basil significantly ($p \leq 0.05$) affected the root and shoot length of maize and the basil residues significantly ($p \leq 0.05$) affected only the root length of maize (Table 1).

There are no previous experimental results presenting cogermination effect of basil seeds on the germination and growth in maize seedlings.

According to [22] basil seeds reduced germination of hoary cress, but promoted shoot and root length.

Table 1. ANOVA of studied traits of maize at cogermination and aqueous extracts of basil

Traits	Df	MS	F test
COGERMINATION			
Germination (%)	1	16.66	0.06^{ns}
Root length (cm)	1	2.40	2.23^{ns}
Shoot length (cm)	1	0.20	0.14^{ns}
AQUEOUS EXTRACTS			
Germination (%)	3	100.8	0.43^{ns}
Root length (cm)	3	13.76	4.59*
Shoot length (cm)	3	2.87	4.31*
RESIDUES			
Germination (%)	3	22.22	0.33^{ns}
Root length (cm)	3	126.61	19.99*
Shoot length (cm)	3	23.59	1.68^{ns}

MS = mean square; * = Significant at $p \leq 0.05$; ns = non-significant
Source: Own calculation.

Table 2. Effect of basil seed cogermination on germination and seedlings growth of maize

Variant	Treatment	Germination		Root length		Shoot length	
		(%)	IR	(cm)	IR	(cm)	IR
V1	Control	63.33	-	6.97	-	3.73	-
V2	Cogermination (basil + maize seed)	66.67	+5.3	8.23	+18.1	3.37	-9.6

IR = the inhibitory or stimulatory percent
Source: Own calculation.

Table 3. Effect of basil aqueous extracts on germination and seedlings growth of maize

Variant	Treatment	Germination		Root length		Shoot length	
		(%)	IR	(cm)	IR	(cm)	IR
V1	Control (0%)	63.33	-	6.97^{a}	-	3.73^{bc}	-
V2	5%	66.67	+5.3	8.10^{a}	+16.2	4.23^{ab}	+13.4
V3	10%	63.33	0	8.67^{a}	+24.4	5.00^{a}	+34.0
V4	20%	53.33	-15.8	3.87^{b}	-44.5	2.67^{c}	-28.4

IR = the inhibitory or stimulatory percent;
Different letters means significant differences at 5% probability level by Duncan's test
Source: Own calculation.

In our study, a slight stimulatory effect of cogermination was observed for germination and for root length by 5.3% and 18.1%, respectively, while shoot length was slightly reduced by 9.6% compared to control (Table 2).

[3, 5] found that sage and dill seeds in cogermination with maize showed non-significant effects on germination, but they significantly reduced maize seedlings.

On the contrary, cogermination of sweet marjoram has significantly stimulated the germination and growth of maize seedlings [4].

Aqueous extracts of basil had non-significant effect on germination of maize seeds (Table 3).

A slight effect also has been observed: the lowest concentration V2 (5%) stimulated germination by 5.3%, while the highest concentration V4 (20%) inhibited germination by 15.8%.

According to [11], germination indices are generally used to detect potential stimulatory or inhibitory allelopathic activity of the test plant, but the results of present study revealed that early seedling growth is influenced to great degree by extracts tested. [7] also reported that aqueous extract of aboveground parts of sweet basil significantly reduced germination of sorghum, millet, maize and wheat. [21] found that *Ocimum* extract at 1% inhibition germination of *Amaranthus* by 80%.

Basil aqueous extracts influenced significantly the growth of maize seedlings (Table 3).

Lower concentrations of basil extract showed stimulatory effect on roots and shoots elongation. The stimulation effect of roots

ranged from 16.2% at V2 (5% concentration) to 24.4% at V3 (10% concentration), and the stimulation effect of shoots ranged from 13.4% at V2 to 34.0% at V3, compared to the control. The inhibition of maize root elongation by the higher concentration extracts (20%) was of 44.5% and the inhibition of maize shoot elongation was of 28.4%.

Thus, the lengths of roots showed more inhibition than the lengths of shoots. A possible explanation is that the permeability of allelochemicals to root is greater than to shoot [18].

These results are in accordance with other studies which reported that lower concentrations of allelochemicals generally have lesser or stimulatory effect on the plant growth, while negative effect increases with the increase in concentration [15].

According to [21], the roots and hypocotyls of chick pea, black gram, moth bean and cow pea, shows the stimulatory effect under *Ocimum* 1% leaf extract treatment, but at 10% concentration of leaf extract treatment shows inhibition for the same legumes.

Incorporated basil residues showed non-significant effect on germination and shoot length, but had a significant stimulatory effect on root length (Fig. 1, Table 4).

Fig. 1. Effect of basil residues on root and shoot seedlings
Source: Original, obtained through the laboratory experiment.

Root length was stimulated from 35.2% at V4 (30 g/kg) to 106.1% at V2 (10 g/kg) compared to the control treatment (V1).

However, basil residues slightly stimulated shoot length from 15.3% at V3 (20 g/kg) to 20.3% at V2 (10 g/kg).

On the contrary, [1] showed that reduction in weed seed emergence and growth was recorded when dry basil plant residues were incorporated in the soil, in rates of 10 and 20 g/kg.

Table 4. Effect of basil residues on germination and seedling growth of maize

Variant	Treatment (g/kg)	Germination		Root length		Shoot length	
		(%)	IR	(cm)	IR	(cm)	IR
V1	Control (0)	70.00	-	14.67^{c}	-	26.10	-
V2	10	70.00	0	30.23^{a}	+106.1	31.40	+20.3
V3	20	73.33	+4.76	22.67^{b}	+54.5	30.10	+15.3
V4	30	66.67	-4.76	19.83^{b}	+35.2	30.27	+16.0

IR = the inhibitory or stimulatory percent;
Different letters means significant differences at 5% probability level by Duncan's test
Source: Own calculation.

CONCLUSIONS

This study indicated that the basil had allelopathic potential on maize development, which varied according to how the basil was used and concentrations used. Cogermination with basil seeds had non-significant effect on maize germination and seedlings growth.

The highest inhibition of maize seedlings was observed in 20% aqueous extracts of basil.

Low concentrations (5 and 10%) of basil aqueous extracts had stimulatory effect on maize seedlings growth.

Basil residues promoted root length of maize.

As a result, the stimulating potential of lower concentrations of basil aqueous extracts and basil residues could be exploited to promote maize crop growth, but field studies should be achieved to complement the information obtained in the laboratory.

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OPPORTUNITIES OF SUSTAINABLE DEVELOPMENT IN THE RURAL AREA AT THE LEVEL OF GALATI COUNTY, ROMANIA

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Abstract

Sustainable development in rural areas can be identified through a series of projects that highlight both economic, environmental, social problems and measures to improve the quality of life. European standards imposed at local level created opportunities for development and modernization of rural life that raised the level of community trust in European funding instruments. From an economic point of view, it is appropriate to create strategies that include measures and methods of transforming the rural economy into a sustainable and performance focused on innovation. To implement these local strategies, the community will need to implement strategic projects in areas such as health, culture, entrepreneurship, agriculture and education. In the context of the presented ones, the paper constitutes a theoretical and practical analysis of the manner in which the opportunities, phenomena and economic and social processes from the rural area of Galati County must be approached.

***Key words*:** *sustainable development, strategies, European funds, opportunities*

INTRODUCTION

The economic, environmental, social as well as the quality of life aspects of rural areas have a complex nature and have consistent implications in consolidating strategies for sustainable development of rural areas, starting with theoretical and practical ideas.

The sustainable development of the rural area is one of the most problematic and complex topics of the current situation, due to the fact that it implies achieving a balance between the desire to conserve the rural economic, educational and socio-cultural environment of the country, on the one hand, and the tendency of modernization of the rural environment, on the other hand. At the same time, this process of rural development is at the confluence between the tendency to expand the urban environment, the rapid development of the industry on account of the rural space and the requirement to maintain, as far as possible, the rural to its current dimensions. The totality of the measures and policies for the sustainable development of the rural environment, which tends to be modernized and aligned with European standards as an area, has as main objective the maintenance and conservation of the national character of the rural space and culture. The opportunity created by this trend of modernization can create some strategies that include measures and methods of transforming the rural economy into a sustainable and performance-focused innovation. The urbanization process that takes place in Galati County has become one of the national problems, due to the disparities created between the rural environment and the city, which are materialized in cultural, economic and social factors, which are summarized in terms of urban and rural settlements, which define the different realities of the geographical space. On the other hand, there have been profound changes in the rural environment, which is why the traditional image of the rural environment with its specific cultural ensemble, undergoes a transformation, related to the contemporary technical process that influences the rural economy, but also elements of the rural economy. comfort, civilization, cultural traditions, education, spiritual life in the rural world. The practical implications of the notion of rural area are related to the legal elements, to the strategic

and operative actions related to the implementation of regional development policies, which involve the preferential use of resources to achieve economic social cohesion and other priority objectives of the European Union [4].

The rural area holds an important place in the history, civilization and national identity of European countries, both by the means of spatial and demographic dimensions and the economic, social, cultural and ecological dimensions. That is why, the important role the rural development policy has in the European policies, comes to us as natural. The future of Europe depends greatly on using the rural area development potential on sustainable principles [10].

Therefore, the purpose of our work is to evaluate the current situation of opportunities, phenomena and economic and social processes in rural areas at Galati County level.

MATERIALS AND METHODS

To achieve the objective of the paper, we used a descriptive analysis based on the use of information on the demographic indicators of sustainable development in the rural areas identified in a series of reports, studies, works, statistics and publications Eurostat, INS - County Department of Statistics Galati and at the National Institute of Statistics of Romania, which should establish the level of economic development and quality of life in the rural areas of Galati County. From a technical point of view, the technique of indirect research was used, with various articles and specialized studies published until now.

RESULTS AND DISCUSSIONS

From the development point of view, the rural areas register a significant gap compared to the urban areas and are characterized by: persistent structural deficiencies (large number of the population employed in agriculture, aging of the population, a large number of subsistence farms, etc.); low added value of agri-food products; low labor productivity and productivity especially in semi-subsistence agriculture; weak entrepreneurial spirit for the development of economic activities, reduced access to credits; a non-functioning land market; a modest export orientation; insufficient investments in research and development; access to services and infrastructure far behind urban areas; the continuous increase of regional disparities; a high share of the population exposed to the risk of poverty and social exclusion; an inefficient public administration; a series of risks for people and the environment exacerbated by climate change and which pose a threat to rural areas [12].

"From an administrative point of view, the Romanian rural area comprises 2861 communes, which includes 12,957 villages, taking into account the changes that have occurred in the last years in the administrative-territorial organization at the basic level of the UAT"[1]. Taking into account the synthesized information, we can make an analysis of the main demographic indicators that reflect the situation in which Galati County is in terms of rural development. If we consider the administrative-territorial structure of Galati County, in 2019, it comprised a number of 61 communes and 180 villages. During the years 2010-2020, there was no change in the number of communes / villages in Galati County. From the demographic point of view, the localities in the rural area of Galați County have, on average, 4,315 inhabitants, most are at a distance of less than 100 kilometers from the municipality of Galați, and the average area of the communes is 6,241 hectares. The population in the rural area has a tendency of continuous diminution due to the aging process that leads to a negative natural growth of the population, to which is added that more and more people choose to migrate to the countries of Western Europe. The rate of internal migration from urban to rural area in Galati County is positive in recent years, but it cannot balance the fall caused by the two trends and is representative for the population over 45 years. As for the younger population, it is rather attracted to the urban environment. The factors that influence this decision to migrate to the urban area are strictly related to the slow process of economic, cultural, health and educational infrastructure development.

Stabilizing the population in the rural region is one of the fundamental problems of sustainable development. From this point of view, according to NIS data (2019), over 620,000 people lives in the Galati county and from those over 260,000 lives in rural area [11].

The rural population from Galati County recorded an involution during the entire reference period (Table 1). The number of people registered in 2019 was 7,862 people lower than in 2015. The ratio between male and female population at county level in the rural area is quite close, registering 136,306 male and 131,853 female. The same proportions are also maintained in the South-East region, the male population being slightly larger. The percentages are reversed at national level, where 49.9% of the people are male and 50.1% are female [5].

Table 1. Population of Galati County

Years	2015	2016	2017	2018	2019
Urban	363,411	361,422	359,737	358,699	359,342
Rural	271,952	271,491	271,094	269,577	268,159
Total	635,363	632,913	630,831	628,276	627,501

Source: Own calculation on the basis of data from Tempo on line data base for 2019, NIS.

An important factor in the economic development of the rural environment is the business environment. Therefore, in Galati County, the commerce sector has a share of 40.83% of the sector of industries operating throughout the county. Regarding the field of agriculture, it represents only 4.11% of the total of companies operating in this field from Galati County. The companies activating in the area are mostly concerned with commerce followed by manufacturing, construction industry, transport and agriculture. Of the total of those present in the county of Galati, in the rural area are found most of the companies active in the agricultural field. Companies in the field of commerce, construction and transport are operating in the urban environment.

If we do an analysis on the companies that carry out their activity in both the rural and urban areas, we will see that most are represented by micro-enterprises (Table 2). It seems that entrepreneurs in rural areas face a major problem in terms of workforce and prefer to set up small companies and then develop them.

Table 2. Structure of companies of Galati County

Structure of companies according to the number of employees	2014	2015	2016	2017	2018
Micro (0–9 persons)	10,337	10,477	10,870	11,257	11,432
Small (10 – 49 persons)	1,086	1,111	1,063	1,066	1,074
Medium (50–249 persons)	186	207	198	181	195
Large (>250 persons)	40	39	39	37	37

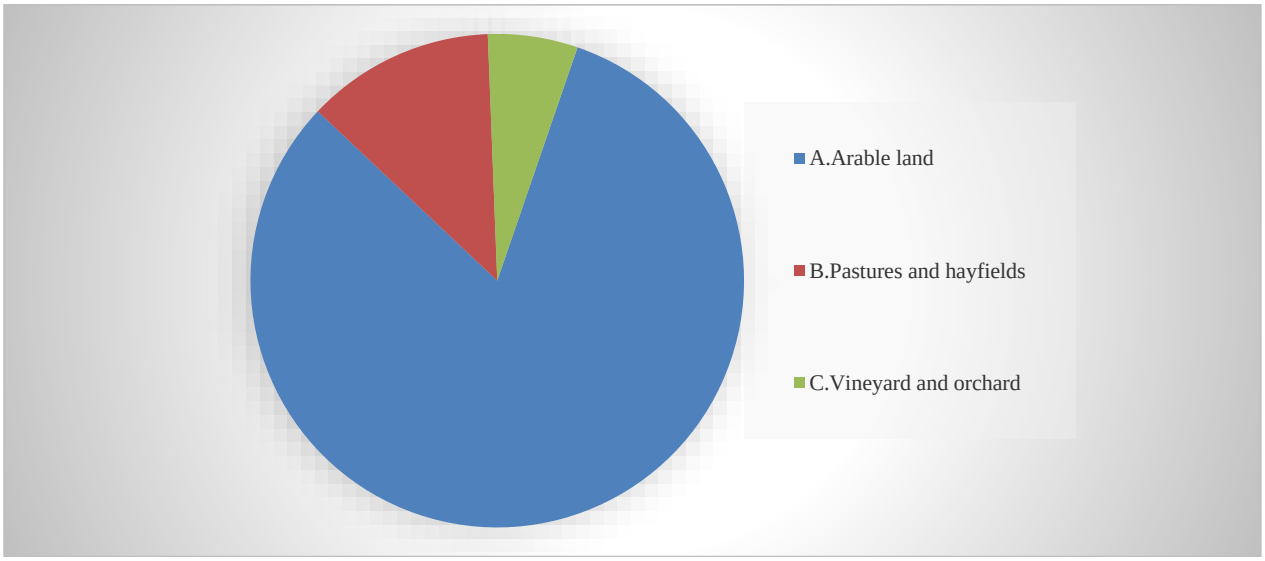
Source: Own calculation on the basis of data from Tempo on line data base for 2019, NIS.

Most of the active population from the rural area work in agriculture where there is a low productivity and, consequently, the incomes are lower than in the urban environment. This factor influences the desire of the population from the rural area to migrate to the urban area where the fields of activity are diverse and the facilities offered can bring an additional income to the families from the rural area. Agriculture is the main source of income in the rural area, but the incomes of the households of the rural people are regularly lower than those registered in the rural households that also have income from wages, obtained by carrying out

other activities (trade, tourism, construction). In order to have a sustainable development, their involvement in the activities that bring income is a problem that needs to be solved. The strategies created at central level with an impact on the rural environment will have to be focused on creating a favorable environment for the development of small businesses in other areas that reduce the migration of the population to the urban environment. A dynamic agricultural sector is an important foundation of rural development, generating strong links with other economic sectors. The rural living environment is improved by the effective participation of people and communities in managing their own social, economic and environmental goals through the involvement of people in rural areas [11].

The agricultural area of Galati County has a share of 80.23% of the land fund. Therefore, out of 446,632 ha as the total county area, in 2014, the agricultural area was 358,311 ha. From 2000 until now, there has been a decrease of the agricultural area by 443 ha. The agricultural area of Galati County, by categories of use, is divided as follows (Fig. 1): 81.75% is occupied with arable land (292.926 ha), 12.35% with pastures and hay (44.268 ha), and 5.89 % with vineyards and orchards (21,117 ha).

As the society develops as a whole, the analysis of agricultural productivity has gained increasing interest, now it is simply essential in the planning of any activity in the economic environment. Increased productivity has allowed food to become less limited, and therefore cheaper. However, the question arises whether this can be done to become constant, because productivity is considered a prerequisite, in order to face the challenge of feeding the population at national level. The agriculture and the environment in which they operate may differ substantially between Member States.



A - 81.75% B - 12.35% C - 5.89%
Fig. 1. Structure of the agricultural area in Galati County
Source: Own calculation on the basis of data from Tempo on line data base for 2019, NIS.

Thus, the question of how productive agriculture is and how the gaps between developed and least developed countries can be reduced remains relevant. As a result, the agricultural sector is challenged to achieve more, with less. Starting with 2010, the Romanian agricultural sector has registered consistent productivity accumulations, marking an average annual growth of 3.1%, higher than the one registered at the level of the European Union (about 1%). The average advance of the productivity of the domestic agriculture was more alert compared to that of Hungary and Poland, similar economies in terms of the characteristics of the agricultural sector. In the last 10 years, Romanian agriculture has recorded productivity gains, significantly higher than those registered in

Hungary and Poland. However, from the level perspective, the efficiency of the utilization of the production factors by the local farms is placed on a lower level compared to these countries, a situation that can be largely attributed to the excessive degree of fragmentation of the agricultural holdings, which is reflected in the dominance of the small farms. Therefore, encouraging, for the time being, timid steps for the association of local producers is likely to contribute to recovering the productivity gap between indigenous agriculture and the other European economies [8].

Analyzing the situation from the point of view of the agricultural productivity at Galati County level, the average production expressed in tons, did not register significantly different values for the two forms of ownership (total and private). In the county of Galati, in 2018, higher quantities were obtained for each of the main crops compared to the quantities at national or regional level. The total average grain production for grains in Galati County was 881,848 tons, that of wheat and rye 179,704 tons, barley and barley was 58,620 tons, and corn maize 639,398 tons. For the sunflower a total average production of 147,179 tons was obtained, for the sugar beet 7,423 tons and for the potatoes 15,887 tons. The total output of the agricultural sector was calculated based on the income generated by the four major activities, namely plant, animal, services and secondary activities (Table 3). At European level, the EU is down in this respect, among the countries with the largest decreases, with Lithuania (-33%), Latvia (-29%) and Germany (-18%). According to the Ministry of Agriculture and Rural Development, Romania registered a 2.3% increase over last year, with wheat harvesting more than 10.2 million tons.

Table 3. Agricultural production of agricultural goods and services (thousands lei current prices)

Galati County	Total	Vegetable	Animal	Agricult. services
2014	2,289,934	1,785,614	466,660	37,660
2015	2,134,227	1,628,712	482,613	22,902
2016	2,389,740	1,909,518	462,237	17,985
2017	2,449,293	1,988,903	446,618	13,772
2018	2,695,443	2,695,443	2,695,443	2,695,443

Source: Own calculation on the basis of data from Tempo on line data base for 2019, NIS [7].

And the production of barley was affected by the dry air wave that swept over Europe, harvesting this year by 4%. However, the decrease also contributed to the fact that the area dedicated to barley crops decreased in winter by over 11%, not being compensated by the spring growth, by only 4%. In contrast to the evolution recorded at EU level, initial estimates show that in 2018, Romania obtained a substantial 9.5% increase in barley harvest. As a result of these developments at EU level, grain prices reached a high during August, reaching levels higher than last year: 50 euros/ton for wheat and 60 euros/ton for barley. Sugar beet production recorded the smallest decrease at EU level of only 1.7%, after the elimination of quotas in October 2017, favored a record production of + 27% in 2017/2018. But the excess production has led to a rapid decrease in the purchase price, but also the sugar price, which is also felt in our country [2].

Regarding the level of education of the population in rural areas, it is lower than that of the population in the urban area. This is a factor that can influence the desire of young families to ensure a better future for their children through a much better education in the urban environment. At Galati County level, according to NIS data, 170 educational units have been identified, out of which 17 having a private character in which they study a number of 94,549 persons. Another identified problem that slows down the process of sustainable development in the rural area is the infrastructure. Considering all the measures implemented through national development programs and the efforts made by the public

administration, there are still areas where infrastructure is still poorly developed in the rural region at the level of Galati County. The length of the roads in counties and townships that were modernized was 589 km in 2017, which represents about 37,78 % from the total. The public infrastructure which ensures the water, sewage and marsh gas supplies is still very rare in the rural area. In 2017 from a total of 61 townships, only 28 (45.90 %) were connected to public sewerage, 10 to the natural gases (16.39%) and 59 (96.72 %) had running water.

Sustainable development in the rural environment means first of all the improvement of the quality of life, the diversification of the economic activities of the rural environment, as well as the attainment of the proposed economic indicators to increase the productivity level. At the level of Galați County, for the rural area, it is proposed to diversify the areas in which jobs can be created (outside agricultural activities), to make the access and links between the urban and rural areas more efficient, to allow the transmission of information and create synergies between the environment. urban social with rural. Also for the rural development it is important to support the entrepreneurs in the agricultural field and to support the diversification of the products, to combat the risk in the agricultural field and to develop the infrastructure of roads and buildings (for education or vocational training). For such actions, organizational tools have been created that allow quick and easy access to certain financing programs with local impact, called LAGs (Local Action Groups). Local action groups represent public-private partnerships made up of various representatives of the socio-economic sector in the respective territory. They may be the representatives of the various fields, including representatives of civil society. The LAGs elaborate an integrated local rural development strategy and are responsible for its implementation. Regarding the development of the rural environment, in Galati County there are the following local action groups that are involved in projects of sustainable development of the rural environment: the Local Action Group "Tecuci Development Association", "Covurlui LAG Association", Local Action Group Association ”The Low Meadow of Siret”, Association of Local Action Group “Siret Barlad Est” and Association of Local Action Group “Eremia Grigorescu 1863” Galati [3].

These newly created structures only facilitate the relationship of public administrations or private organizational structures to develop projects that solve the problems identified at local level in areas such as: education, culture, infrastructure, tourism, business environment, agriculture, social services, etc. The great chance for the development of rural localities seems to be represented, after accession, by the European funding programs. The manner in which these structures can develop certain projects at rural level, is the basis of the financing obtained through two financing programs: LEADER and NPRD (National Program for Rural Development). The LEADER program it is part of the European Union's Community initiatives. This initiative was born on the occasion of the reform of the Structural Funds in 1989. The purpose of the LEADER program is to provide support and to encourage the inhabitants of the rural area to evaluate the long-term development opportunities of the micro-region. The intention is to support the implementation of integrated strategies, with innovative solutions and that ensure the sustainable development of the region through: protecting the local cultural and natural heritage; strengthening the rural economy, which means first and foremost job creation; improving the administrative capacity of local communities.

“The National Program for Rural Development 2014-2020 is the program that grants non-reimbursable funds from the European Union and the Government of Romania for the economic - social development of the rural area in Romania. NPRD is funded by the European Agricultural Fund for Rural Development (EAFRD). The EAFRD is a financial instrument created by the European Union to support the Member States in implementing the Common Agricultural Policy (CAP). NPRD (funded from the European Agricultural Fund for Rural Development) supports the strategic development of the rural area through

the strategic approach of the following objectives: OS1 Restructuring and increasing the viability of agricultural holdings; OS2 Sustainable management of natural resources and combating climate change; OS3 Diversification of economic activities, job creation, improvement of infrastructure and services for improving the quality of life in rural areas. Considering these instruments that can have a major impact on the sustainable development of the rural environment, we can say that there are equal opportunities for the economic growth of the rural environment as well as the urban one, but based on the analysis of the statistical data we observe an asymmetrical development of these environments" [9].

Most of the 61 localities of Galati County that currently make up the rural area, face a low degree of basic infrastructure development, but they are eligible for investment projects. However, the existing human resources are not uniformly distributed among the territorial administrative units. The first measure in ensuring the efficient use of the funds allocated through the NRDP 2014-2020 is the identification of the areas where the realization of investments in infrastructure would register the highest levels of the effect / effort ratio from the perspective of socio-economic development [6].

The measures that are required at the level of the local public administrations must take into account a concrete strategy that involves the involvement of both the private and public environment regarding the absorption rate of the European funds for the sustainable development of the rural environment. Development solutions need to be looked at with different measures for each locality, because there is a different character and a specific degree for each of them. As a result, it can be concluded that for each locality there must be a development strategy with an efficient medium and long term impact, as well as a well structured local action plan, in order to benefit from the advantages offered by the specificity of the area.

Strengthening and developing the local economy by attracting new investors and supporting local entrepreneurs will contribute to increasing the quality of life of the population both directly and indirectly. Directly by creating diverse and well-paying jobs and indirectly by increasing the local budget. "In this way the local public authorities will be able to support the development of services in the field of education, health, culture, social services and will be able to launch works of modernization and development of the infrastructure. The support of the agricultural sector is one of the most feasible variants at the local level, considering the resources owned by the localities of Galati County".

CONCLUSIONS

Galati County needs a radical transformation in terms of sustainable development of the rural environment. This involves highlighting the cultural, economic identity and creating a favorable business environment both in the agricultural sector and in various fields of services. The basic functions of rural, economic, ecological and socio-cultural areas are the key dimensions of sustainable development. The theoretical analysis presented in this article emphasizes the socio-economic data and the current and future characteristics for creating tools suitable for sustainable rural development directions.

Thus, we can say that the sustainable development of the rural region is a concrete objective of the rural policy that aims at its conservation and development, the development of the economic environment and the improvement of the quality of life. This objective can be achieved by outlining some appropriate policy options and strategies that will meet the agreement of the involved territorial administrative units, economic agents and the population. The development of basic infrastructure and local services in rural areas are the essential tools in any activity to exploit the growth potential and to promote the sustainability of rural areas. Infrastructure development is the first step in the local development process. Facilitating the access of the population from the rural area to utilities (running water, sewerage, natural gas and electricity) will increase the interest of the

population towards the rural area, acting as an "adhesive" for the potential investors. it is the creation and support of the economic environment thus creating a competitive, stable and diversified space, in order to ensure the continuous economic growth and the increase of the quality of life of the inhabitants.

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FROM FARM TO TABLE. MANAGEMENT AND MARKETING FOR SMALL FARMERS

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Abstract

Management and marketing strategies for agrofood production and European distribution policies for agriculture are centered on production. EU and Romania pay huge subsidies to farmers. However, all this policies concern the first link in the chain of food production and distribution. The Romanian small farmer is stimulated to produce raw materials then to sell them at a very low price in the absence of adequate storage spaces. This can increase the value added by selling finished products. Even if it produces finished products, the small producer does not reach the consumer but an intermediary, a link in the distribution chain, as in vegetables and fruits production. In this article we propose a model to shorten and streamline the distribution chain from producer to consumer. The first strategy is to create an associative form that establishes policies regarding the production, what to produce and in what quantities, depending on the demand on the market, whether to sell unprocessed products or to make some small canned goods. The second is the realization of a price strategy, which will be realized after a research among the consumers. The third policy is to determine how the products are distributed and exactly where. The last strategy, but not least, is to create a local brand and promote it among consumers. There will also be small processing units for finished products. All decisions will be made after conducting a research among consumers, the necessary research to find out the consumers preferences regarding the price, brand and other aspects that will be the basis for realizing the policies of the associative form. One of the biggest challenges will be to convince the small Romanian producers to associate, being very well known that they do not want to associate unless they have a real motivation, which is most often financial or the safety of selling of their products. We choose an interdisciplinary approach, using both management and marketing tools due to the complexity of the studied problem, both upstream, that is production, and downstream, distribution.

Key words**:** *management, marketing, agrofood, production, distribution, association, farmers*

INTRODUCTION

The importance of the subject is given by the fact that small producers live on the brink of subsistence, most of them selling their products along the roadsides or near the markets in the city. Most of the time they do not have access to the agri-food markets.

Therefore, small producers are humiliated, often fined by the police and after paying for transport they are left with a small amount of money, sometimes nothing. The purpose of this paper is to create a simple and efficient model with the help of management and marketing strategies that will support the small farmers. They must sell their products at a fair price and be sure that they do not work in vain. This would help the local economy.

This also ensures consumers access to fresh local products. To carry out the work we conducted a qualitative study among small producers to see if they agree to be part of an association. During the research I carried out a qualitative research among small producers and the results were not what we expected.

Finding a model by which small producers can be helped is the ultimate goal of the paper. This would prove social responsibility, in the context where the producers are local, from the rural area, of small size, and the consumers are from nearby cities.

The research results will be presented in the next part.

MATERIALS AND METHODS

The purpose of the research is to find a more profitable way for the little farmers to extent their businesses, compromises which they would be able to make as creating the associations, the availability to focus on

storage, on the processing and distribution and not just selling the raw material.

The research was made in Teleorman County between 07th of February and 26th of March 2020.

A number of twenty small farmers was interviewed at their farms.

In this regard we identified five research objectives, as following below:

Q1: Identifying the availability of small farmers to associate.

Q2: Identifying the possibility to create some storage and processing centers.

Q3: The possibility of creating a chain of their own distribution.

Q4: Identification of willing to work with big chains of supermarkets.

Q5: Possibility of creating your own local brand.

The questioner's questions were:

Q1: Are you willing to associate?

Q2: Would you like to have a storage and processing center?

Q3: Would you like to create your own distribution chain?

Q4: Are you willing to work with the big supermarket chains?

Q5: Do you want to create your own local brand?

RESULTS AND DISCUSSIONS

A theoretical approach

The biggest problem we have at the rural level is the fact that although we are in the top 6 EU countries by agricultural area, we are not performing.

The lack of performance is given by the fact that the agricultural areas are not planted together, on large areas, but on the contrary, there are many and with very small areas, which ensure the subsistence of farmers' families.

If at European level the key to success is given by the association in different forms and by the support of the Governments, in our country we have both problems related to the association and to the financing.

The number of individual holdings is around 80,000 holdings [7].

According to National Institute of Statistics [9], the mechanization in agriculture is weak, the number of tractors being less than 200,000, not to mention sophisticated agricultural equipment.

The problems do not stop at the fact that we have many subsistence farms and are not mechanized, but go further, in the sense that these farms work very small areas under 0.1 ha, 3,158,890 households, between 1 and 2 ha 746,430 units and 929,273 works between 2 and 5 ha [7].

Analyzing the situation of Romanian households, we realized that in our country we have a number of over 2.6 million family gardens, from which they feed their own families and whose surplus is capitalized in various forms.

From year to year, the rural population has decreased dramatically [6].

We all know that young people in our country have emigrated in search of a better life, leaving villages deserted or with an aging population.

Elisabeth Laville talks in her book "L'entreprise verte" (green organization) about the new social and human imperatives [8].

The same paper shows that the economic paradigm must be changed, taking into account this time both the social and the ecological dimension [8].

In a old paper, we made a SWOT analyses of the agri-food sector in Romania, and we found a lot of weakness, among all, low productivity. One of the threats was the poor absorption of European funds and aging of rural population [1].

In order to answer these problems faced by the Romanian village, the work "Green Management" comes with a model of good practices, seeing everything as an ecosystem [3].

A marketing strategy would be very good to redesign the producer-consumer relationship, for the benefit of both parties [2].

Consumer satisfaction is poor when purchasing peasant products on the side of the road, often on sidewalks and we propose a model to change this, both for the benefit of the consumer, especially related to health, and the financial gain of the child manufacturer.

In the work "Limits of certainty", the value and time are discussed. If we look at the small producers, they spend more time on the road, while they are selling the products, than they are actually working the land. This paradigm must change and we will propose some solutions [5].

In State of the World 2008: Innovations for a Sustainable Economy, it is shown that we must move from traditional economic growth to economic development, a development that must focus on the well-being of the people, and not a blind growth, at any cost.

However, in our country this new development model is left to wait and we must act now by creating a new economic model [4]. The same idea is addressed in the paper "Economic growth and the natural environment" [10].

Qualitative research

The sample structures

In the sample we included small local producers of subsistence farms, people who have no other income, surviving by selling products near markets.

In terms of age, 20% of those interviewed were between 46 and 60 years old and 80% over 60 years old, meaning older people.

Regarding education, as shown in the table, all people have primary and secondary education.

In terms of income this is below 200 euros for 80% of the respondent, which shows a direct link between low income and the need to sell products to survive.

15% earn between 200 and 400 euros and only 5% over 500 euros. It was found that most live alone or with a partner (35% alone, 60% with a partner) while only 5% in families of three members (Table 1)..

The discussions with them were both at their households and at the points of sale, near the markets or in communal fairs.

For the first objective (Identifying the availability of small farmers to associate), we asked the producers if they *"are willing to associate".*

At this question, only 15% of the answers were "yes", and the most of them, 85%, were "no".

As we can see in the table above, small producers are not willing to cooperate or adhere to a form of association. When they were asked why they didn't want this, they failed to give a conclusive answer, so I concluded that this has more to do with the fear of the unknown and the way they used to work, even if rudimentary, for them it is an already known model, making performance being something they are not thinking about.

It's a system I don't understand.

Maybe if they would see success stories, then they would reorient and look at the association as an opportunity.

Many of the respondents asked me at the end of the interview who would be the leader of the association.

Table 1. The sample structure

Characteristics	**Share in the sample**	**Results**
Age groups	46-60 Over 60	20% 80%
Education	ISCED 4 or less *	100%
Monthly income	‹200 EUR 201-400 EUR ›500 EUR	80% 15% 5%
Number of family members	1 2 3 ›4	35% 60% 5% 0%
Gender	Male Female	35% 65%

** ISCED = International Standard Classification of Education. ISCED 4 or less is roughly equivalent up to post-secondary non-tertiary education.*

Source: Field survey, 2020.

The analysis of data

Table 2. The results

Questions	**Measurement**	**Results**
Are you willing to associate?	Yes No	15% 85%
Would you like to have a storage and processing center?	Yes No	75% 25%
Would you like to create your own distribution chain?	Yes No	5% 95%
Are you willing to work with the big supermarket chains?	Yes No	35% 65%
Do you want to create your own local brand?	Yes No	60% 40%

Source: Field survey, 2020.

"Would you like to have a storage and processing center?" is the second questions, and it serve the second objective, "Identifying the possibility to create some storage and processing centers".

Most of them, 75%, agreed with the storage centers, but when it came to open processing units, they were reluctant, raising different problems or barriers, such as legislative, bureaucracy, additional expenses and especially the lack of financial resources for investments.

Only 25% of answers were "no".

When asked if they know that non-reimbursable European funds can be accessed for processing units in rural areas, they nodded negatively, saying they did not believe this, considering that it was not possible for anyone to give them money for nothing.

The possibility of creating a chain of their own distribution was the third objective and for this we applied the next question:*"Would you like to create your own distribution chain?".*

Regarding the creation of their own distribution chain, most of the interviewed farmers (95%) were not willing to try it on the grounds that it is a very complicated problem that goes beyond them.

However, they would be willing to help someone integrate into a ready-made chain.

Identification of willing to work with big chains of supermarkets is another objective of our research and for this we asked the small farmers if they *"were willing to work with the big supermarket chains?".*

35% agreed and 65% weren't agree to work with the big supermarket chains.

Most of the arguments were that they hit barriers at the entrance to these supermarket chains, where the import products have priority over the domestic ones. They also argued that they cannot deliver products all year round as supermarkets need them, due to the lack of stores, therefore the big chains prefers to work with importers.

"Do you want to create your own local brand?" was the last question.

When we talked about the possibility of creating a new local brand, they seemed to not know what we were talking about, not understanding the concept very well, and then after a few examples they became excited by the idea having as motivation a kind of local patriotism, 60% answered positive and 40% in negative (Table 2).

Conclusions

Qualitative research among small farmers has shown us that small farmers are not willing to do anything extra work to become more efficient.

The association seems not realistic for them, the requirements of supermarkets seem impossible, and the creation of storage and processing centers are not easy to reach.

Under these conditions, creating their own distribution chains and creating their own brand seems like an utopia.

However, they would be willing to sacrifice but to do something in their place, without having any additional responsibilities.

Management and marketing strategies for small farmers

We propose below a model whereby small farms become a successful business model meant to ensure a sustainable development of the community. In the qualitative research it was done and noticed that small farmers are not willing to associate, this is due primarily to the lack of information. In order to determine the farmers to associate, they must be presented with success stories from the country and from abroad, especially a model of good practices in which are highlighted the advantages and opportunities of the association.

This could be part of a project funded with non-reimbursable European funds.

In our model we propose redesigned agricultural policies.

Fig. 1. A new four-step subsidies model
Source: Own design.

At present the subsidies are given only on the basis of agricultural production of raw materials, which is totally wrong because the value added is little.
In our model (Fig. 1), we propose that the subsidies be divided into four phases, as follows:
-subsidy for unprocessed products;
-subsidy for storage;
-subsidy for processing;
-subsidy for own distribution.
This would stimulate the processing and shortening of the distribution chains, in the sense that the products would arrive directly from the farmer on the shelves of the stores and later on the consumers table.
For this, the European Union must adapt its agricultural policy, especially regarding subsidies in the sense that the subsidies must follow the product from the raw material stage to the finished one from the shelves of the stores.
For the raw material to be processed, the first step is to create modern deposits of sufficient capacity to provide the raw material for processing throughout the year.
Thus the farmers will no longer be forced to sell the raw material at ridiculous prices.
Regarding the distribution of products, besides the classic channels, we set up the creation of online stores and other brands, for example "Product in Teleorman".
Online stores and "Product in Teleorman" must come as a healthy alternative to imported products and consumers will be aware that besides the quality and health benefits due to local products, by buying them they will support the local economy, being a proof of responsibility social.
Regarding the marketing strategy I proposed an integrated model (Fig. 2) based on the marketing mix, respectively:
- product policy;
- price policy;
- distribution policy;
- promotion policy.
Regarding the product policy, we propose the transition from unprocessed products, to their processing, the manufacture of preserves, candied fruits, etc.
Fresh products of the highest quality will be used, which will be found under the brand name "Product in Teleorman".

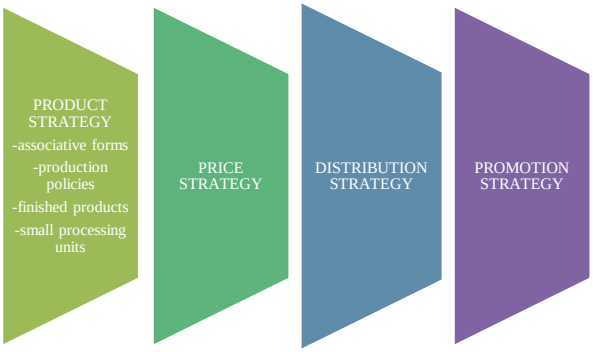

Fig. 2. Management and marketing strategies for small farmers
Source: Own concept.

The label of the product will have the map of Teleorman county and, the commune where the processing unit is will be marked with a point on the label`s map.
The processing units will be small to medium size, and will consist of ten to twenty small producers. The product range will be formed according to the specifics of the manufacturers.
Regarding the price strategy, we propose a fair price, consistent with the quality of the products. The distribution will be done first of all in the online stores as well as in the brand stores "Product in Teleorman". The promotion will be done online and in stores through tastings and printing materials. For a successful promotion a beautiful story will have to be created meant to develop in the consumer the feeling of local patriotism (Fig. 3).

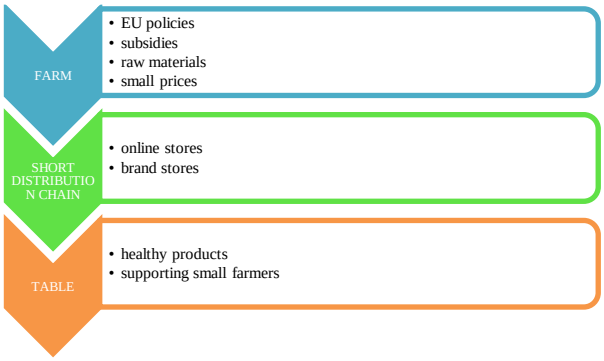

Fig. 3. From farm to table, short chain
Source: Own concept.

The limits of research

The research has quite a few limitations, first of all because it was limited to a small

geographical area and to a number of twenty respondents.

At the same time, we consider that the situation differs from one area to another, depending on the predominant cultures in the area and the propensity of the producers for the business, being common ones that are oriented more towards trade others towards production.

CONCLUSIONS

We can conclude by saying that as the small European farmers managed to associate, create well-known brands (of cheese, wine, pasta, etc.) and short distribution chains, this would be possible with us too, with the involvement of both farmers and authorities.

Unfortunately, the biggest challenge is not changing the mentality of the small producers, who when they see promising prospects will be eager to associate and develop, but rather to change the European policies.

The great European powers do not want finished products from Romania but raw materials that they will process and resell them to us, as finished products with high added value through supermarkets in our country.

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SCIENTIFIC BASICS AND PROSPECTS OF DEVELOPMENT OF PRODUCTION OF ORGANIC ANIMAL PRODUCTS IN RUSSIA

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Abstract

The purpose of the study is to work out the scientific basics for the development of organic production livestock products for their application in the practice of the agro-industrial complex of Russia. In preparing the article, we took data from the Ministry of Agriculture of the Russian Federation, the Federal State Statistics Service of the Russian Federation, statistical materials FAOSTAT, EUROSTAT, scientific works of Russian and foreign scientists. The following methods of scientific research were used: statistical-economic, monographic, abstract-logical, calculation-constructive. Using the principles of a system approach, the scientific basics for the development of organic production, from the author's point of view, has been developed, which is a form of scientific knowledge that studies the sequence of creation and development of enterprises in organic agriculture, ensuring the effective construction and interaction of the system structure. A system analysis of the environment in which the development of organic livestock production is supposed to take place has made it possible to divide the scientific basics into three blocks of elements (technological, economic and social), including all its stages (problem-tasks-solution).The probable efficiency of production of organic livestock products is substantiated on the basis of its total cost indicator, predicted before 2030, taking into account the use of organic production methods and without them, using extrapolation and analogy of European experience.

Key words: *livestock, scientific basics, organic products, Russia, agriculture*

INTRODUCTION

At present, agricultural producers in Russia have understood the need to switch to organic production, the advantages of which are improving the quality and competitiveness of products on the market, increasing the efficiency of organizations by increasing the price of products, and also improving the living standards of the population through good nutrition and prevention.

Organic farming concepts were developed by Sir Albert Howard [16] in the early 20th century. He developed organic farming practices and distributed them through the British Soil Association and the Rodale Institute in the USA. He reflected his views on organic agriculture in the book "Agricultural Testament". Rudolf Steiner, a philosopher, social reformer, architect and esoteric, introduced the concept of "biodynamic farming", the main idea of which is to see a farm as a whole self-sustaining organism producing fertilizers and feed, and the disease appears to be a problem of this organism [26]. In modern times, biodynamic farming is widely used in many countries of the world. Also one of the scientists at the origins of organic farming is Lady Evelyn Barbara "Yves" Belfour [17]. In 1943, her book "Living Soil" was a breakthrough for the development of organic production and natural agricultural products. The term "organic farming" was first used by the english scientist J. Northbourne [18] in 1940. He considered the unity of God, man and the earth, and also negatively related to the industrial type of development. His views influenced the ideas of E.F. Schumacher [26], who believed that the economy should be oriented towards people in order to ensure sustainable development of the environment and man. Nowadays, many works by world

scientists on various aspects of the development of organic animal husbandry. Disclosure of the features of organic animal husbandry in comparison with traditional methods of raising animals was carried out by I. Blanco-Penedo [5]. The works of some authors are devoted to the study of world experience in the development of organic animal husbandry in various regions: Europe (S. Mirela [27], E. Herbut [14], S. Mihina [19]), Central Asia (H.R. Ansari-Renani [1], M . Chander [8]) and others. T.A. Boldanov [7], H.A. van de Weerd [29] is involved in the development of the organization of organic livestock management systems. Promising areas for the development and improvement of organic livestock are being studied by D.P. Bhandari [4], B. Horning [15] and E. Boehncke [6]. The market for Swiss organic products in households was investigated by S. Mann [13]. Romanian scientists Balan et al [2] and R.S. Cretu [11] studied organic farming. Issues of the business process and the risks of small and medium-sized organic farmland in Serbia were studied by D.V. Tsiyanovich [12]. The market of organic products of Moldova was analyzed in the works of Movileyanu P., Movileyanu V. [21]. A.T. Bolotov and V.R. Williams is considered the founders of organic agriculture in Russia. In the work of 1771 "On the separation of fields" A. Bolotov [3] proposed introducing crop rotation, as well as cultivating crops based on weather and soil. The works of Robert Williams [31] in the first half of the 20th century were devoted to grass field farming, as well as the fight against agrochemicals. Currently, the conceptual foundations of the development of the market for organic agricultural products have been developed [10] by such scientists as N.K. Dolgushkin, A.G. Paptsov, N.D. Avarsky, V.V. Taran, J.E. Sokolova, A.N. Osipov, H.N. Hasanova, V.M. Kruchinina, A.S. Lankin, E.A. Novoselov, S.M. Ryzhkova, E.A. Silko, A.N. Stavtsev, O.V. Zakarchevsky, D.S. Natarov. Theoretical and methodological foundations and strategies for the development of organic production are studied by O. Yu. Voronkova together with other scientists [30]. Measures for the development of organic management at enterprises and the methodology for organizing and controlling the production of organic meat raw materials described in the works of N. N. Zabashta, E. N. Golovko and others [32]. The development of the scientific basics for the development of the market for organic dairy cattle products was made by A. S. Nechitailov [22]. Despite the relevance and popularization of the concept of "organic production" in Russia, their theoretical study, conceptualization of basic concepts and terms, development of methods, principles and development factors have not yet been carried out. Therefore, at the present stage, it becomes necessary to develop the scientific basics for the development of organic production in Russia, in particular in the livestock industry, which is one of the main for providing the population with quality, safe and nutritious products.

MATERIALS AND METHODS

In preparing the article, the information used was taken in the Ministry of Agriculture of the Russian Federation, the Federal State Statistics Service of the Russian Federation and in statistical materials FAOSTAT, EUROSTAT. The subject matter was researched by the authors as a complex of interconnected elements, which corresponds to the methodology of the system approach. Such a perception and study of the conceptual-categorical apparatus made it possible to formulate the quintessence of the scientific basics for the development of organic production, which is a form of scientific knowledge that studies the sequence of creation and development of enterprises in organic agriculture, ensuring the effective construction and interaction of the structure system. System analysis is a combined component of a systematic approach and is a sequence of procedures to identify the correlation between the components of the system. The study of systems was carried out by many scientists, each of whom has his own vision of the concept, classification, structure, laws of their functioning, as well as characteristics and stages of system analysis. The development of the scientific basics for the

development of livestock production allowed us to conceptualize these stages as follows:

1. Definition of a problem – 2. Statement of tasks – 3. Searching of decisions

A system analysis of the environment in which the development of organic livestock production is supposed has led to the specification of the scientific basics in three blocks of elements, including all its stages (Fig. 1). The development of any production cannot be determined without the inclusion of the technological aspect, which is its basis. The market environment determines the goal of the functioning of any object to achieve the maximum financial result, which determines the allocation of the economic element in the development system of organic livestock. Understanding that the development of production and economic activity are the main forms of activity of society as a whole allows us to isolate a separate social element in the system. Conducting a phased system analysis of each element will allow us to formulate the scientific basics for the development of the production of organic livestock products.

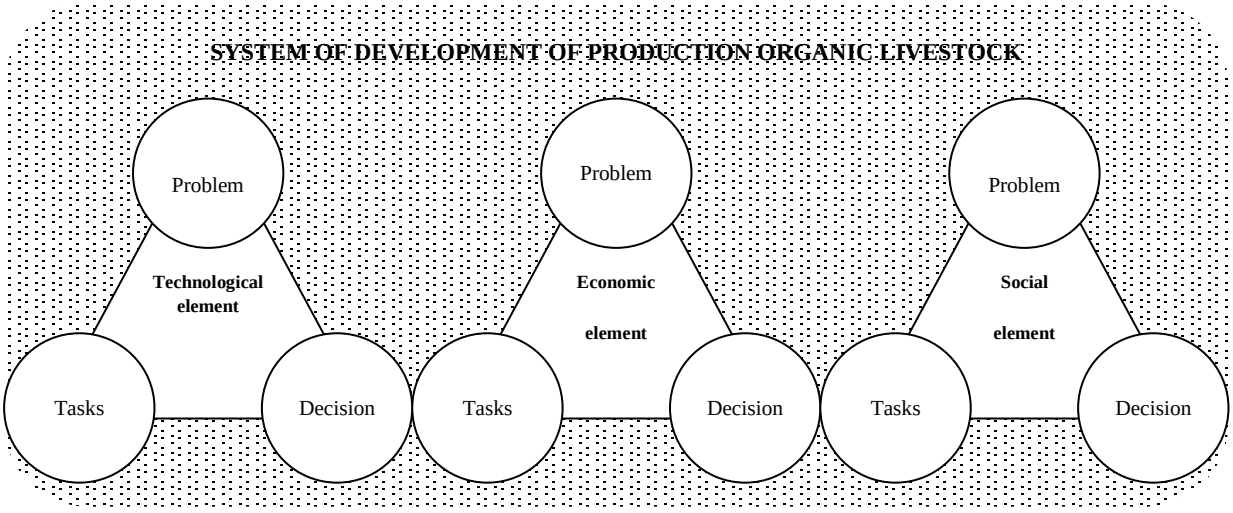

Fig. 1. The introduction of elements of scientific basics in the system of development of production organic livestock
Source: Compiled by the authors.

The principles of systems and dynamics allow us to rely on the theory of Harvard school, in particular, W. Mitchell [20] and W. Persons [24], in developing the scientific basics for the development of organic production. The created Harvard barometer was based on the understanding that in the dynamics of various elements of the economy there are indicators that go ahead of others in their changes, and therefore can serve as harbingers of the latter. He described the empirical laws of the three curves (A is the stock market; B is the commodity market and C is the money market), which is the arithmetic average of the series of indicators included in them and extrapolated to a given time period. The barometer predicted a change in each curve based on a change in the others. One of the main methods of knowing the sphere of economic activity is the analogy, which is the knowledge of a phenomenon or object by transferring its nature to another phenomenon or object for the purpose of studying. A.I. Uyomov [28] developed an ontological-methodological concept used in system analysis, one of the directions of which is the creation of a theory of conclusions by analogy. "An analogy can also be determined through modeling (although the opposite approach is often used); in this case, the analogy should be called «transfer of information» from the prototype to the model and vice versa." The variety of forecasting methods made it possible to choose one that is most closely related to analogy. Extrapolation can be interpreted as to some extent an analogy for a number of signs. In the definition of extrapolation, its relationship with analogy is traced. It is a research method in which the conclusions drawn from observation of a part of a phenomenon are transferred to its other part, that is, forecasting occurs (Fig. 2).

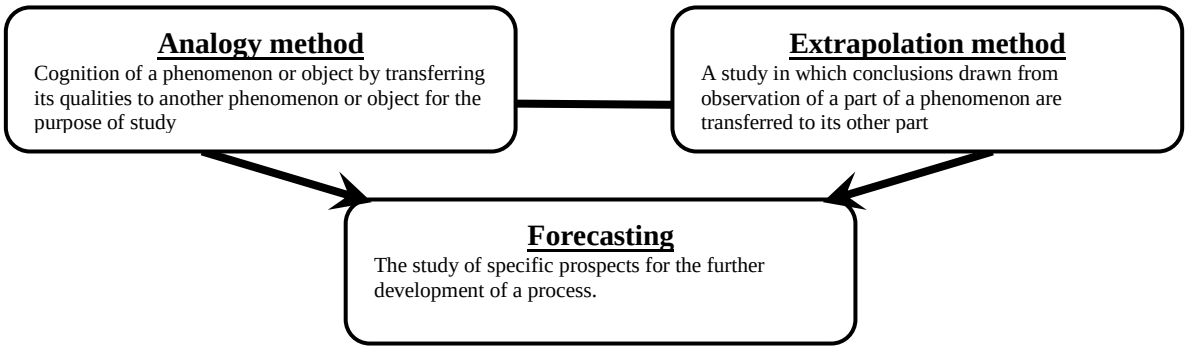

Fig. 2. Correlation of economic research methods to justify the development of production of organic livestock products
Source: Compiled by the authors.

Organic production in Russia at this stage is only beginning to develop. There is still no precise study of regulatory issues, state support, a ready-made certification and conversion mechanism. To justify the prospects for the development of organic production in the region, we consider it reasonable to use the methods of economic analogy in symbiosis with the extrapolation method in forecasting.

RESULTS AND DISCUSSIONS

Currently, nearly 200 countries are engaged in the production of organic products in the world. Over the past 20 years, the market for such products has grown more than 5 times. The leading place in this market is occupied by the USA, Germany and France.

A review of data on the production of organic products in various geographical regions showed that in Africa and Asia they are mainly engaged in crop production, since arable land and perennial plants occupy a large share in the structure of land use. In Europe and North America, arable land and pasture land occupy approximately equal shares. Australia and Latin America are the leaders in the share of livestock production.

In most countries, organic livestock is represented by the production of beef, milk and lamb. The stock of all types of animals used for the production of organic products is growing [23]. The main problem is the difficulty in providing certified feed for monogastric animals such as pigs and poultry. And also the need to bear sufficiently large costs to create conditions for the maintenance of such animals (cages, pens). Accordingly, for the consumer, this increases the final price of the product. It is much easier to keep and feed organic animals on a walk (cattle, sheep).

In terms of per capita consumption of organic products, the USA and European countries are considered leaders, here the population has the opportunity to overpay for organic products to add them to their daily diet.

At present, Russia does not keep a statistical record of organic production - data are not collected or accumulated, which made it difficult for the authors to assess the current condition of organic production. Available information has led to the following conclusions. The volume of organic production in Russia is growing. For the period from 2014 to 2016 it increased by almost $ 20 million to $ 160 million. However, this amounted to only 0.02% of the global volume, and the number of people who constantly consume organic products was about 1%. Organic production is most developed in such constituent entities of the Russian Federation as the Krasnodar Territory, Yaroslavl and Moscow Regions, as well as the Republic of Tatarstan, where the program Development of agricultural production and the creation of the innovative cluster "Econutrition" has been adopted. In Tatarstan, for the first time in Russia, territories were ranked according to the degree of readiness to carry out organic production.

The website of the National Organic Union provides a list of Russian certified producers of organic products as of today. In total, there are more than 80 organizations on this list, mainly having a certificate for the production of crop products. This is information obtained from

open sources, that is, voluntarily. Only eight enterprises announced the production of livestock organic products and two for milk processing. Organic farming is mainly concentrated in the Kaluga and Yaroslavl regions.

The work of two farms with recognizable brands in Russia – the "AgriVolga" holding of the Yaroslavl region and the eco-company "Stories from Bogimovo" of the Kaluga region was considered as an object of research on organic livestock production. Each of them had its own way of developing the organization of organic production. "AgriVolga" is a large holding that has united dozens of enterprises, transformed and reorganized their production into organics. "Stories from Bogimovo" is a small enterprise organized "ab initio" by a group of volunteer activists who have applied the European experience in organizing organic animal husbandry.

In general, in Russia, the livestock industry is represented by a small number of farms producing certified organic products. However, this does not mean that there is no production of such products. Due to the imperfection of the legislative base and limited information, producers have not received the necessary certificates. After the entry into force of Federal Law No. 280–FZ from 01.01.2020, all previously obtained certificates for the production of organic products are canceled, and you can get them again only at an organization accredited by the Federal Accreditation Agency. To date, the accreditation process has passed "Organic Expert", certificate number RA.RU.10HB01.

Having studied the theory and methodology of the scientific basics of the development of production, as well as the practice of developing the production of organic livestock products in the world, the authors proposed a scheme of its scientific basics (Fig. 3).

The technological component involves the creation, implementation or change of livestock production technology, taking into account the requirements of the standard for the transition to the production of organic products.

The economic component of the scientific basics for the development of organic livestock production is determined by the change in the financial and economic situation of the economic entity in the transition to the production of organic livestock products.

The social component of the scientific basics for the development of organic animal husbandry involves reducing social tension and improving the quality of life of the population through the formation of the habit of consumption of certified organic meat and dairy products.

The developed scientific basics are recommended to be put into practice as a single mechanism for organizing the production of organic animal husbandry, that is, all three components must be included – technological, economic and social, then the tasks set to improve product quality, enterprise performance and improve the nutritional quality of the population will be achieved by response proposed decisions.

The practice of organic farming in the world shows its effectiveness and attractiveness to investors [9]. The increase in the selling price of organic products significantly outstrips the growth in costs of its production, the volume of production of such products in value terms is also increasing. In Russia, due to the fact that until 2020 there was no legislative base (Federal Law No. 280–FZ entered into force only in January 2020), organic production is poorly developed, the lack of a single base of organic producers does not allow collecting and processing the available statistical information about them activities.

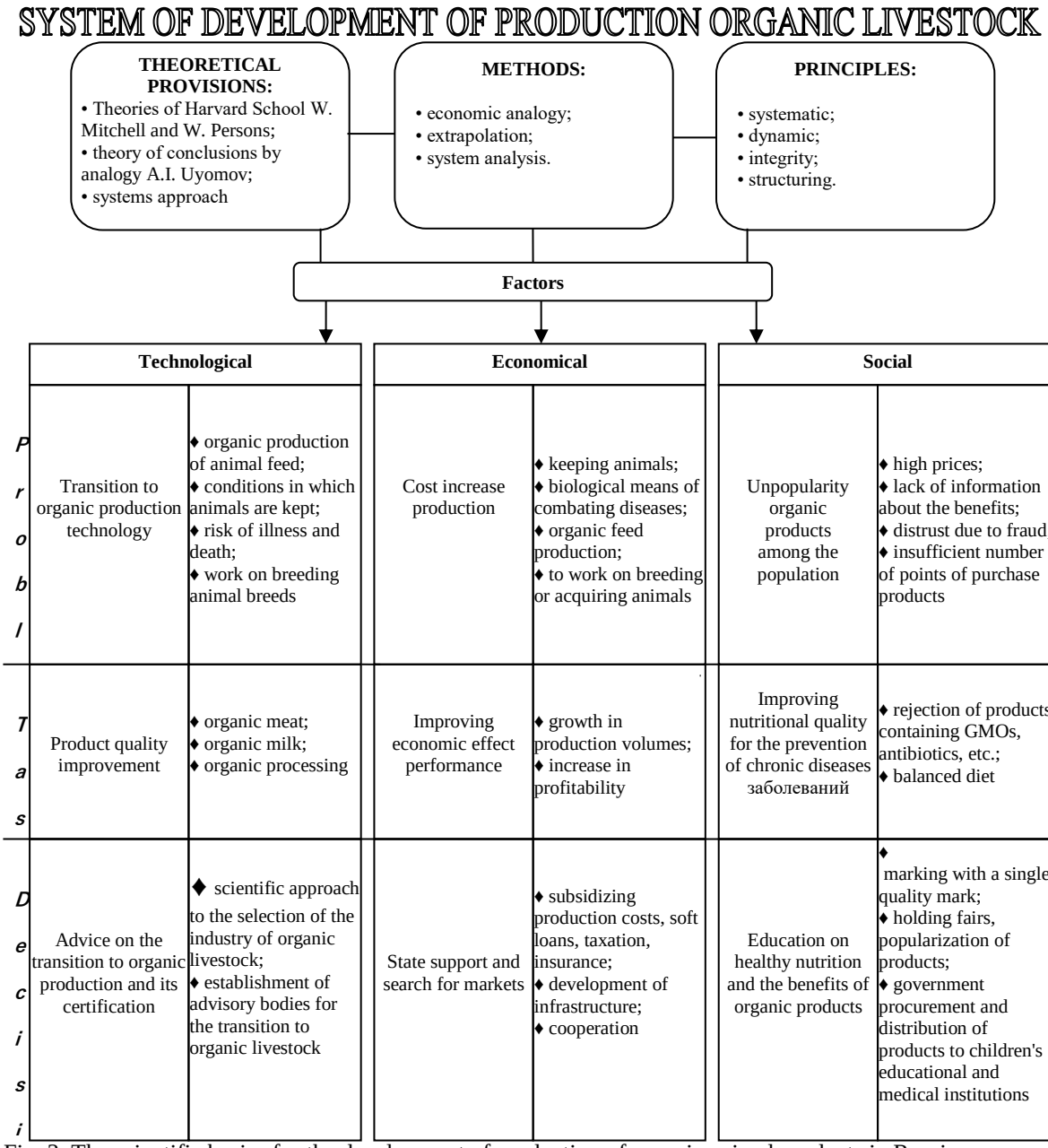

Fig. 3. The scientific basics for the development of production of organic animal products in Russia
Source: Compiled by the authors.

To assess the effectiveness and attract potential producers, a forecast was developed for the development of organic animal husbandry in Russia until 2030 using extrapolation and analogy methods.

The use of extrapolation in forecasting is due to the sufficiency of the time period of the source data to identify development trends. When forecasting, the method of selecting functions was used. When plotting trend lines for all types of animals, a high tightness of communication was observed – the determination coefficient $R^2 > 0.9$.

In general, the forecast showed the following results: a reduction is expected only for the number of cattle, for the rest of the animal species, an increase is expected by 2030 (Fig. 4).

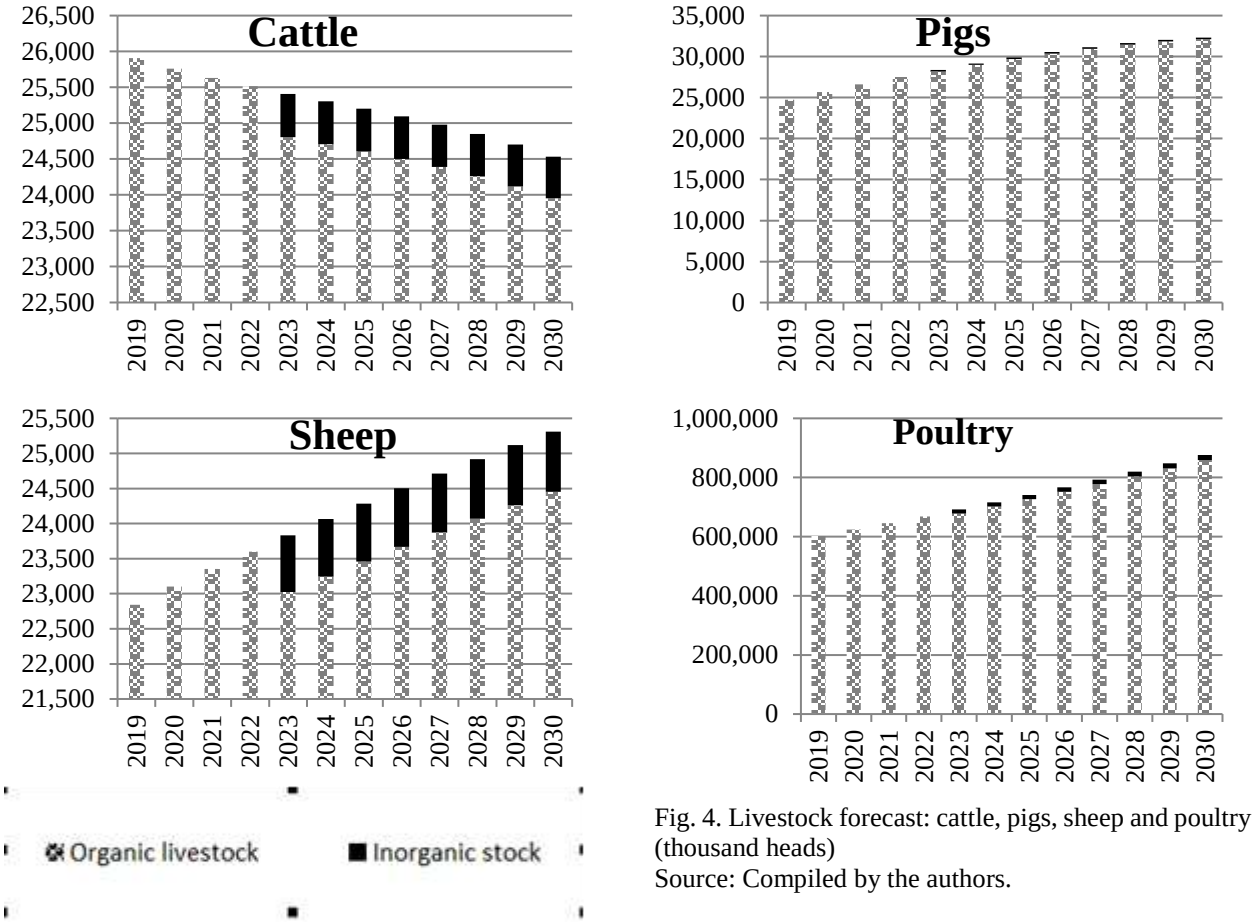

Fig. 4. Livestock forecast: cattle, pigs, sheep and poultry (thousand heads)
Source: Compiled by the authors.

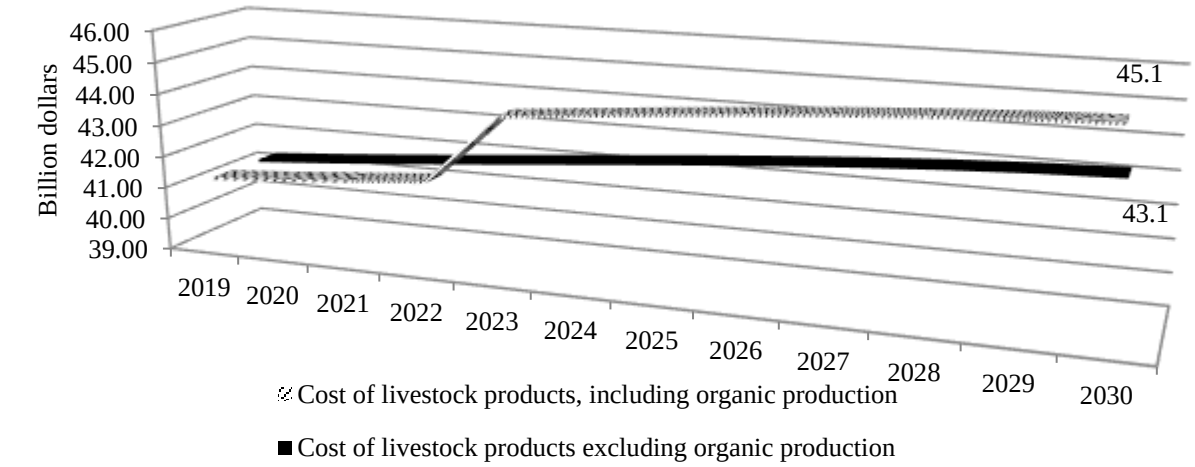

Fig. 5. Development of production of organic animal products in Russia (forecast)
Source: Compiled by the authors

Using the initial data, an organic livestock was set aside. This was done taking into account the ratio of organic livestock to total livestock in Europe. It was also taken into account that after the entry into force of Federal Law No. 280–ФЗ from 01.01.2020, the conversion period will begin, during which the products will not be organic for 3 years.

Using special conversion factors, as well as selling prices of inorganic and organic agricultural products, a forecast was obtained for the development of production of organic livestock products in Russia in value terms (Fig. 5).

2020-2023 – the period of transition to organic production (conversion), starting from 2023, the cost of livestock products will begin to

increase, and given that the price of organic livestock products is higher than inorganic, its cost will be higher, according to the forecast, by 2030 it will reach 45.1 billion dollars.

The decrease in the number of certain animal species in Russia will be offset not only by an increase in the number of other animals, but also by an increase in the selling price of products that will be certified as organic. The developed forecast shows that the development of organic livestock in the Russian Federation will be a catalyst for increasing the efficiency of agricultural production in general.

CONCLUSIONS

Studying the principles of a system approach made it possible to formulate the scientific basics for the development of production of organic livestock products. All tasks were divided into 3 blocks of elements: technological, economic and social. Technological block involves the creation, implementation and change of production technology, taking into account the requirements of the standard for the transition to the production of organic products. The economic block of the scientific basics of development is determined by a change in the financial and economic situation of an economic entity in the transition to organic animal husbandry. Social block determines the reduction of social tension and the improvement of the quality of life of the population through the formation of the habit of consumption of certified organic meat and dairy products. The practical application of the developed proposals should be carried out taking into account the simultaneous involvement of all elements, then the tasks set for the organization of organic animal husbandry will be achieved by the response of the proposed decisions.

Organic livestock production in the world is growing dynamically – the number of animals and pasture areas are increasing. Due to technological and production features, the main organic products in the world are beef, milk and lamb. In Russia, according to the National Organic Union, about 10 enterprises received certificates for organic livestock, mainly in the Kaluga and Yaroslavl regions. However, one cannot assume that organic livestock farming is completely absent in Russia Federation, because due to the imperfection of the information and legislative frameworks, some enterprises producing products that can be considered organic by technical characteristics did not receive the necessary certificates. Studying the experience of the organization and functioning of organic production in Russia showed two ways of its development - large holdings, the transformation of technological processes into organics and small enterprises organized “ab initio”.

The forecast for the development of organic livestock in Russia until 2030 showed an increase in the cost of livestock production, taking into account the transition of part of production to organic. When forecasting, the data on the ratio of the organic population of animals to the total in Europe were taken as the basis. After the completion of the conversion period, starting in 2023, the cost will increase sharply and, according to the forecast, by 2030 it will reach $ 45.1 billion.

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RESULTS AND POTENTIAL IN THE ECONOMIC EFFICIENCY OF BREEDING YOUNG SHEEP FOR MEAT

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Abstract

The paper analyses the economic efficiency of the young sheep meat, for the year 2019, as well as the results that can be obtained following the variation of some indicators. The methodology used is the economic analysis, based on the calculation of technical-economic indicators and economic efficiency indicators. The results indicate that for young sheep meat, the total income value is higher than the total expenses by 6.6%. The variable expenses represent 97.2% of the total expenses, and within the variable expenses, the highest share, of 50.5%, is held by the expenses with fodder. The cost per unit of product is 9.4 lei/kg, and the average selling price per unit of product is 10 lei/kg live. If the value of the production increases by 20%, the gross profit increases by 28.6%. The price at the farm gate can vary between 8 lei/kg, if the production value is reduced by 20% and 12 lei/kg when the value of the production increases by 20%.

Key words**:** *economic efficiency, sheep, meat, indicators*

INTRODUCTION

In order to satisfy the need for sheep meat for domestic consumption, but also to create the export availability, it is necessary to fully exploit the productive capacity of the species for meat production, to make the best use of the fodder resources, to fatten the entire herd of lambs available for slaughter and to sale them at higher body weights, as well as to apply the methods to increase the economic efficiency of the breeding and fattening the young sheep [4]. Feeding is an essential factor, with direct influences on production and economic efficiency [3]. The application of breeding and fattening technologies for sheep youth, both in small and medium-sized farms, as well as in large farms, leads to very good results in terms of profitability.

Their productivity is conditioned, to a decisive extent, both by valorisation of all the productive particularities of this species, as well as by the viability and the pace of growth and development of the lambs [10].

The economic decisions must follow the optimal allocation of resources, taking into account the existing resources and a certain structure of the obtained results.

Of great importance is the quality of the results obtained, therefore, the whole concept of economic efficiency is a qualitative concept. Comparing the effects with the efforts, structuring this report under the influence of the time factor and tracking the quality of the obtained results ensures the efficiency of any economic activity [11].

It is known that Romania has a large availability and a tradition of sheep meat for export. In the last years, the activities of promotion of sheep meat have led to an orientation of the breeders in the direction of sheep meat production, but also of the consumers for an increase of this product among the consumption preferences. The sheep sector has significant potential for many rural areas in terms of development and employment, in particular through the sale of sheep meat, as well as high quality dairy products, which can be distributed through short supply chains at the local level [7].

MATERIALS AND METHODS

In order to analyse economic efficiency of young sheep meat, for the year 2019, a series of indicators were used. Thus, the technical-

economic indicators were estimated in terms of cost, price, productivity, profitability, breakeven point, as well as a series of economic-financial indicators such as the value of the main production, the productivity of labour force in value expression, labour costs at 1,000 lei main production, material expenses at 1,000 lei main production, total expenses at 1,000 lei main production and so on.
Also, simulations of possible scenarios have been performed, with decreases or increases in the value of the production, or with variations of certain categories of expenses, to see what results can be obtained.

RESULTS AND DISCUSSIONS

Starting with the calculation of the different categories of expenses of the technological estimate, the obtained results are presented in Table 1.

Table 1. Technological estimate - young sheep meat

	M.U.	Quantity	RON/ M.U.	RON /head
Fodder expenses				184.00
Hay	kg	156	0.60	93.60
Succulent fodder	kg	500	0.12	60.00
Coarse fodder	kg	0	0.10	0.00
Concentrates	kg	38	0.80	30.40
Biologic material	kg	15	10.00	150.00
Energy and fuels	RON			5.00
Medicines	RON			14.00
Other material expenses	RON			3.00
Supply	RON			8.70
Animal insurances	RON			0.00
TOTAL VARIABLE EXPENSES	RON			364.70
Labour	RON			10.60
General expenses	RON			0.00
Interest to credits	RON			0.00
Amortization	RON			0.00
TOTAL FIXED EXPENSES	RON			10.60
TOTAL EXPENSES	RON			375.30

Source: Own calculations.

Analysing the structure of expenses on young sheep meat, it can be seen that most of the expenses consist of variable expenses, and within them, about 50.5% are those with the fodder, followed by the expenses with the biological material (41.4%). This situation is shown also in the Fig. 1.
Table 2 presents the income and expenditure budget of the young sheep meat.

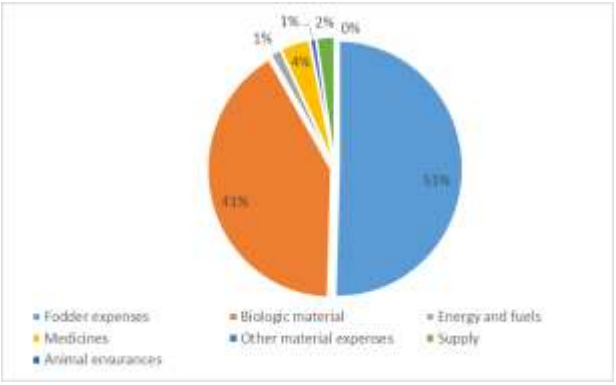

Fig. 1. Structure of variable expenses at young sheep meat
Source: Own calculation.

Table 2. Income and expenditure budget

	Average daily gain	
	RON/head	RON/kg
VALUE OF PRODUCTION	400.00	10.000
Of which, main production	400.00	10.000
SUBSIDIES	23.00	0.575
RAW PRODUCT	423.00	10.575
TOTAL EXPENSES	375.30	9.383
Of which, for main production	375.30	9.383
VARIABILE EXPENSES	**364.70**	9.118
Fodder expenses	184.00	4.600
Biologic material	150.00	3.750
Energy and fuel	5.00	0.125
Medicines	14.00	0.350
Other materials	3.00	0.075
Supply quota	8.70	0.218
Animal insurances	0.00	0.000
FIXED EXPENSES	**10.60**	0.265
Labour expenses	10.60	0.265
General expenses	0.00	0.000
Interest to credits	0.00	0.000
Amortization	0.00	0.000
TAXABLE INCOME	24.70	0.618
Taxes	2.5	0.062
NET INCOME + subsidies	45.2	1.131
TAXABLE INCOME RATE (%)	6.6	6.6
NET INCOME RATE+ subsidies(%)	12.1	12.1
COST OF PRODUCTION	375.3	9.383
PRICE	400.0	10.000

Source: Own calculations.

The calculated cost of production is 375.3 RON/head, and the delivery price of 10 RON/kg live leads to a production value of 400 RON/head. Adding the subsidies, it reaches a gross product of 423 RON/head. Under these conditions, the taxable income rate is 6.6%, and the net income rate plus subsidies reaches 12.1% (Table 2).
By applying intensive technologies and by specializing the breeding in the direction of

meat production, a high profitability can be obtained. These results can be obtained due to the technical-economic peculiarities of the species, of which we mention: makes good use of a wide range of forage resources; requires small investments and maintenance costs are lower; is suitable for joining with other zootechnical, or vegetable branches. [3]. In Fig. 2, there are presented the cost and the price of the young sheep meat, for the year 2019.

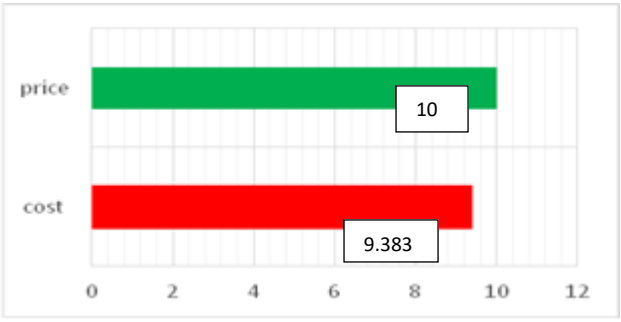

Fig 2. Production cost and selling price
Source: Own calculation.

The results show that the difference between production cost (per kg) and selling price of live sheep youth is very small, the rate of taxable income being 6.6%.
Under the conditions of accessing subsidies, the rate of net income plus subsidies amounts to 12.1% (Fig. 3).

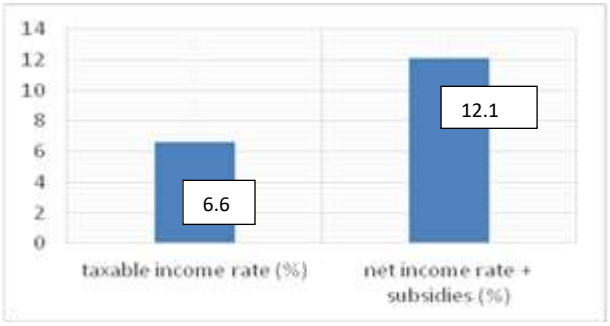

Fig. 3. Income rates for young sheep meat, 2019
Source: Own calculations.

The results indicate that the breakeven point is reached at a production value of 120 lei and a weight of 12 kg / head. The operating risk rate is 30%, and the security index is quite high, being 70%.
It turns out that the situation of young sheep meat is comfortable, because the safety margin is over 20%.

In order to estimate the economic efficiency of the young sheep meat for the year 2019, a series of indicators was calculated which we present in Table 3.

Table 3. Technical-economic indicators of economic efficiency

No.	INDICATORS	M.U.	VALUES
1	Average production	gr/head/ day	200
2	Value of production	RON/kg	10.000
3	Value of the main production	RON/kg	10.000
4	Total expenses	RON/kg	9.383
5	Expenses for the main production	RON/kg	9.383
6	Variable expenses	RON/kg	9.118
7	Material expenses	RON/kg	8.775
8	Fixed expenses	RON/kg	0.265
9	Labour expenses	RON/kg	0.265
10	Unit cost	RON/kg	9.383
11	Price	RON/kg	10.000
12	Work productivity in physical expression	Man - hours/kg	0.09
13	Labor productivity in value expression	RON/man-hour	111.11
14	Labor costs at RON 1000 total production	RON	26.50
15	Material expenses at 1000 RON total production	RON	877.50
16	Expenses at 1000 RON main production	RON	938.25
17	Profit or loss on the product unit	RON	0.618
18	Rate of return	%	6.6
19	Margin on variable expenses	RON	0.883
20	Margin on variable expenses%	%	8.8
21	Breakeven point in value units	RON	120
22	Breakeven point in physical units	kg	12.01
23	Operating risk rate	%	30
24	Security index		0.70
25	Absolute position as against breakeven point	RON	280
26	Relative position as against breakeven point		2.33

Source: Own calculations.

Some simulations of possible scenarios were made, as follows: increasing or decreasing the value of the production by 20%, as well as maintaining the initial result, when the fixed costs are reduced by 10% and the results are in Table 4.
When the value of production increases by 20%, the result increases by 28.58%, and when the value of production decreases by 20%, the result is lower by the same 28.58%. If fixed expenses are reduced by 10%, in order to obtain the initial result, a reduction of variable expenses follow, and the value of production will decrease by 3%.

Table 4. Simulations of possible scenarios

	Indicators	Values	%	Breakeven point Result = 0	Result to be obtained at an increase of value of production by 20%	Result to be obtained at a decrease of value of production by 20%	Maintaining initial result when fixed expenses are reduced by 10%
1	Value of total production	400.00	100	120	480.00	320.00	387.99
2	Variable expenses	364.70	91.18	109.51	437.64	291.76	353.75
3	Margin on variable expenses	35.30	8.83	10.60	42.36	28.24	34.24
4	Fixed expenses	10.60		10.60	10.60	10.60	9.54
5	Result	24.70		0.00	31.76	17.64	24.70

Source: Own calculations.

As potential for the young sheep meat, we can consider that the numerical evolution of the sheep herds indicates their increase since 2012. Romania ranks the 4th in the EU, after the UK, Spain and Greece.

Of the total number of sheep, over 99% belong to the private sector, and within it, over 92% are in individual agricultural holdings.

Domestic sheep meat production had a continuous growth trend between the years 2012-2017, reaching the end of the period with an increase of 8.4%.

Valorisation of sheep meat production: 56% of it is delivered directly to the market during the holidays, 33% is intended for family consumption - which involves a very small number of intermediaries.

As negative aspects, we can mention small productions, weak sales of the obtained products, due to the lack of slaughterhouses of small capacity, in order to increase the internal consumption of sheep meat.

In 2017, there were 256,000 farms in our country, of which over 61% fall in the size class under 10 heads, that is, belong to households that are not market oriented [8]. Young farmers and newcomers to the agricultural sector should be further supported, through direct aid and rural development policy, in line with national policies, in order to introduce incentives for the creation or takeover of sheep and goat farms, considering that the high average age of farmers in the livestock sector, which surpasses even that of other agricultural professions, due to their insufficient profitability, are among the main challenges in maintaining the vitality of rural areas and maintaining food security [7].

When approaching a European strategy in the field of sheep farming, we need to take into account the current and future directions of sheep exploitation at EU level, as the sheep sector in Europe is made up of important traditional agricultural enterprises, which support the survival of thousands of producers who provide products of excellent quality and with specific characteristics, as well as derived products, thus having an essential socio-economic contribution in rural areas [6].

In the extensive exploitation, the production of sheep meat is obtained economic certainty only if a large part of the feed is cheap, i.e. the sheep are fed on natural pastures and with marginal products [5].

Sheep farmers are interested in obtaining meat, but also in sheep's milk, leading to a new breed structure. In the current situation in Romania, with the change of the exploitation directions in the sheep breeding, the objectives of the breeding programs have been modified, the first place being the increase of the level of meat and milk production, which can ensure an increase of the economic efficiency indicators [1].

What is negative on the sheep sector, is the fact that the export of live animals continues, and the slaughter decreased by about 32.8%. Raw material is still being sold, without taking into account the fact that higher economic results can be obtained by selling value-added products [9].

In a report made by the European Parliament, it recommends, among other things, the

replacement of the export of live animals with value-added products, such as frozen or chilled meat (http://www.ziare.com/europa/uniunea-europeana/romania-ar-crea-peste-5-000-de-locuri-de-munca).

The sheep and goat sectors are characterized by low profitability, with revenues being among the weakest in the Union, largely due to high operational and regulatory costs, which sometimes exceed sales prices, as well as an administrative burden too large, which leads to the increasingly frequent abandonment of these sectors by farmers.

In these conditions, Romania, through the tradition of sheep breeding and the geo-climatic conditions it has, can be a great source of products of this species, especially sheep meat https://www.europarl.europa.eu/doceo/document/A-8-2018-0064_RO.html.

CONCLUSIONS

In conclusion, the calculated economic efficiency indicators indicate that the young sheep meat has a low profitability and that it needs to be supported by subsidies.

However, the security index is quite high, and the margin of safety shows that the situation is comfortable, at least at the time of 2019.

Sheep are a species from which several products can be used, and meat is one of them. But this product is not in the consumption traditions of the Romanians, so it is necessary for the local farmers to turn all their attention to exploiting the opportunities regarding the export of sheep meat, with added value [2]. This thing, however, implies increasing the number of slaughterhouses intended for slaughtering sheep, in order for the export product to be chilled or frozen meat, also taking into account the requirements of customers in the countries of destination.

ACKNOWLEDGEMENTS

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PRODUCTION OF WINE GRAPES AND CULTURAL TRADITIONS RELATED TO VINE IN ROMANIA

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Abstract

This paper analyzes the evolution of the areas cultivated with grapes for wine and of the production obtained in Romania, between 2013-2018. Culture with tradition in our country, known since the Bronze Age, vineyards occupy important areas today on the Romanian territory and since ancient times they are also related to beautiful, complex, cultural symbols and customs. Of the total vine area, the vineyards where grapes are grown for wine represented in 2018 over 80%. The available pedo-climatic conditions, as well as the technologies applied, placed Romania on the 5th place in the U.E. in terms of vine area. The data used in this paper were taken from specialized sites and from reference works.

Key words**:** *Romania, traditions related to vine, vineyards, wine grapes*

INTRODUCTION

The vine is a multiannual culture, specific to the temperate, subtropical and tropical climates, which can be cultivated on five continents, between the parallels of 30° and 50°, both North and South [13].

On the territory occupied today by our country, the wild vine (*Vitis vinifera silvestris*) dates from the year 7000 BC. From this derived part of the varieties that are cultivated now, for example, Fetească Neagră [2].

The development of viticulture in Romania was possible due to the favorable conditions that the vines find in our country, especially in the hilly area [21]. Soil and land exposure are essential elements for vine culture [24], to which are added the climatic factors - precipitations and temperature [19].

The importance of viticulture for the national economy can be summarized as follows: the vines make good use of the sloped, eroded, sandy and poorly solificated sandy lands, unsuitable for other crops; about 85% of the vineyards are on slopes; apart from the fact that it is the raw material for obtaining wines and wine distillates, from grapes are obtained in the food industry: compotes, jams, preserves, raisins, juice, concentrated must etc., and from the seeds is extracted the oil; viticulture stimulates the development of the machine-building industry, the chemical industry (for fertilizers, insect-fungicides, pesticides etc.), the manufacturing industry for plant support systems, transport and local industry [22].

Because of the importance of viticulture for the national economy, we decided for this paper to analyze the evolution of the areas cultivated with grapes for wine and of the production obtained in Romania, between 2013-2018.

Complementary to these agricultural/ economic notes and goal, it has to be stated that during history, on the territory occupied today by our country the agricultural works applied in the vineyards have been interwoven with ancient cultural traditions of worship of the nature and of the sacred. So, in addition to the economic role of the viticulture and *due to* the fact that the economy of a state uses not only a natural, but also a social environment that preserves in memory and practice the ancestral values that permeate it and which are sometimes capitalized even economically (e.g. the core values of the rural tourism, of the agritourism etc.), we broad and enrich the framework of the paper with a national cultural mark related to vine. Long before that the viticulture has developed as an economic sector in the modern meaning and as science up to nowadays, peoples have cultural

peculiarities (which of course are dynamic – vary, change, even disappear under political, economical and other type of major commands).

The aspects related to the vines selected from the Romanian civilization require also preliminary observations on the context that integrates them, respectively the mention of some landmarks in the ancient history of the Romanians which is older than the history of Romania (it was only in 1862 that the Romanians, who stayed for about four centuries under Ottoman protectorate, were allowed to use the term *Romania* and to choose the flag with nowadays colors): a) the origin widely accepted as Thracian of the Dacian from the Carpathian-Danubian-Pontic area and the first great Dacian state under Burebista in the 1st century BC, from Panonia until over the Dniester; b) the transformation of Dacia into Roman province 106 - 272 CE; c) the Christianization of the Romanians from the apostolic times, see the missionary route of St. Ap. Andrei in the former Scytia Minor, followed by the organization of the church after the Aurelian withdrawal from the north of the Danube, the Christians being no more persecuted by the still pagan authority of Rome. Thus the historical framework allows and validates a trans-disciplinary approach of the vine within the present work, the cultural side being structured on and aiming to highlight two categories of elements: (a) pre-Christian customs preserved in folklore until today, which have survived through rites in parallel with the Christian faith and practice or they were assimilated by Christianity and (b) the Christian axis that symbolically refers to the vine. Both categories of element are part of the identitary mark of the Romanian peasant and of his household especially before the forced collectivization (1949-1962) and previous the globalization in its most recent form (the Romanian peasant is an endangered species under the command, the instruments and the pressure of globalization).

MATERIALS AND METHODS

This paper, in its economic part, highlights elements related to the production of grapes for wine at national level. Emphasis was placed on the analysis of areas occupied by vineyards, which include a variety of grapes for wine, at national and macro-regional levels. Also, the areas with vineyards in the private sector and the areas cultivated with grapes for wine, in ecological regime, at European level were studied. Another indicator analyzed in this paper is the production of grapes for wine, which was approached, on the one hand, at the national level, and on the other, at the macro-regional level. The paper also presents the quantitative and valoric imports and exports of grapes from Romania, the main partners of our country in this category of goods, as well as the average purchase price of grapes for wine in Romania, in 2018. In order to make a more complex study, more materials from the viticulture field were studied. The statistical data subjected to the analysis were taken from both national and international sites and were graphically represented. The period studied in this paper was 2013-2018.

Complementary to the economic analysis, as previously announced in the introductory part, we also elaborated a brief incursion into the universe of the Romanians' cultural traditions related to vineyards, appealing in this direction to reading, analysis and intellectual processing of several reference sources on two directions: (a) customs and rites related to vine preserved in the Romanian folklore until today and (b) the Christian axis of the Romanians through history, based on the Bible and The Tradition of the Christian Church, mostly Orthodox. Following the latter direction we will appeal to the Gospel which, for a Christian believer, is not primarily a historical work, but one which, although originating at a certain time in the past, is from then until now alive and working as preserving fundamental aspects from the life and the work on earth of Jesus Christ, recognized by Christians as Son of God, with theandric nature (alive and working are considered all the sacred texts of any religion by the followers).

RESULTS AND DISCUSSIONS

We structure this section into two complementary parts, the first one with

economic profile (I), and the second with cultural aspects (II).

(I). According to the data presented in the Communiqué of the European Commission of 2017, Romania registered the largest number of vineyards in the European Union, thus: 855,000 individual areas, respectively 36% of in Romania only 27.7% (and this time the total. The average area of a vineyard was 0.2 ha and represented the lowest value at European level. Unlike other Member States, smallest value at European level) of the total area cultivated with grapes was destined to produce high quality wines. Grapes for wines with protected designation of origin (PDO) represented 64.2%, and grapes for wines with protected geographical indication (PGI) - 35.8%. In the Southeast area, most of the vineyards operated, respectively, 41.5% of the total country [10].

In Romania, on 82% of the vineyards were cultivated varieties for wine [24].

The share that viticulture has from the turnover obtained from the vegetable production is 14% [21].

Fig.1.The map of Romania's wine regions
Source: [7], [8].

Vine is cultivated, with a few exceptions, throughout the hole country. Romania has 8 wine regions, 37 vineyards and wine centers (Figs. 1 and 2). The most representative wine region is that of the Moldavian Hills, which totals almost 70,000 hectares [7]. The most famous and appreciated vineyards in Romania are the ones from Târnave, Cotnari, Huşi, Panciu, Odobeşti, Dealu Mare, Murfatlar and Recaş. Vrancea County has the largest area cultivated with vines (about 13% of the country's vine-growing area) and most people involved in this field of activity, about 80,000 [4].

Fig.2. The list of Romania's vineyards
Source: [7], [8].

The oldest and best-known vineyard of the country is in Moldova and was mentioned in the chronicles during the reign of Ștefan cel Mare/Stephen the Great [2]. Viticulture was one of the sectors that benefited from Romania's accession to the E.U. The funds The funds allocated through the National Support Programs in Romania for the wine sector also contributed to equipping wine farms with modern machinery, to renewing the existing vineyards which were no longer adapted to market requirements, but also to the establishment of new vineyards and harvest insurance [1, 15]. Thereby, less favored vine varieties have been replaced with valuable local varieties or international varieties, such as Feteasca Neagra (autochthonous), Cabernet Sauvignon and Sauvignon Blanc - international appreciated varieties [1]. In 2018, the area cultivated with grapes for wine in the EU-28 was 3,014.04 thousand ha, distributed as follows: Spain (923.71 thousand ha); France (745.39 thousand ha) and Italy (629.21 thousand ha). These were the main cultivating states at European Union level. Romania ranked fifth, with 166.46 thousand ha (Fig. 3).

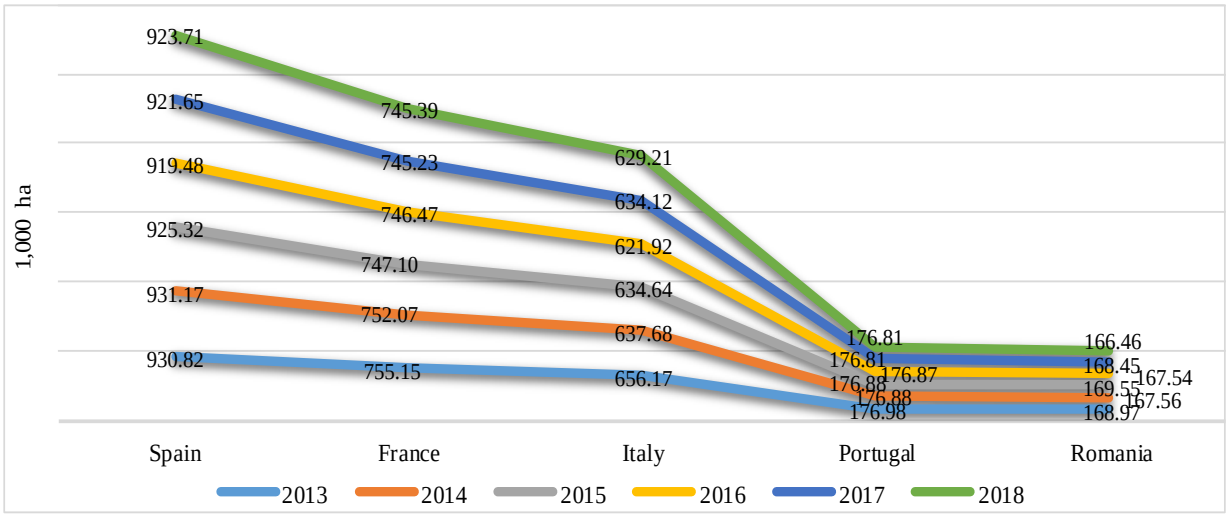

Fig. 3. The area cultivated with grapes for wine in the main cultivating states of the EU-28, between 2013-2018
Source: [11], own interpretation.

At national level, the largest area cultivated with grapes for wine for the analyzed period, was registered in 2015 (169.55 thousand ha), and the smallest in 2018 (166.46 thousand ha). The largest vineyards in the E.U. were registered in 2015 as follows: Spain occupies the first position with the Castilla-La Mancha region (434,000 ha), which represented about 14% of the total area of the Union vineyards; the second position in this ranking was occupied by France with the Languedoc-Roussillon regions (239,000 ha, respectively 7%) and Aquitaine (144,000 ha, respectively 5%) [10].

In 2018, the 166.46 thousand ha that were cultivated with grapes for wine, in Romania, presented the following structure (see Figure 4): 71% represented grapes for other wines (without PDO/PGI), meaning 118.74 thousand ha; 15% - grapes for wines with protected designation of origin (PDO), meaning 24.10 thousand ha; 14% - grapes for wines with protected geographical indication (PGI), meaning 23.63 thousand ha.

The evolution of the areas cultivated with the categories of grapes for wine from Romania is shown in Figure 5.

While the areas cultivated with grapes for other wines (without PDO/PGI) decreased by 6.49%, the areas occupied by the other categories of wine grapes increased. The highest growth was observed for grapes for wines with protected designation of origin (PDO) -15.48%.

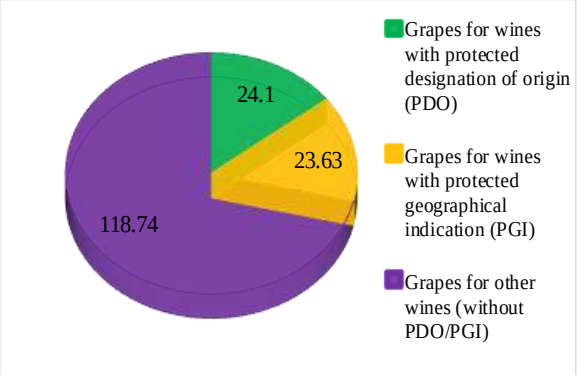

Fig. 4. Surface cultivated with different categories of grapes for wine, in Romania, in 2018
Source: [11], own interpretation.

In 2018, in Romania were cultivated the following noble varieties of grapes for wine: Roșioară, Fetească Neagră, Băbească Neagră, Muscat Ottonel, Cabernet Sauvignon, Sauvignon, Aligote, Riesling italian, Fetească Albă, Merlot and Fetească Regală. Besides these, in culture were encountered mixtures of noble varieties and other varieties, on small surfaces. Figure 6 shows the areas that were cultivated in 2018 with the aforementioned varieties and their share.

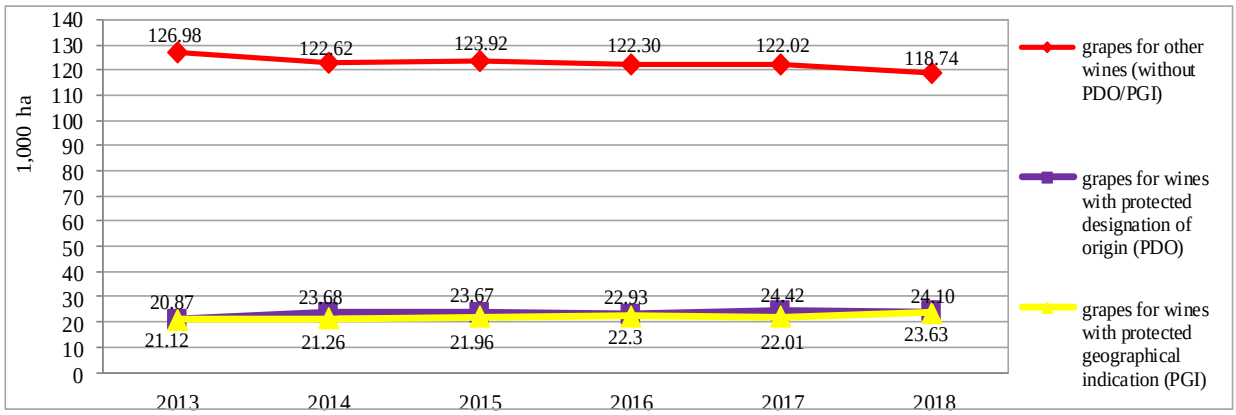

Fig. 5. The dynamics of the areas cultivated with different categories of grapes for wine, in Romania, between 2013-2018
Source: [11], own interpretation.

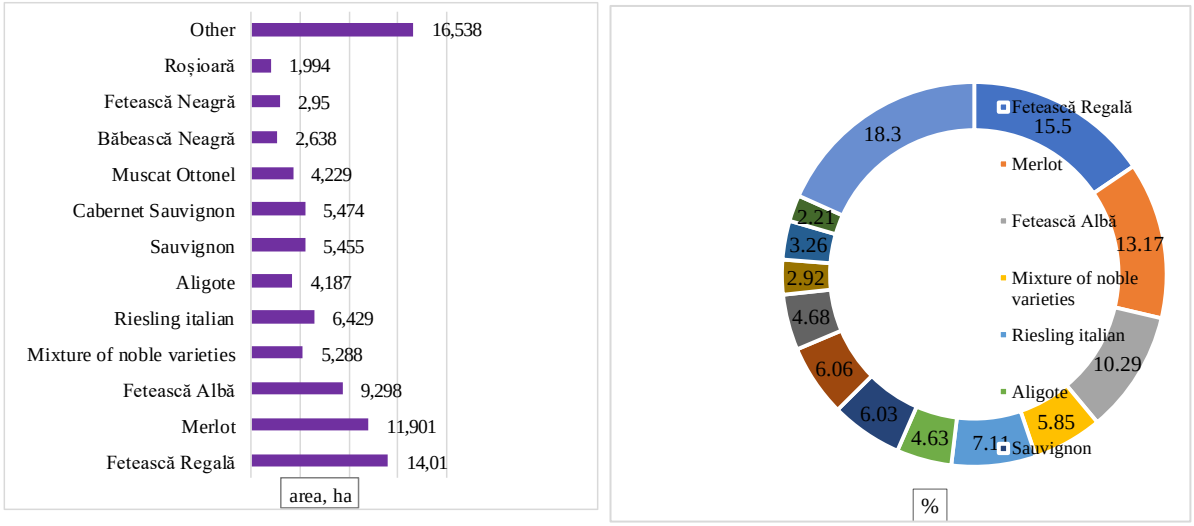

Fig. 6. The main noble varieties of grapes for wine cultivated in 2018, the surface and share (ha, %)
Source: [16], own interpretation.

It is noted that, in 2018, the most cultivated noble grape variety for wine was Fetească Regală (Romanian variety with white grapes), which occupied an area of 14,010 ha, followed by Merlot, a French wine variety for red wines (11,901 ha) and Fetească Albă, Romanian variety with white grapes (9,298 ha). The total area occupied with grapes for wine other than the ones mentioned, was 16,538 ha. The new form of tourism, oenotourism, which has also shyly entered our country, may represent a way of supplementing the income of cultivators of noble grape varieties for wine. In the European Union, the most interested in this form of recreation, which appeared in Germany in 1935, are tourists who come mainly from the Netherlands, Germany and Belgium [3]. In the context of the current situation, when focusing on organic farming, and the wine sector lately, there is a tendency to increase the areas cultivated with organic vineyards and the number of producers who opt for green technologies [6].

The main countries cultivating grapes for wine in the E.U. pay particular attention to organic viticulture. This is why they are in the first places also in terms of the surface on which ecological technologies are practiced for the cultivation of grapes for wine are: Spain (113,419 ha); Italy (106,447 ha) and France (94,020 ha) (Fig. 7).

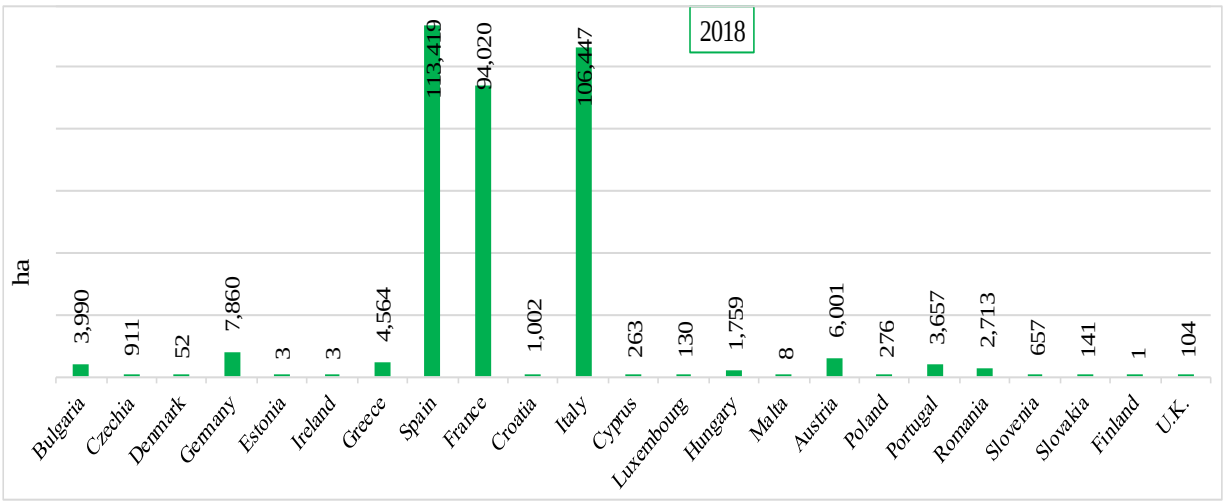

Fig. 7. The surface cultivated with grapes for wine, in ecological regime, in the main cultivating states of the EU-28 in 2018
Source: [11], own interpretation.

In Romania in 2018 there were cultivated 2,713 ha of with grapes for wine, under ecological conditions, which ranked our country 9th in the E.U. The surface occupied by the organic vineyards represented 0.02% of the agricultural area of the country. The distribution of wine areas by Macroregions of development and forms of ownership, in 2018, is shown in Fig. 8.

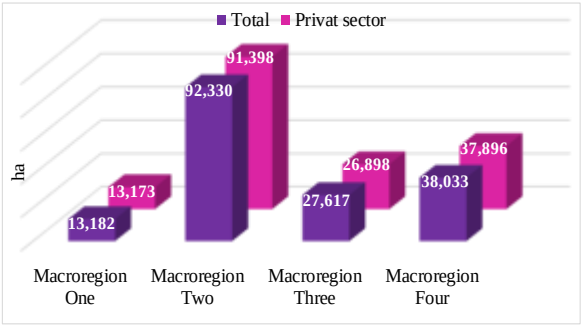

Fig. 8. Surface cultivated with vine for wine by macroregion and ownership
Source: [17], own interpretation.

From the analyzed data it is found that, the largest area with vineyards for wine was cultivated in Macroregion Two, of 92,330 ha. In this Macroregion is the wine region Hills of Moldova with 69,134 ha. Of the total vineyard area of Macroregion Two, 91,398 ha are owned by the private sector.

Macroregion One recorded the smallest wine-growing area of 13,182 ha, of which 13,173 ha were owned by the private sector. According to Chiurciu et al., 2018, in Macroregion One the largest areas were cultivated with fruit trees, vegetables and cereals [5].

Regarding the production of wine grapes, in the European Union, in 2018, the following situation was registered: in the first place was Italy (7,485.53 thousand tons), followed by Spain (6,673.48 thousand tons) and France (6,232.74 thousand tons) (Fig. 9).

It is observed a reversal of the places from the top cultivators, so that Italy having a better yield took first place. Romania was in 5th place, with a production of 1,069.17 thousand tons.

With the exception of Spain and Portugal, where production has decreased, in the main wine grape producing countries there have been increases in the harvest, between 2013-2018. For Romania, the growth was of 14.63%, in 2018 compared to 2013.

In the category grapes for other wines (without PDO/PGI), in 2018, the highest harvest was obtained, of 706.02 thousand tons, and the smallest, of 176.15 thousand tons for grapes for wines with protected geographical indication (PGI) (Fig. 10).

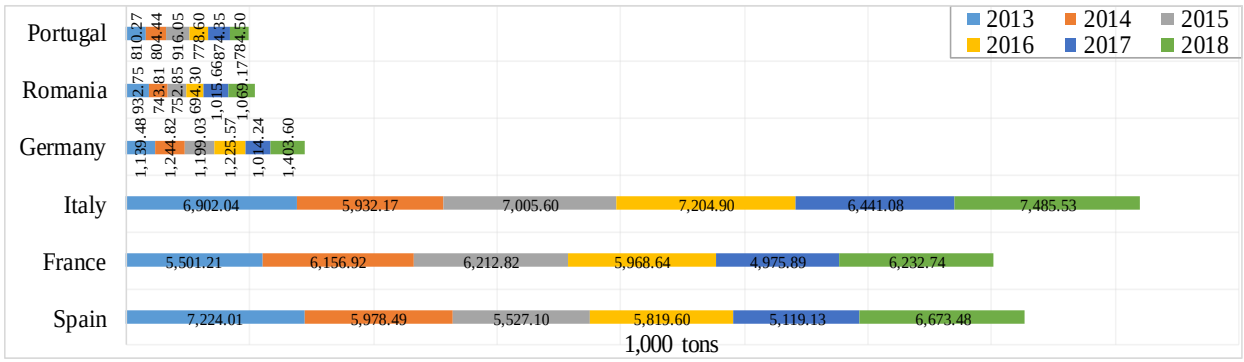

Fig. 9. Wine grapes production in the main cultivating states of the E.U.-28, between 2013-2018
Source: [11], own interpretation.

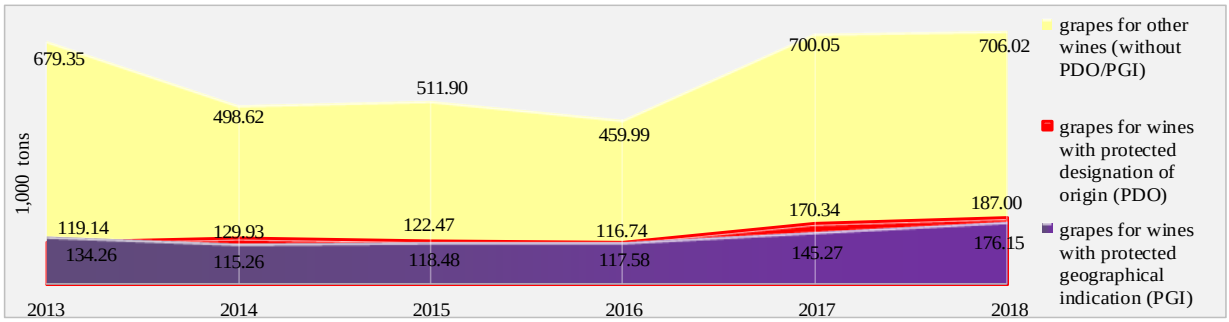

Fig. 10. The dynamics of the production obtained in different categories of grapes for wine, in Romania, between 2013-2018
Source: [11], own interpretation.

Production for wine grape categories obtained in Romanian vineyards varied, registering the lowest value in 2016 in the category of grapes for other wines (without PDO / PGI), of 459.99 thousand tons, for grapes for wines with protected designation of origin (PDO) 116.74 thousand tons in 2016 and 115.26 thousand tons in 2014, for grapes for wines with protected geographical indication (PGI).

There is an increase for the analyzed period, manifested in all three categories of wine grapes. The highest growth was produced by grapes for wines with protected designation of origin (PDO) 56.96%.

Macroregion Two obtained in 2018 the largest wine grape production, at country level. Of the 628,457 tons harvested, 620,978 tons were obtained in the private sector (Fig. 11). Closely related to the rank for the cultivated areas (Fig. 8), the last place regarding the wine grapes production was occupied by Macroregion One - 94,568 tons total, of which 94,548 tons in the private sector.

The average purchase price for wine grapes in Romania varied during the analyzed period, registering the lowest value in 2013, of 1.07 lei/kg, and the highest in 2016 and 2017, of 1.67 lei/kg (Fig. 12).

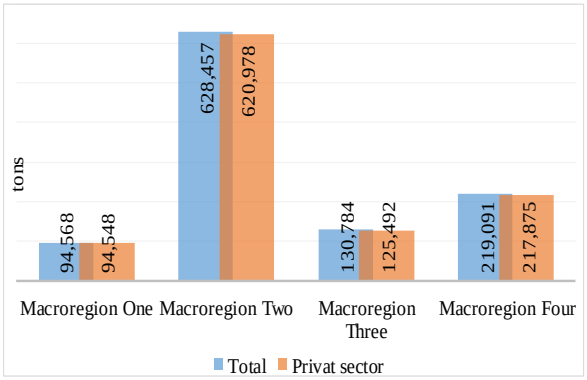

Fig. 11. Production of wine grapes, on Macroregions of development and forms of ownership, in 2018
Source: [17], own interpretation.

In 2018, when the price was 1.44 lei/kg, there was an increase of 34.58%, compared to 2013, when the price was 1.07 lei/kg (Fig. 12).

The Euro equivalent of the price of 2018, for 100 kg of grapes (30.88 Euro/100 kg of grapes) placed Romania in the group of countries with low values of this indicator.

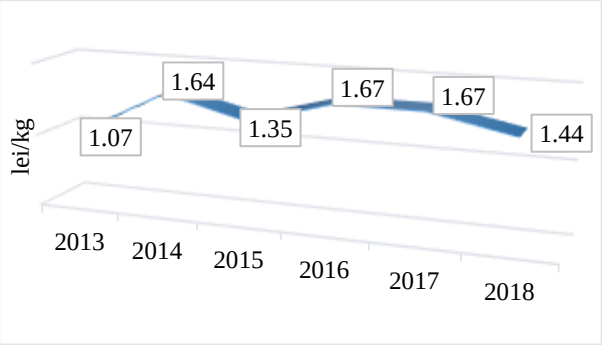

Fig. 12. Average purchase price for wine grapes/country
Source: [16], own interpretation.

At the level of the European Union, in 2018, the highest price for 100 kg of wine grapes was registered in Luxembourg, of 129.50 Euro/100 kg grapes and in the Czech Republic, of 75.74 Euro/100 kg. The lowest price for wine grapes was obtained in Austria, 25.19 Euro/100 kg and Hungary 26.80 Euro/100 kg [11].
Figure 13 shows the dynamics of quantitative (tons) imports and exports of Romania, for the grape category, between 2015-2018. The quantitative imports of grapes increased from 36,881 tons in 2015, to 44,994 tons in 2018, with a maximum of 51,287 tons in 2017 (Fig. 13). The main states from which Romania imported grapes in 2018 were Republic of Moldova - 11,771 tons, Italy - 9,481 tons and Greece - 8,842 tons. Other partner countries were the Netherlands, Turkey, Germany, Iran, Macedonia, Spain, France, Poland and others [14].

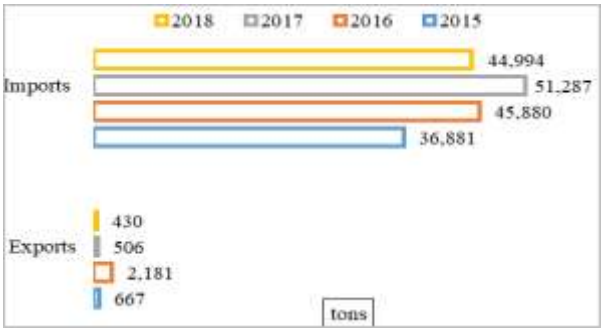

Fig. 13. Quantitative imports and exports of grapes in Romania in the period 2015-2018
Source: [14], own interpretation.

Romania did not export large quantities of grapes, ranging from 667 tons in 2015 to 430 tons in 2018. The biggest quantity was exported in 2016 - 2,181 tons. The states where Romania exported grapes in 2018 were: Bulgaria - 233 tons, Hungary - 107 tons, Republic of Moldova - 65 tons, Greece - 15 tons, UK - 6 tons, Ireland - 2 tons, Spain and Italy one ton [14].
The value of grapes imports (Thousand US Dollars) increased from 35,724 thousand US Dollars in 2015, to 55,308 thousand US Dollars in 2018 (Fig. 14).

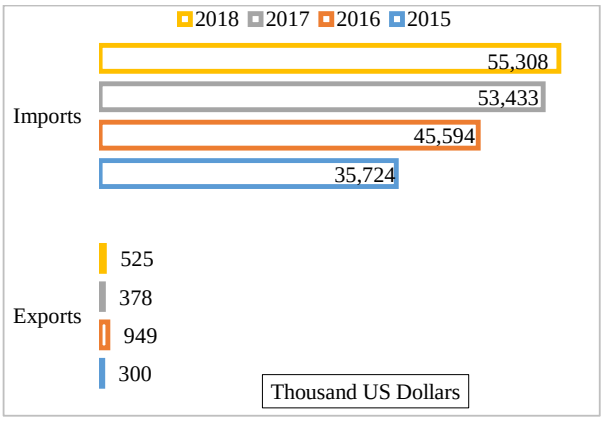

Fig. 14. Value of imports and exports of grapes in Romania in the period 2015-2018
Source: ITC, 2020, own interpretation [14].

The partners of Romania were, in 2018: Republic of Moldova - 10,881 thousand US Dollars, Italy - 10,191 thousand US Dollars, The Netherlands - 8,672 thousand US Dollars and Greece - 8,339 thousand US Dollars. Other countries from which Romania imported grapes were Germany, Turkey, Iran, Spain, Macedonia, India, Czech Republic, France and others [14].
The value exports ranged from 300 thousand US Dollars in 2015, to 525 thousand US Dollars in 2018, with a peak of 949 thousand US Dollars in 2016. In the top of the States with which Romania had trade for the grape category, in 2018, were: Bulgaria – 170 thousand US Dollars, Hungary - 127 thousand US Dollars, Republic of Moldova – 119 thousand US Dollars, Greece - 44 thousand US Dollars, Italy - 31 thousand US Dollars, UK - 14 thousand US Dollars [14].
(II.) Indigenous cultural traditions related to vine: (a) customs and rites related to vine preserved in the Romanian folklore until today and (b) highlights from the Christian axis that symbolically refers to the vine.
(a) The culture of vine and the wine production are estimated by historians to have been basic works in the Carpathian-Danubian-Pontic area

since the Bronze Age. "The first written mention of Dacian viticulture comes from the ancient geographer Strabo, who wrote about the order given by King Burebista for the vineyards to be burn, but also that the Dacians, men and women alike, drink the wine from the horn, without bending it with water" [23].

For millennia, in the peasant household the vine life cycle and its exploitation were marked by celebrations and rites that associate pre-Christian customs to landmarks in the Christian-Orthodox calendar (e.g. "At Sântămărie (Virgin's celebration) the guardines of the vine are hired and the vineyard shall be magically protected. At the Transfiguration, the new fruit is tasted. On the Day of the Cross it starts the ingathering of the grapes" [12], [20] - all being gathered in the Folk Romanian Calendar based on "high-precision cosmic clocks" [12], [20], from which we select and synthetically present customs from the traditional Vine New Year recorded on February the 2nd: ***Arezanul viilor, Bundăretele*** and ***Târcolitul viilor*** (the first and the second have untranslatable names and the third approximately means getting round the vineyards).

Chronologically, firstly there are preparations for the ceremonial and for this purpose in Muntenia and Oltenia a sacramental culinary product called ***Bundărete*** (hog's pudding) is prepared, from the pig cut a few days before February starts and it is prepared by default (also) from the *vital* organs of pig.

On the morning of the New Vine Year, the head of the family, "in fully body and soul cleanliness" [12], [20], goes to the vineyard carrying with him Bundăretele and wine; there it will eat from these products and cut ropes from the vine with which he will decorate its harbor after a precise ritual, considered to be a magical, regenerative force, called ***Târcolitul viilor***.

Arezanul viilor (ceremonial of Thracian origin) includes, depending on the geographical area, Bundăretele and Târcolitul viilor: the owners of the vineyards (men) go to their own vineyard from which they cut a few ropes with which they adorn themselves (garland on the head, belt and along the body), then unpack a bottle of wine buried in the fall and with these they go to the common party. Around the fire, together they celebrate a sacrifice: they incinerate the dried cut ropes from the old vine and its product (they throw wine into the fire); then they celebrate playing around the flames, jumping over the fire, and in the evening they return to the village with the lights lit in their hand and they continue celebrating at family level [12], [20].

(b) The Christian references to the vineyard can be placed in the transdisciplinary context of the work at least by calling for a quantitative argument: although at present there are recognized 18 religious cults in Romania, the majority of Romanians declare themselves Christian-Orthodox, about 18.8 million Romanians - respectively 86.6% of the population of Romania (practitioners below 60%) as part of about 7% of Orthodox Christians worldwide [9, 18]. We have two highlights on these aspects.

Firstly, it should be mentioned the *Parable of the unworthy workers of the vineyard* presented by three of four apostles in the frame of the Gospels. With a wide and subtle register of interpretation, within its core is the problem of the authority, always actual: the non-compliance with God and its consequences. The chronicle renders the workers hired to work the vineyard in the absence of the master, workers who alienate themselves from any moral reaction: they do not recognize the master's ownership right, so they do not send him the appropriate part of the fruit and they mistreat and kill his servants and finally the most precious messenger, his son, wanting *the deletion of the owner, the Lord*, who is the *foundation* of the vine and of the boars' profit-the unworthy boars want the benefit of the whole construction, without accepting its foundation, and they substitute for the legitimate authority an authority without foundation in itself (their own), in the service of their own profile and profit become an idol. The parable culminates with a perpetual valid and trans-cultural warning message, noticed by some Romanian annalists: the inability for *free* cooperation with a benevolent authority triggers the autonomous mechanism of a rectifying authority.

The last mention explains the preservation of the Orthodoxy among Romanians, especially in the rural space, as the peasants kept faith and survived through many harsh times believing the Christian word with symbolic appeal to vine and wine production: *I am the true vine, and My Father is the worker. (…) Abide in Me and I in you. As the branch cannot bear fruit of itself, unless it remains in the vine, so do you, if you do not remain in Me.*

CONCLUSIONS

Following the analysis of the specific indicators for wine grape production in Romania for the period 2013-2018, the following were found:

-The smallest area cultivated with vines with grape varieties for wine, was, 166.46 thousand ha (2018);

-In 2018, our country ranked 5th in the top of the cultivating countries with vineyards related to grape varieties for wine;

-In 2015, the most significant area cultivated with grapes for wine was registered, 169.55 thousand ha;

-In 2018, numerous noble grape varieties were cultivated for wine production (Muscat Ottonel; Riesling italian; Fetească Regală etc.). The most significant area occupied with a noble variety of wine grapes for the year 2018, was 14,010 ha (Fetească regală).

-In 2018, 2,713 ha of vineyards with grapes for wine were grown, in an ecological system. Due to this surface, our country ranked 9th in the top of the vine-growing countries in the ecological regime, at the level of the European Union;

-At the macro-regional level, in 2018, the largest area with vineyards destined for wine production was 92,330 ha (Macroregion Two). It is necessary to specify that, 91,398 ha are in the private sector;

-Romania, in 2018, ranked 5th, in the ranking of wine grapes producing countries in the European Union, with a production of 1,069.17 thousand tons;

-At national level, in 2018, there was a 14.63% increase, compared to 2013, of grape production for wine;

-The largest production of grapes for wine was obtained in 2018, in Macroregion Two, namely 628,457 tons, of which 620,978 tons were made in the private sector;

-The highest average purchase price for wine grapes at national level was 1.67 lei / kg (2016 and 2017);

-In 2018, the average purchase price for wine grapes increased by 34.58%, compared to 2013;

-In 2018, the equivalent in Euro of the price for 100 kg of grapes was 30.88 Euro, which placed our country in the group of countries that registered low values for this indicator;

-Imports of grapes increased during the analyzed period, reaching, in 2018, 44,994 tons and 55,308 thousand US Dollars. The countries from which grapes were imported were the Republic of Moldova, Italy, Greece and the Netherlands;

-Romania exported, in 2018, 430 tons of grapes, worth 525 thousand US Dollars and had as main partners Bulgaria, Hungary and the Republic of Moldova.

In perspective, Romania can become an important player on the European market for wine grapes, if it will increase the qualitative and quantitative level of investments in the wine grapes cultivation and marketing sector.

Complementary to the above economic aspects, the cultural traditions of the Romanians relative to the vine are ancient, complex, with pre-Christian origins and many of them were sustained in time by peasants due to their religious belief.

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THE MAIN TRENDS IN THE ACTIVITY OF AGRI-FOOD COOPERATIVES IN ALMERÍA, SPAIN

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Abstract

Located in the South-East of Spain, the province of Almería was considered in the first part of the twentieth century, a poor region. Despite the infertile soil, the limited resources of water and the land not exactly suitable for agriculture, today over 70% of the vegetables exported from Spain are produced here. In the largest greenhouse in the world, as Almería is also called nowadays, are grown tomatoes, peppers, cucumbers, eggplants, with a high yield and a low level of pesticides. The practice of intensive agriculture has led to the growth of the economy of the area, which is mainly based on agriculture and tourism. This paper focuses, especially, on the analysis of relevant indicators for the specific activity of the agri-food cooperatives in Almería. In order to highlight the impact of the economic activity of Almería's cooperatives on the economy, the paper presents a series of indicators of horticultural production in Spain. The statistical data presented and analysed that formed the basis of this paper were provided by Eurostat, Cooperativas Agro-alimentarias de España Grupo Cooperativo Cajamar.

Key words**:** *Agri-Food Cooperatives, Almería, exports, Spain, vegetable production*

INTRODUCTION

Almería is one of the 8 provinces of the Andalusian region, located in the southern Spain and the eastern Andalusia. Benefiting from a hot and dry climate, the province is known as one of the driest areas in Europe, with rainfall that in some places does not reach 200 ml per year (Figure 1).

Fig. 1. Map of Spain, Andalusia region
Source: [5].

If in the western part of the coastal area there are vast crops, the interior of the province is made up of mountainous landscapes and dry lands. This selenar aspect of the Tabernas Desert was the setting for western films in the 1960s. The population, characterized by a small number of inhabitants per km^2, lives on the coast of the Mediterranean Sea, which stretches for almost 250 km [6].

The first Moorish settlement in the area was built in 955, on the site of an important Roman port (Portus Magnus) and was named after the bay with wide beaches, "Al-Mariyya - mirror of the sea". It was under Arab rule until 1489, when it was conquered by Catholic Christians. It would later become the city of Almería and, today, the capital of the province of the same name [4].

In the 1950s, Spanish GDP was 40% lower than Italy's, and Almería's 50% lower than the national average. Almería was an arid expanse that survived from tourism and the exploitation of marble in the mountains. The Franco regime initiated the development plan for this area. Thus, in 1963 the Cooperative "Caja Rural Provincial de Almería" (now Cajamar Caja

Rural, the largest cooperative bank in Spain) started to operate and in 1977 COEXPHAL (Association of cooperatives and producer organizations) was set up, with the support of Cajamar, to give farmers access to foreign markets [13].

The development of horticultural greenhouses has led to very important social and economic benefits for the province of Almería, but it has created social challenges and had a negative impact on local biodiversity and natural resources. There are currently 15,000 farming families employed in production, and an additional 40,000 jobs are being offered. Workers of different nationalities (over 110 nationalities) work in the greenhouses of Almería. According to official published data, 95% of all farms are owned by families of farmers and their products are marketed mainly by cooperatives [7].

The economic contribution of horticultural greenhouses is about 1,800 million Euros, and the sector related to the auxiliary activity generates another 1,600 million Euros. In the province of Almería, greenhouse production represents 13% of gross domestic product (GDP), while the average agricultural GDP in Spain is 2.5%. The total economic activity around the agricultural system represents 40% of the GDP of the province of Almería [7].

Today Almería is in the top of fruit and vegetable producers and among the top 3 richest provinces in Spain, in terms of GDP per capita, and the agricultural area is now the largest cooperative area of vegetables in Europe, in which most cooperatives use biological pest control [18].

The development of agriculture has even led to the development of an education system that trains specialists in the field, such as the Universidad de Almería, founded in 1993.

In addition to agriculture, Almería is also famous for tourism, thanks to its vast beaches and natural reservations.

MATERIALS AND METHODS

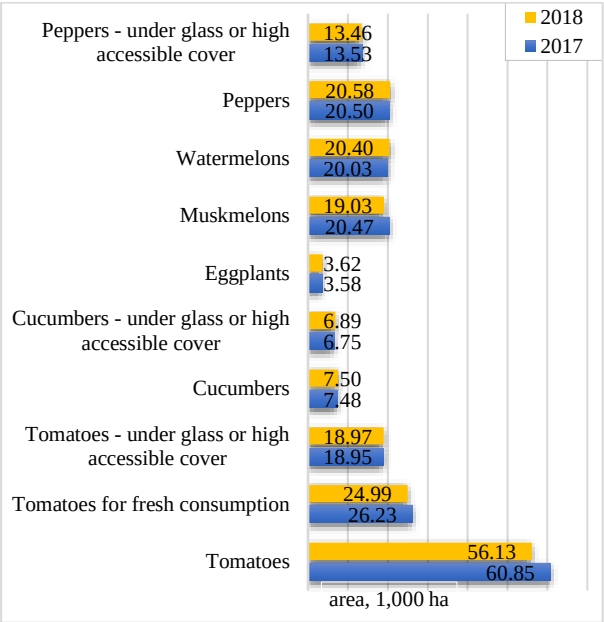
The paper analysed, mainly, a series of indicators related to the activity of agri-food cooperatives in Almería. Also, here, the presentation of specific indicators for the horticultural sector in Spain was required. This was necessary to emphasize the positive contribution of the cooperatives in Almería to the good progress of the Spanish economy. The main indicators analysed: the number of cooperatives in the regions of Spain; areas cultivated with the main vegetable categories in Spain; areas with greenhouses in Almería; horticultural production in Almería; the areas in Almería, where biological control is applied for the main vegetable species; quantitative and value exports for the main vegetable categories. The statistical data used in this paper were provided by Eurostat, Cooperativas Agro-alimentarias de España, Grupo Cooperativo Cajamar. In order to accomplish this work, numerous specialized materials were consulted, especially from Spain. The results of the paper were presented in graphic and tabular form.

Part of the data and analysis presented in this paper are the result of the training mobility carried out within the Erasmus+ project CooPerformance - Digital, state-of-the-art agribusiness education for farmer led entreprises in the agri-food value chain, AG 2019-1-RO01-KA203-063752

RESULTS AND DISCUSSIONS

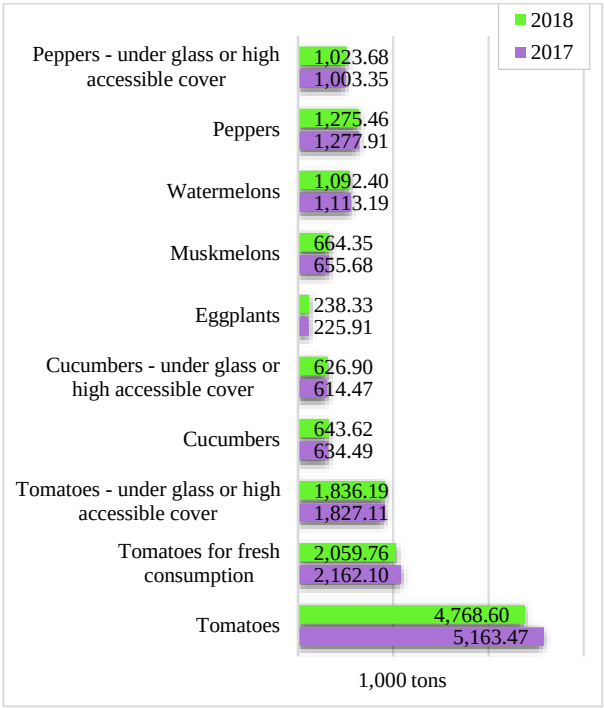
According to Eurostat, Spain is a major grower of vegetables and melons. In 2018, 56.13 thousand ha of tomatoes were cultivated in this country. It was the second largest tomato grower in the E.U., after Italy. The area registered in 2018 was decreasing compared to 2017, when it was of 60.85 thousand ha (Figure 2). In the tomato category, were analysed the subcategories Tomatoes for fresh consumption and Tomatoes under glass or high accessible cover, where Spain has been the European leader in the recent years. 24.99 thousand ha of tomatoes were grown for fresh consumption and 18.97 thousand ha of tomatoes under glass in 2018. The area cultivated with Cucumbers was of 7.50 thousand ha in 2018 (second place in the E.U.), and the areas with cucumbers under glass or high accessible cover represented 6.89 thousand ha (first place in the E.U.). For other important categories of vegetables, the following areas cultivated in

2018 were noted: 3.62 thousand ha with eggplants (third place in the E.U.), 19.03 thousand ha muskmelons (second place in the E.U.), 20.40 thousand ha watermelons (first place in the E.U.), 20.58 thousand ha peppers (first place in the E.U.), 13.46 thousand ha peppers under glass or high accessible cover (first place in the E.U.).
In 2018 there were increases in the areas for tomatoes under glass or high accessible cover, cucumbers, cucumbers under glass or high accessible cover, eggplants, watermelons and peppers, compared to 2017.



* Eurostat official classification of vegetables
Fig. 2 Areas cultivated with the main vegetables in Spain
Source: [12].

In 2018, 4,768.60 thousand tons of tomatoes were harvested in Spain. It was the second largest tomato producer in the E.U., after Italy. The production achieved in 2018 was decreasing compared to 2017, when 5,163.47 thousand tons were obtained (Figure 3). 2,059.76 thousand tons of tomatoes for fresh consumption (first place in the E.U.) and 1,836.19 thousand tons of tomatoes under glass (first place in the E.U.) were harvested in 2018. Cucumbers production was of 643.62 thousand tons in 2018 (second place in the E.U.), and in the category of cucumbers under glass or high accessible cover were obtained 626.90 thousand tons (first place in the E.U.). For other important categories of vegetables, the following quantities were obtained in 2018: 238.33 thousand tons of eggplants (second place in the E.U.), 664.35 thousand tons of muskmelons (first place in the E.U.), 1,092.40 thousand tons of watermelons (first place in the E.U.) , 1,275.46 thousand tons of peppers (first place in the E.U.) and 1,023.68 thousand tons of peppers under glass or high accessible cover (first place in the E.U.). Compared to 2017, in 2018 there were increases in production for tomatoes under glass or high accessible cover, cucumbers, cucumbers under glass or high accessible cover, eggplants, muskmelons and peppers under glass or high accessible cover.



* Eurostat official classification of vegetables
Fig. 3 Production for the main vegetables in Spain
Source: [12].

But where do these vegetables come from? What is the basic cell in Spanish agriculture? The answer is simple - family farms, united in agri-food cooperatives.
In Spain, in 2017, a number of 3,225 agri-food cooperatives operated. Of these, the most, 710, were in the south, in Andalusia and accounted for 22.02% of the total (Figure 4). It was followed, with a considerable difference, by Castilla-La Mancha, where there were 430 Cooperatives, is 13.33%. In the north, in Cantabria, the smallest number was registered, 5 cooperatives [9].

Autonomous communities	Nr.	%
Andalusia	710	22.02
Castilla-La Mancha	430	13.33
Castile and León	345	10.7
Valencian Community	335	10.39
Catalonia	298	9.24
Extremadura	281	8.71
Aragon	193	5.98
Galicia	169	5.24
Region of Murcia	127	3.94
Chartered Community of Navarre	92	2.85
Basque Autonomous Community	66	2.05
Canary Islands	61	1.89
La Rioja	46	1.43
Balearic Islands	31	0.96
Community of Madrid	20	0.62
Principality of Asturias	16	0.5
Cantabria	5	0.16

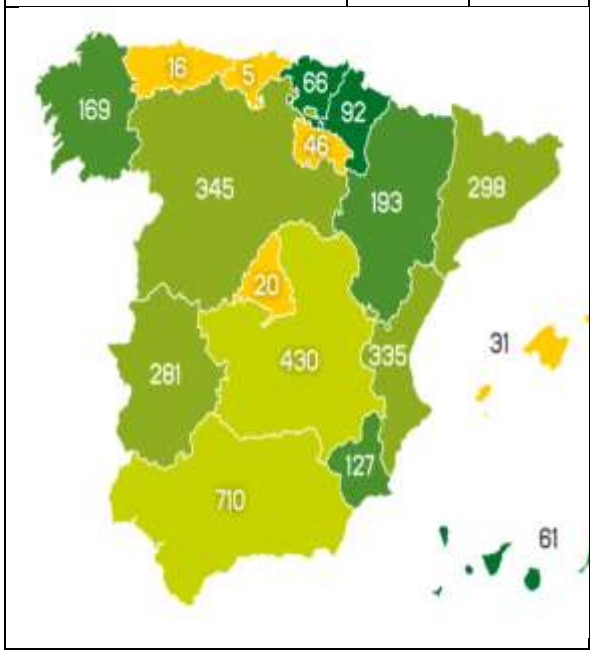


Fig. 4. Number of cooperatives in the regions of Spain, 2017
Source: [9].

Although in 2006-2017 the number of cooperatives in Spain decreased by 8%, their turnover increased by 56%. At the same time, large cooperatives have increased their export dynamism [9].

From the analysis of the distribution of direct payments on the territory of Spain, it resulted that in the region of Andalusia the largest amounts were granted, and the largest number of farmers benefited from these direct payments. The regions of Castilla y León and Castilla-La Mancha followed [8].

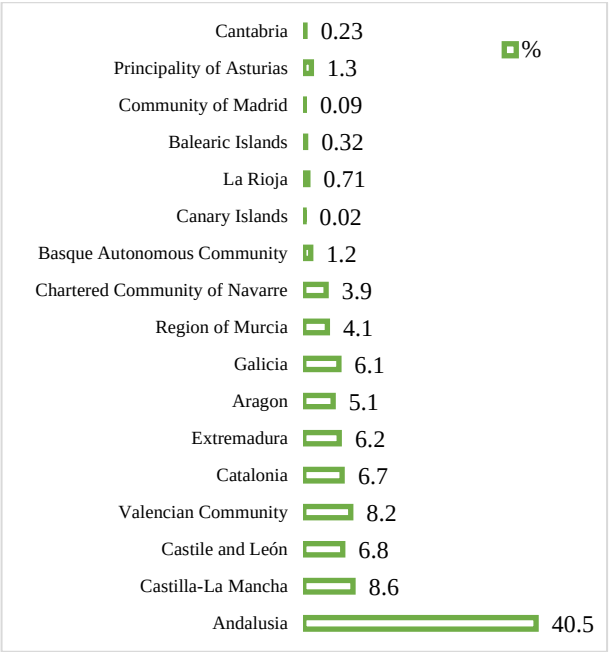


Fig. 5. Turnover of cooperatives in the regions of Spain, 2017
Source: [9].

The turnover recorded by the Spanish Cooperatives is shown in Figure 5. As it can be seen, in the first place were the cooperatives in the region of Andalusia, which accounted for 40.5% of the total turnover. Castilla-La Mancha ranked second with 8.6%.

The importance of Andalusian agri-food cooperativism for Spain can be seen in Figures 4 and 5, it represents 22% of the Spanish cooperatives and accounts for 40.5% of the group's turnover.

Vegetables obtained in the province of Almería, the largest greenhouse in the world, have gained fame due to the quantities produced, to the yield per hectare (200 tons / ha for tomatoes) and to the quality (99.3% of the production has the level of pesticide residues close to zero). The technology used involves the application of natural fertilizers and drip irrigation, which means high taxes, water representing 10-15% of the cost of production for vegetables in Almería. It is used a model of solarium with almost flat roof (Photo 1), because there is not much rainfall and a super-intensive agriculture is practiced, without excessive chemicalization, with the help of beneficial insects [3].

Photo 1. The model of greenhouses in Almería
Source: [2].

In the summer months, when the countries where it is exported usually get their own harvest, maintenance and preparation work is carried out for the following season.
Farmers are united in cooperatives, through which they procure the necessary inputs, have set up their own collection, sorting and packaging Center and they analyse the vegetables.
In Almería, the financing is made through loans from the banking institution dedicated to the agricultural sector since the early '60s, Cajamar Caja Rural. The foundation supported by this bank finances a research Center, where new varieties of vegetables and fruits are produced and new cultivation technologies are tested, adapted to the particularities of the area [2].
Returning to modern cultivation technologies applied in Almería, it was concluded that this is the province that has the largest horticultural area under biological control. This favoured the fact that only 0.8% of the horticultural products harvested in Almería registered values above the maximum residue limit allowed, compared to 2.6% as the average in the E.U. [1].
There is a decrease from 25,000 ha (2012/2013) to 23,345 ha where biological control is applied in 2018/2019.
The evolution of these areas during the agricultural campaigns 2012/2013 - 2018/2019 is presented in Figure 6.
Studies carried out by Grupo Cooperativo Cajamar have shown that 48.3% of the cultivated area is subject to biological control.

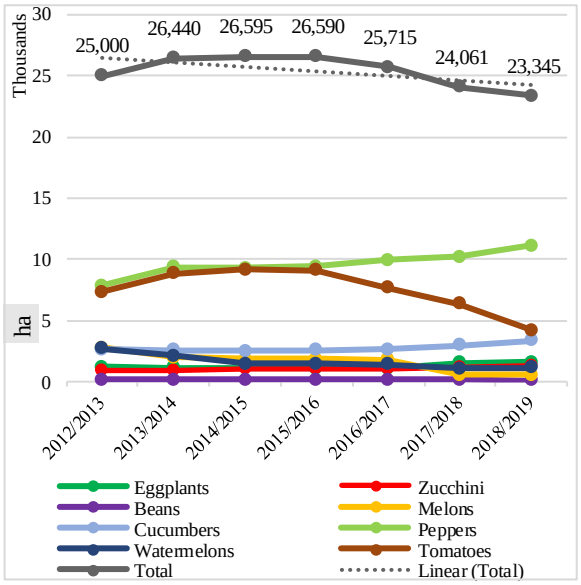


Fig. 6. Evolution of areas in the province of Almería, where biological control is applied, to the main vegetable species
Source: [14].

Compared to the 2017/2018 campaign, the area in the last analysed campaign was 3% smaller. There were also decreases in the areas cultivated with beans, melons, watermelons and tomatoes.
In the 2018/2019 campaign, the culture where biological pest control was used on the entire cultivated area, was that of peppers (Figure 7). This was followed by the cultivation of eggplants - 74.4% of the total areas occupied with this vegetable and cucumbers - 71.6%. The crop with the lowest percentage in terms of the area to which biological control is applied is watermelon, 10.9%.
The Junta de Andalucía (The Regional Government of Andalusia) calculated that there are currently 35,839 ha of greenhouses in the provinces of Granada - 8.4% of the total, Malaga - 2.2% and Almería - 89.4%.
The largest increase took place in the coastal area of Granada, where the covered area increased by 8% in 2019. In Almería, the area increased by 1.4% in 2019 compared to 2018, thus reaching 32,048 ha [14].
Greenhouses in the province of Almería are the largest structure made by humans, which can be seen with the naked eye from Earth's orbit [10].
The large area they cover, over 30,000 ha, made them appear as a white dot, thanks to the foil that covers them (Photo 2)

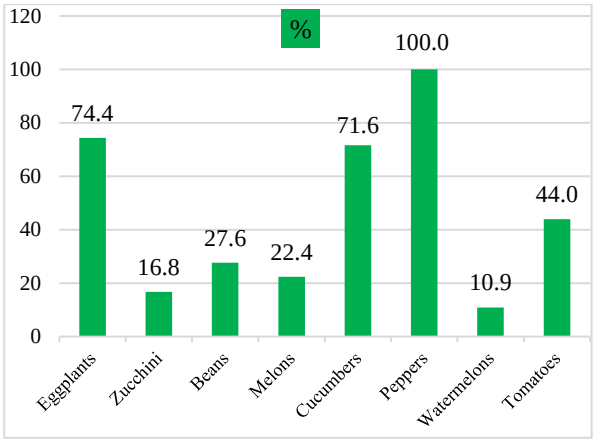


Fig. 7. Areas (%) where biological control is applied, for the main vegetable species (Almería province)
Source: [14].

Photo 2. Greenhouses in Almería seen from space
Source: [11].

The areas occupied by greenhouses in the province of Almería increased in the period 2012-2019 from 28.639 ha to 32.048 ha (Figure 8). The average annual growth in the last 10 years has been 1.5% and was due, as mentioned by Grupo Cooperativo Cajamar, to the expansion to the Levante area, because in the west there is not much room to develop greenhouses.

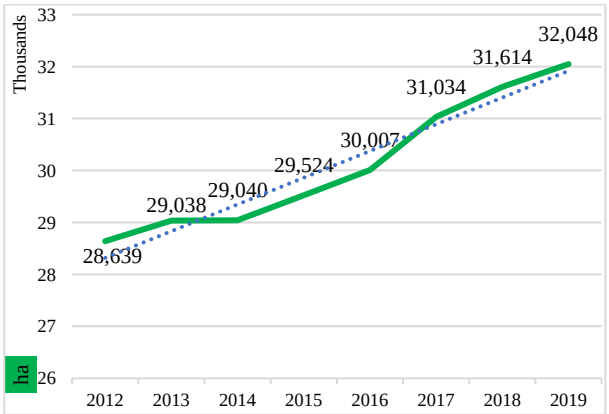


Fig. 8. Evolution of greenhouse areas in the province of Almería
Source: [14].

The area occupied by horticultural crops in general has also increased. The vegetable area was of 58,654 ha in the 2018/2019 campaign, 5.4% higher than in the previous campaign.
Horticultural production in Almería fluctuated during the analysed period (Figure 9). Favourable weather conditions and the effectiveness of treatments for pests have increased production yields for most cultivated species, especially in the spring.

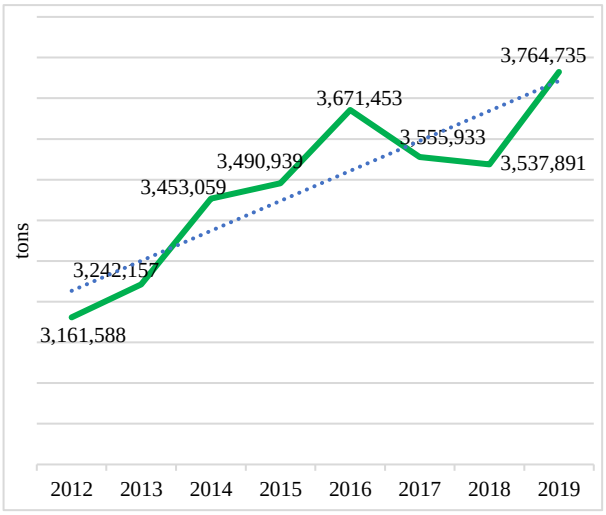


Fig. 9 The evolution of horticultural production in Almería
Source: [14].

Thereby, the total horticultural production of the province of Almería for 2019 was of 3,764,735 tons (6.4% more than in 2018), of which 3,525,187 tons (4.4% more than in 2018) belong to protected crops. Compared to 2012, the increase for total horticultural production is of 19.08%.
Table 1 presents the production from Almería for the main vegetable crops, for the agricultural campaigns 2017/2018 and 2018/2019. From the analysis of the presented data, we conclude that in the categories of green beans and tomatoes the productions decreased, by 45%, respectively 10.8% for tomatoes. In the other horticultural crops there were increases, the most significant being in lettuce (49.4%) and melons (32%).
Spain is one of the most important players in the world trade with agricultural products. Thereby, in 2017 it ranked 9th, in the export category, climbing a position in the ranking, compared to 2006 [17].

Table 1. Production from Almería for the main crops, compared on two campaigns

Specification	2017/2018 tons	2018/2019 tons	2018/2019 / 2017/2018 %
Eggplants	181,130	190,614	5.2
Green beans	7,897	4,347	- 45
Peppers	707,693	785,043	10.9
Tomatoes	996,254	888,389	- 10.8
Cucumbers	459,777	527,352	14.7
Zucchini	456,045	459,420	0.7
Melons	91,927	121,344	32.0
Watermelons	477,152	548,677	15.0
Total greenhouses	3,377,875	3,525,187	4.4
Lettuce	130,271	194,675	49.4
Other horticultural crops	29,745	44,873	50.9
General Total	3,537,891	3,764,735	6.4

Source: [14].

In the category of fresh or chilled tomatoes, Spain ranked third in the world, with exports of 1,098,005 thousand US Dollars (2018), respectively 1,140,930 thousand US Dollars (2017). From the presented data, there was an increase in value exports in 2018, compared to 2017. The exported quantity was of 809,612 tons in 2017, respectively 813,875 tons in 2018 [15].

Table 2. Exports from Almería for the main vegetable crops, compared on two campaigns

Specification	2017/2018		2018/2019	
	tons	1,000 Euro	tons	1,000 Euro
Eggplants	120,189	108,067	123,328	129,435
Green beans	10,953	24,220	12,540	33,842
Peppers	513,894	624,901	553,417	738,643
Tomatoes	446,601	503,016	447,334	527,952
Cucumbers	451,779	358,041	485,865	395,627
Zucchini	286,689	238,705	308,201	268,836
Melons	54,787	43,135	66,574	47,706
Watermelons	274,443	167,678	330,988	156,086
Lettuce	148,882	116,705	165,503	129,522
Other horticultural crops	154,228	218,558	218,335	256,647

Source: [14].

In 2018, Spain was the world's largest exporter of eggplant, with a quantity of 155,000 tons, followed by Iran, with 140,000 tons and Mexico, 76,000 tons. Spain accounted for 25% of the global eggplant exports, in 2018 [1].

The province of Almería is the leader in Andalusia in terms of exports. Sales abroad increased between January - October 2019 by 11% for Almería, unlike the values recorded at the regional level, Andalusia - 5% and at the national level, 1.6% [16].

Table 2 presents the exports of vegetables of the province of Almería, quantitative and value, for the 2017/2018 and 2018/2019 campaigns. Peppers was the most exported category, 553,417 tons in 2018/2019, followed by cucumbers (485,865 tons) and tomatoes (447,334 tons).

For the green beans category, the lowest quantity exported was registered - 12,540 tons, respectively 33,842 thousand euros.

It is observed that in all categories of vegetables analysed, exports increased from one campaign to another. Watermelons exports had the highest increase, from 274,443 tons (2017/2018) to 330,988 tons (2018/2019) and then peppers, from 513,894 tons (2017/2018) to 553,417 tons (2018/2019). The lowest increase was noted for tomatoes and green beans.

Quantitative vegetable exports of the province of Almería are shown in Figure 10.

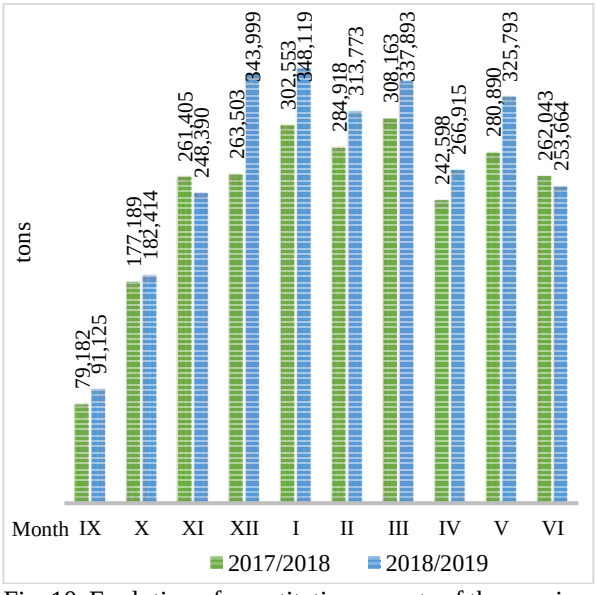


Fig. 10. Evolution of quantitative exports of the province of Almería by months, compared on 2 campaigns
Source: [14].

Corresponding to the applied crop technologies, the peak of exports was recorded for the 2018/2019 campaign in January and December, and for the 2017/2018 campaign in

March and January. In September, the smallest quantities of vegetables were exported from both campaigns. In 2018/2019, the province of Almería exported the largest quantities of vegetables to Germany, France, the UK, the Netherlands, Poland and Italy.

Regarding the value exports, by months, of the province of Almería, presented in Figure 11, the highest values were observed in January and December of the 2018/2019 campaign, and for the 2017/20118 campaign - January and February. The lowest values were also obtained in September, for both campaigns.

Almería's partners, which recorded the highest values for value exports were, in 2018/2019 Germany, France, UK, Netherlands, Italy and Poland.

The emergence and development of agri-food cooperatives in Spain and in the province of Almería in particular has been a beneficial fact that has led to the development of agriculture and living standards in this poor area.

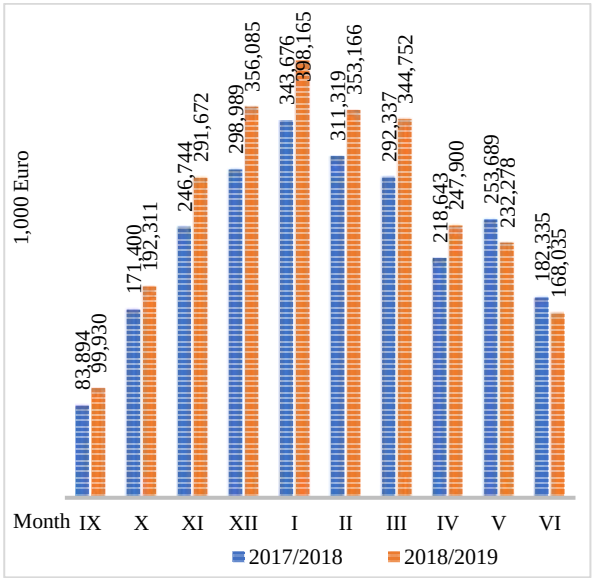


Fig. 11. Evolution of value exports of the province of Almería by months, compared on 2 campaigns
Source: [14].

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CONCLUSIONS

Following the research, on the one hand, of the main aspects related to the activity of agri-food cooperatives in the province of Almería, and on the other hand, of the main indicators specific to the horticultural sector, the following resulted:

-15,000 families work in the horticultural sector in the province of Almería, due to the development of greenhouses;

-95% of the total farms are owned by farmers' families, and the products made are sold through cooperatives;

-greenhouse production in Almería has a share of 13% of GDP, compared to the average agricultural GDP in Spain (2.5%);

-the agricultural area of Almería, currently represents the largest cooperative area of vegetables in Europe;

-In 2018, 56.13 thousand ha of tomatoes were cultivated in Spain. This cultivated area placed Spain on the second place in the top of tomato growers, at the level of the European Union;

-Spain, in 2018, ranked second in the top of the tomato producers in the European Union, with a production of 4,768.60 thousand tons. Italy ranked first in this ranking;

-In Spain, horticultural products are made in family farms, which are united in agri-food cooperatives;

-In 2017, a number of 3,225 agri-food cooperatives were registered in Spain. A significant aspect is represented by the fact that a number 710 were in the south, in Andalusia (22.02% of the total);

-Cooperatives in the region of Andalusia, accounted for 40.5% of the total turnover of Spanish Cooperatives;

-In Almería there was a very good yield for tomatoes (200 tons / ha);

-The vegetables obtained in Almería are superior in terms of quality (99.3% of production has the level of pesticide residues close to zero);

-48.3% of the cultivated area is subject to biological control, according to a study conducted by Grupo Cooperativo Cajamar. In the 2018/2019 season, biological control was applied on 23,345 ha. This surface has

undergone changes compared to the previous periods;
-Currently, there are 35,839 ha of greenhouses in the provinces of Granada (8.4% of the total), Malaga (2.2%) and Almería (89.4%);
-In 2019, the area occupied by greenhouses was of 32,048 ha, which represented an increase of 1.4%, compared to 2018. Also, in 2019, there was an increase of 11.90% in the area with greenhouses, compared to 2012;
-The horticultural production achieved at the level of the province of Almería in 2019, was of 3,764,735 tons. In 2019, there was an increase in production by 6.4%, compared to 2018;
-Almería ranks first in the top exporters of Andalusia;
-In 2019, for the period January-October, in Almería there was a 11% increase in sales abroad;
-The top of quantitative exports for Almería in the 2018/2019 season was made up of: Peppers (553,417 tons); cucumbers (485,865 tons) and tomatoes (447,334 tons);
-Value exports were dominated in the 2018/2019 season, also by Peppers (738.643 thousand Euro). They increased by 18.20% compared to the 2017/2018 season;
-The main sales markets for the vegetable products made in Almería in the 2018/2019 season were: Germany; France; UK; Netherlands; Poland and Italy.
The increase of the living standard and the development of agriculture in Spain, but also in the province of Almería was due to the development of cooperatives. This type of association represents a solid basis for the agricultural sector in Spain, which in the future will ensure the food security for the population.

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THE ECONOMIC IMPACT OF FARM SUBSIDIES IN MOLDOVA'S AGRICULTURAL SECTOR DEVELOPMENT

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Abstract

Governmental support is needed to achieve and maintain the farm economic performance, which is on the long run is the key to its sustainable development. The governmental intervention into the agricultural sector was highly discussed explaining/justifying such an involvement. This is caused by some forms of market failure, when private markets are not able to function efficiently. Agricultural subsidizing policy is an important mechanism through which the government can support this sector. This paper aims to analyse the distribution and structure of governmental subsidies fund in Moldova during 2010-2018 and its possible outcome on the development of agricultural sector. The research analyses data related to the subsidies allocation dynamics and structure. The statistical data were provided by the Agency of Interventions and Payments in Agriculture, National Bureau of Statistics and Ministry of Finance. The supported subsidized measures are targeted on three main pillars: the increase in competitiveness of the agricultural sector through modernization and market integration; to ensure sustainable management of natural resources in agriculture; and to improve standards of living in rural areas. Subsidies tend to be allocated to support sectors that are already competitive and self-sufficient and does not require perhaps the governmental support for further development. The largest share of subsidies are allocated for the purchase of machinery and equipment, which does not increase the value-added of products.

Key words**:** *agricultural sector, development, farmers, subsidies allocation*

INTRODUCTION

The agricultural activity was always related to risk uncertainty. This is due to its exposure to natural factors and various hazards. Thus, farmers' incomes are uncertain and the agricultural production presents high volatility. An important tool to support the farmers activity are subsidies. Incomes related to agricultural activities are more variable than non-agricultural incomes [10]. Main economic risks for agricultural producers are related to the variation in earnings, thus subsidizing could be regarded as a management strategy that allows to stabilize income and consumption for farmers.

Governmental support is needed to achieve and maintain the farm economic performance, which is on the long run is the key to its sustainable development. The governmental intervention into the agricultural sector was highly discussed explaining/justifying such an involvement. This is caused by some forms of market failure, when private markets are not able to function efficiently. Agricultural subsidizing policy is an important mechanism through which the government can support this sector.

Subsidies are aimed to support farmers' incomes, to stimulate the food supply and to influence the costs of agricultural products.

Nevertheless, there are several opinions that subsidies create market inefficiencies and disturb global trade. In the same time, it is believed that subsides are benefitting mainly large landlords and to not directly farmers.

Programmes that support the allocation of subsidies to farmers contribute to stabilize agricultural markets, to support low income families, rural development, to ensure food security etc.

In Moldova, most of rural population's incomes are related to agricultural sector. The increase in the competitiveness and efficiency of the agricultural sector aimed at farm performance, would contribute to support rural

families with low incomes. However, increasing of efficiency and competitiveness of family farms is a complicated objective, as it requires serious structural changes within agricultural sector.

Subsidies allocations might help increasing farmers efficiency and competitiveness. This particularly refers to small family farms that relies on less development possibilities compared to corporate sector. Due to this is important to allocate the scarce subsidies funds to the farms that would contribute to obtain the highest return in terms of increasing viability of farms and sustainable development of rural areas. Subsidies can contribute positively to the increase of production, particularly regarding some activities that are risky [7]. In general, it is considered that "subsidies can help to maintain direct resources for more productive use in response to new technologies or changing market environment" [7].

MATERIALS AND METHODS

In order to analyse the dynamics and structure of subsidies allocations in Moldova various indicators were used. The period analysed in this study was 2010-2018. The statistical information concerning the amount, structure and number of recipients of the allocated subsidies from the Agency of Interventions and Payments in Agriculture. Other data included in the analysis were provided by National Bureau of Statistics and Ministry of Finance. To complete the proposed objectives various methods as the analysis and synthesis of scientific literature, comparative analysis, systematization of information were used.

RESULTS AND DISCUSSIONS

For Moldova, the agricultural sector brings about 12 percent to Gross Domestic Product (GDP) and over 30 percent together with food processing industry. Agri-food products constitute over half of total exported goods. Most of rural population in employed in agricultural activities, while 25 percent of total population is employed in agricultural activities. Nevertheless, the agricultural productivity and yield in the sector did not register any increase and remains at a low level.

The gross agricultural output increased in the examined period and constituted about 32637 million MDL in 2018. About 70 percent of the Gross Agricultural Output (GAO) is generated from plant production, while the share of animal sector has been constantly declining after the 90s (Fig. 1).

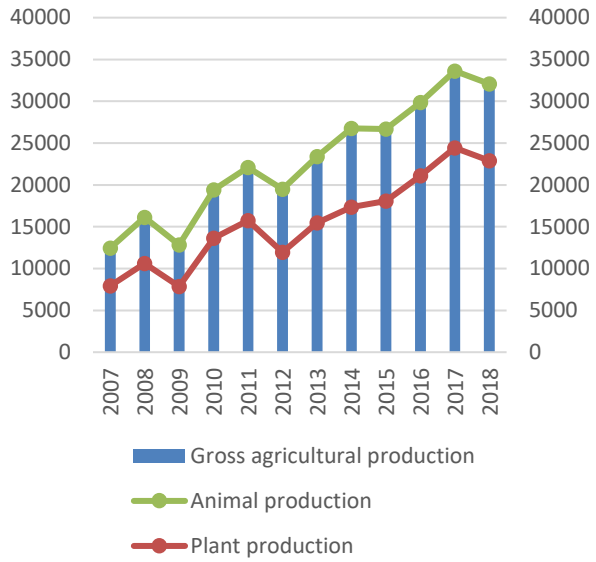

Fig. 1. The development of Moldova's agricultural sector Source: based on data from National Bureau of Statistics

The agricultural sectors still registers a very slow increase in its gross value-added. Despite the fact that increased the agri-food exports, maintaining a positive balance for the agri-food trade, an increase in exports of low value added products as cereals, seeds and oleaginous fruits is observed [1, 2, 11].

While the exports structure is based mainly on few commodities groups as: fruits, cereals, seeds and oleaginous fruits, oils and fats, sugar, alcoholic drinks. In the same time, Moldova has net imports on several commodities groups related to meat and dairy sector. This situation could be a problem not only to the agricultural sector development but also to country's national food security.

The government promoted different programs and strategies to support and promote growth and competitiveness increase in the agricultural sector. In 2010 was founded Agency of Interventions and Payments in

Agriculture (AIPA). The main objective of the Agency of Interventions and Payments in Agriculture is to support the development and promotion of the agricultural policy through the increase of allocated subsidies to farmers [4]. The main task of the AIPA is managing the agricultural subsidizing fund. Previously such task was executed directly by the Ministry of Agriculture and Food Industry (currently Ministry of Agriculture, Regional Development and Environment) [3].

The decision of funds allocation is yearly approved by Governmental decision based on the latest Law 276/2016 of subsidizing principles of agricultural producers from Moldova, adjusted to European experience [5]. The aim of recently promoted agricultural policies and strategies was competitiveness enhancement [6]. Nevertheless the expenses for agriculture remain at a very low level. From the allocated amount about one third is spent on research, education and extension, food safety.

During 2008 for farmers were allocated 900 million MDL, about 2.5 times more funds than its level in 2010. However, the amount of allocated subsidies to farmers is quite small and represent around 0.5 percent from GDP or less. Despite the fact that the amount of allocated budget expenditures for agriculture increased in their total value during 2011-2018, the share of agricultural expenditures in governmental budget decreased in recent years (3.5 percent in 2018).

Table 1. Subsidies allocation in Moldova

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Subsidies, millions MDL	400	400	400	462,8	564,7	610	700	900	900
Expenses for agriculture in governmental budget, millions MDL	982.7	829	1,253.8	1,359.7	2,009	2,173.4	1,350	2,073	2,135.1
Share of agriculture in total expenses, %	4.1	4.5	5.8	5.7	6.8	7.2	4.5	3.5	3.5
Share of agricultural subsidies in GDP, %	0.5	0.4	0.37	0.38	0.42	0.41	0.43	0.5	0.5
Number of beneficiaries	3,749	1,088	4,457	4,012	5,133	3,801	4,321	7,800	4,357

Source: based on data from National Bureau of Statistics [13], Agency of Interventions and Payments in Agriculture, Ministry of Finance.

The number of subsidies recipients increased gradually (7,800 in 2018) or by seven times more since 2010. Yearly, the agency has debts in paying the approved subsidies to farmers. In 2018, from 900 million MDL allocated, 221 million MDL were allocated for paying the approved subsidies in 2017 and only 631 million are directed for the current year payments (Table 1).

The subsidy fund did not have clearly established support measures to farmers but more a variable character [3]. Despite the fact that little changes occurred in the aim of the subsidy fund, its main goal identifies with the Strategy for the development of agriculture and rural sector 2014-2020 which has as main objective "the increase in competitiveness of the agricultural sector through modernization and market integration; to ensure sustainable management of natural resources in agriculture; and to improve standards of living in rural areas" [9]. However, over the last years the subsidy fund were oriented towards three main pillars: enhanced competitiveness through restructuring and modernization; sustainable management of natural resources; and improved investment conditions in rural infrastructure and for agricultural enterprises. The main promoted pillars identifies with the Strategy for the development of agriculture and rural sector 2014-2020 [6, 8, 9].

Despite the fact that the subsidies allocations structure remained unchanged, its distribution among main pillars and components is uneven. Almost 80 percent of the fund is allocated to only four support measures: purchasing of agricultural equipment and machinery (26%), development of the processing and post harvesting infrastructure (27%), investing in the establishment of new multiannual plantations (19%) and crediting agricultural producers (6%) (Table 2).

Most of the allocated funds are directed to the first pillar: increase on competitiveness of the agri-food sector through modernization and market integration. The three measures under first pillar in 2018 that received most applications are for purchasing agricultural equipment and machinery (33.8%), crediting agricultural producers (25.5%) and investments for establishing, modernization and clearing of multiannual plantations (20%). The most subsidies funds in 2018 required from farmers were for investments in the development of the processing and post harvesting infrastructure (314.8 million MDL). The authorized payments for this measure still had the largest share in 2018, but the approved amount is twice less than the required subsidy (170 million MDL).

Table 2. Distribution of allocated subsidies by financed measures, million MDL

Subsidized measures	2010	2011	2012	2013	2014	2015	2016	2017	2018
Production of vegetables and fruits on protected fields	6.9	2.9	10.6	14.4	50.9	9.3	14.5	12.6	5.6
Stimulating the investments for establishing, modernization and clearing of multiannual plantations	80	38	74.3	88.6	93.9	29.9	136.4	183.8	125.5
Stimulating investments for purchasing agricultural equipment and machinery	91.8	45.9	165.14	141.7	117.9	51.6	110.6	236.5	167.1
Stimulating investments in the use and technological renovation of livestock farms	2.7	8.08	16.9	27.3	47.2	35.6	34.8	56.8	26.0
Stimulating the purchasing of pedigree cattle and the maintenance of their genetic fund	7.3	2.5	11.1	29.2	47.4	55.07	22.8	24.9	5.2
Stimulating investments in the development of the processing and post harvesting infrastructure	29.1	19.6	43	69.8	141.2	113.4	108.7	204.7	170.2
Crediting agricultural producers	2.8	23.5	40.6	39.2	15.8	12.3	76.3	78.13	37.9
Insuring risks in agriculture	18.82	11.2	37.8	41.2	29.3	24.8	9.1	4.5	5.5
Stimulating the establishment and operation of agricultural producer groups	-	-	-	-	-	-	-	0.4	1.1
Stimulating promotion activities on foreign markets	-	-	-	-	-	-	-	0.04	-
Agricultural land consolidation	-	-	-	0.046	0.059	0.01	0.01	0.03	-
Stimulating investments in purchasing irrigation equipment	-	-	-	-	-	58.8	-	37.2	23.7
Stimulating agricultural producers through reimbursement of irrigation costs	10.0	1,9	-	2.1	-	1.1	-	-	0.1
Stimulating investments for purchasing equipment No-Till and Mini – Till	-	-	-	-	-	-	-	-	49.4
Promotion and development of ecological agriculture	4.1	5.3	-	-	-	-	0.5	1.9	1.0
Improvement and development of rural infrastructure	-	-	-	-	-	2.1	4.1	12.2	9.0
Consulting and training services	-	-	-	-	-	-	1.0	1.2	0.2

Source: based on data from the Agency of Interventions and Payments in Agriculture.

According to the latest Agricultural Census data [12], in Moldova 99 percent from 902,214 agricultural holdings belong to small size farms with a share of 97 percent in the total agricultural area. Nevertheless, at subsidies allocation large agricultural holdings (with over 100 hectares) prevail in the distribution of funds. Small farms benefit only from 30 percent of subsidies. Thus, a more equal distribution and support of small farms sector

is needed in order to enhance the competitiveness and insure better incomes for families from rural areas.

Also, subsidies tend to be allocated to support sectors that are already competitive and self-sufficient and does not require perhaps the governmental support for further development. Instead it should be directed towards sectors with low value added that require more support to achieve growth. Such support refers particularly to the animal production (milk and meat sectors). The allocated subsidies are oriented mainly to vegetables, fruits, cereals while animal production is basically neglected. Despite the fact that there is offered support measures for the development of the livestock sector, these investments are not attractive and avoided by agricultural producers. As a consequence, a decrease in the money allocated for the above mentioned support measures, from 94.6 million MDL in 2014 to 31.2 million MDL in 2018 is noticed.

Also, the largest share of subsidies are allocated for the purchase of machinery and equipment, which does not increase the value-added of products. Moreover, these investment refers mostly to the acquisition of tractors (27% of all subsidized equipment units). For this measure particularly benefit the large corporate farms, which already have a clear advantage comparing to small-scale farms.

A quite large increase in the subsidizing fund of crediting agricultural producers is observed. This measure is supposed to facilitate the acquisition of inputs and does not contribute to a greater competitiveness of the agricultural sector nor it is sustainable in the long run. This measure is more needed for small farmers that are lack of financial opportunities compared to large scale producers.

The current targeting of the subsidizing fund aims more at supporting inputs production of wealthier farmers. Thus, the objectives and offered support measures should be revised and oriented to offer financial opportunities to smaller agricultural producers.

From the promoted support measures in the long run, some of them have achieved little results. Among these are risk insurance measure and the irrigation subsidy. Both measures had been inefficient and benefitting wealthier farmers.

An important concern of the subsidizing fund in that yearly a large share of the annual budget are directed to pay the debts to farmers approved subsidies from previous year that could not be covered because of the exhausted financial resources. As a result, accepted farmers requests on subsidies finish on a holding list that are prioritized within next year budget allocations.

CONCLUSIONS

The agricultural sector of Moldova is characterized by a high level of exposure to natural factors and weather conditions, it has low productivity level, the agri-food trade balance is positive but does not reflect the market demand, the employment rate quite high while labour productivity is low.

The aim of recently promoted agricultural policies and strategies was competitiveness enhancement. Nevertheless the expenses for agriculture remain at a very low level. From the allocated amount about one third is spent on research, education and extension, food safety. Over the last years the subsidy fund were oriented towards three main pillars: enhanced competitiveness through restructuring and modernization; sustainable management of natural resources; and improved investment conditions in rural infrastructure and for agricultural enterprises.

The subsidies allocations structure remained unchanged, its distribution among main pillars and components is uneven. Almost 80 percent of the fund is allocated to only four support measures: acquisition of agricultural equipment and machinery (26%), development of the processing and post harvesting infrastructure (27%), investing in the establishment of new multiannual plantations (19%) and crediting agricultural producers (6%)

Also, subsidies tend to be allocated to support sectors that are already competitive and self-sufficient and does not require perhaps the governmental support for further development. The largest share of subsidies are allocated for the purchase of machinery and equipment,

which does not increase the value-added of products.

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ANALYSIS OF THE AGRITOURISM DEVELOPMENT POTENTIAL OF DEPOPULATED VILLAGES IN HUNEDOARA COUNTY USING THE FISHBEIN-ROSENBERG MODEL

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Abstract

The purpose of the paper was to analyze the most depopulated 20 villages in Hunedoara County in order to identify the possibilities of rescue from extinction by exploiting their agro-tourism potential. The rural area of Hunedoara County has a high agro-tourism potential due, firstly, to the very beautiful landscapes and secondly to the numerous tourist objectives that can be found on the County territory. Starting from the preferences of tourists and investors that were identified through previous research, we analyzed the agritourism potential of the most depopulated 20 villages in Hunedoara County. This analysis aimed at identifying and scaling ten indicators that were used later in the development of a Fishbein-Rosenberg mathematical model. The results of this model is a hierarchy of villages analyzed according to the potential of agritourism development. This hierarchy can represent a starting point for investors that are interested in developing agritouristic facilities in the depopulated villages in Hunedoara County.

Key words**:** *rural tourism, agritourism, consumer behavior, decision making, rural development*

INTRODUCTION

Although the depopulation trend is found in most rural areas in Romania, it should be noted that in the case of Hunedoara County, depopulation of the rural area is much more pronounced [13].

According to data from National Institute of Statistics, in Romania, during the period 1992-2019, the population domiciled in the rural areas decreased by 5.15%. In the same period, in Hunedoara County, the population domiciled in the rural area decreased by 22.38%, 4,3 times more than at the national level [17].

This massive decline in the rural area population can lead to the disappearance of some rural communities that have lasted and developed for hundreds of years [1].

According to the figures provided by the last census of the population, a number of 73 villages in Hunedoara County had less than 50 inhabitants. Noteworthy is the fact that 48 of them had less than 30 inhabitants and four villages had under 3 inhabitants [16].

Considering the beautiful landscapes, the history and traditions of the places and the numerous tourist objectives present in Hunedoara County, the handiest solution for rescuing these villages from extinction can be finding, encouraging and supporting some private persons or legal entities who are willing to invest in agritourism facilities in the depopulated villages [11].

Another agro-tourism investor's advantage is the possibility to access European funding through National Rural Development Programme, sM 6.2 and sM 6.4. [8].

Besides the beautiful landscapes and the multitude of natural and anthropic tourist objectives that are found near the analyzed villages, the very low prices of land and households in the depopulated villages can represent an additional essential reason for the people interested to invest in creating agritourism facilities in these villages [3].

We started this research using the example of Rosia village in Balșa commune. In this depopulated village, which at the 2011 census had only one inhabitant, a private investor

managed to buy most of the households and land at a convenient price.
Currently, the investor has completed the repair of the electricity supply network and the construction of water grid. The works continue for the repair of the households and their arrangement for the agro-tourism activity
Starting from this example and correlating the information regarding this business with the information obtained from the market research regarding the preferences of the consumers of tourism and agritourism services, we analyzed the possibility of implementing this example in the other depopulated villages in Hunedoara County [4].

MATERIALS AND METHODS

The model used to conduct this research is the Fishbein model, whose pioneer was Ajzen and Fishbein. For them an attitude is someone's feeling in a favorable or unfavorable way toward some stimulus objects [7]. Attitudes are at the core of this research because, help us to create a frame of mind, liking or disliking, in this context referring to choosing agritouristic facilities, instead of the conventional ones. In other words, are people feelings favorable or unfavorable towards this idea?
The behavioral intention, which means the person's desire to undergo a specific action under a certain situation, is influenced by the behavioral attitude and the subjective norms of the model.
Both subjective norms and behavioral attitudes are enriched with weights, stated by the next formula:
$BI = AW1 + SW2$
The abbreviations above means: BI refers to the behavioral intention, A means behavioral attitude and S is subjective norms, W1 and W2 are the weights for both subjective norms and behavioral attitude. So basically, the model weight each belief by its evaluation and importance [15].
This model assumes that someone's positive or negative feeling regarding an idea or an object is governed by two factors. One refers to the personal belief toward the idea or the object, if they have certain features or not and the person evaluation of those features [2].
As it could be seen, his main hypothesis is that a person behavioral intention is regulated
by both attitudinal and personal component and a normative and social component. By personal attitude he understands someone options of being in favor or not of undergoing the behavior. In terms of the subjective norms, the meaning behind them is the social pressure felt by a person to behave in certain ways. For him, the reasons play a major role in his analysis [9].
This is a one of the most widely used model in consumer behavior research [18].

RESULTS AND DISCUSSIONS

Starting from the preferences of tourists and investors that were identified through previous research, we analyzed the agritourism potential of each village. This analysis aimed at identifying and scaling ten indicators that were used later in the development of a Fishbein-Rosenberg mathematical model [7]. From this model resulted a hierarchy of villages analyzed according to their potential of agritourism development. This hierarchy may represent a starting point for investors interested in investing in the creation of agritourism facilities in the depopulated villages in Hunedoara County.
The Fishbein model was made using ten indicators. The relevance of the indicators was weighted according to their importance.
The weighting of the indicators was done in two stages. The first stage consisted of combining the results obtained from two previous studies regarding the preferences of consumers of agritourism services and the requirements of potential investors in agritourism services [4]. This stage was necessary because, the indicator "price of buildings and land" was found only in the study on the requirements and preferences of potential investors. The second stage involved an additional weighting of the indicators taking into account the data regarding the example of the agro-tourism development of the Roșia village in Balșa commune. The analysis revealed, the following scale of indicators importance: 1. Access road; 2. Landscape; 3. Land and constructions prices; 4. Electricity

grid; 5. Distance to the main tourist objectives; 6. Labor force; 7. Buildings state; 8. GSM signal coverage; 9. Peace and intimacy; 10. Village and commune notoriety.

Table 1. Fishbein-Rosenberg model for agritourism development potential

No.	Village	Commune	Acces roads	Landscape	Land price	Electricity	Distance	Labor force	Buildings state	GSM signal coverage	Peace and intimacy	Notoriety	Total
Ex.	Roșia	Balșa	70	81	8	70	30	35	24	24	16	7	365.0
1	Gialacuta	Brănișca	70	63	48	52.5	24	30	20	22.5	16	2	348.0
2	Goleș	Toplița	40	81	40	70	24	25	24	22.5	14	2	342.5
3	Tomnatec	Bulzeștii de Sus	50	72	48	52.5	24	25	16	22.5	18	1	329.0
4	Gotești	Răchitova	60	72	72	17.5	24	30	16	15	18	1	325.5
5	Valea mare de Criș	Tomești	40	72	40	52.5	30	25	16	22.5	18	6	322.0
6	Stănculești	Bulzeștii de Sus	40	72	48	52.5	24	25	16	22.5	18	1	319.0
7	Dragu-Brad	Blăjeni	60	72	72	17.5	18	35	12	7.5	18	3	315.0
8	Răchițaua	Bătrâna	40	81	64	35	24	10	16	22.5	18	4	314.5
9	Ludeștii de Sus	Orăștioara de Sus	30	72	32	52.5	36	30	16	22.5	18	5	314.0
10	Piatra	Bătrâna	40	72	64	35	24	10	12	22.5	18	4	301.5
11	Dumești	Vorța	90	63	16	35	24	15	16	22.5	16	1	298.5
12	Bercu	Bretea Română	90	18	8	70	24	25	28	22.5	10	1	296.5
13	Văleni	Baia de Criș	70	45	8	70	24	25	16	22.5	12	1	293.5
14	Deleni	Zam	40	63	40	52.5	18	15	16	22.5	16	1	284.0
15	Brășeu	Zam	30	63	40	52.5	18	15	16	22.5	18	1	276.0
16	Valea	Zam	30	54	40	52.5	18	15	12	22.5	16	1	261.0
17	Alun	Bunila	50	36	16	52.5	24	15	24	15	16	6	254.5
18	Bejan Târnăvița	Șoimuș	60	18	32	35	30	25	12	22.5	14	1	249.5
19	Bocșa Mare	Certejul de Sus	60	9	40	52.5	24	20	12	15	14	1	247.5
20	Măgureni	Beriu	40	72	40	20	12	10	12	7.5	16	4	233.5

Source: Authors' own calculation.

During the visits made in each village, we evaluated and scored each attribute separately, on a scale from 1 to 10 in increments of 0.5 points.

The evaluation and scoring took into account the possibilities of implementing the agritourism development model developed in Roșia village from Balșa commune in the depopulated villages studied. The final scores for each attribute presented in Table 1.

A total of 9 of all 10 attributes concern both tourists and investors. The only attribute that strictly concerns investors is the land price and the constructions price, which ranks 3rd as important, because this indicator is the main competitive advantage of the most depopulated villages compared to other villages which are not yet depopulated.

The access road attribute in on the first place. According to the opinions of both potential investors and tourists, the existence of a road that can allow access to the location is the most important condition that tourists have.

Very few people are willing to spend their holidays in a very remote place that has no access road nearby [10].

The landscape attribute is on second place because, in previously conducted research, both tourists and potential investors considered that landscape is the tourist destination's strongest point.

The attribute of land and construction prices is on third place because directly affects the potential investors business plan. This attribute can also indirectly affect tourists because investors who will build agritourism structures in depopulated villages will invest less money. in buying land, which will allow them to invest more in facilities and services and will also allow them to offer very competitive prices and higher discount offers compared to other agritourism pensions that required higher investments [11].

The attribute on the fourth position is represented by the existence and the state of the electrical grid in the analyzed villages. This attribute is considered vital by both tourists and potential investors. Most of the studied villages are already connected to the electrical grid, except for three villages, two of them, Piatra and Răchițaua, are located in the commune of Batrâna and have the possibility to be connected to the electricity grid at a reasonable

cost, because the direct distance is less than 2 km from the existing network. Unfortunately, in the case, of Măgureni village from Beriu commune, the distance from the first village that has electrical grid is over 5 km and the relief is very rugged. The investment needed to bring electricity in this village is very high and the only economically viable solution is to achieve electricity on site using photovoltaic panels. In the case of villages that are already connected to the network, the score was given in terms of the percentage of constructions connected to the network and the condition of the poles and electrical transformers.

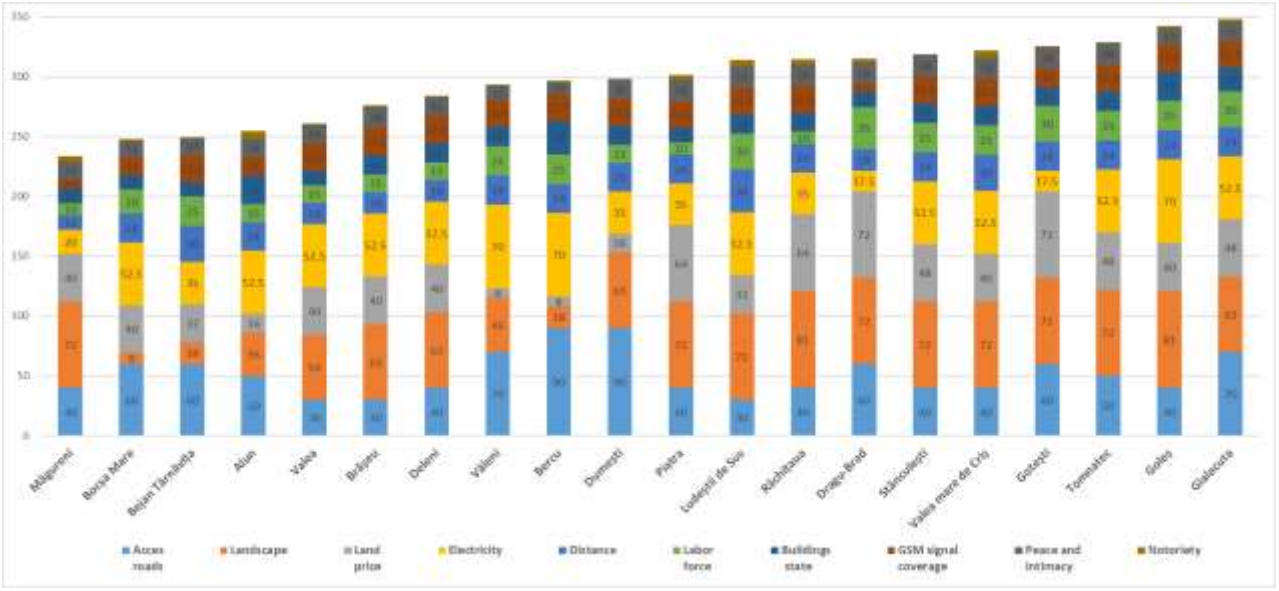

Fig. 1. The analyzed attributes share within the score obtained by each village
Source: Authors' own calculation.

Distance is the attribute on position number five. In calculating the score for this attribute for each village it was taken into account the distance to the main County transit roads, the main urban settlements and the distance to the main tourist attractions in Hunedoara County.

In the case of the labor force indicator (6th place), the demographic situation of the neighboring villages and of the commune as a whole was taken into account in order to evaluate the existing human capital [12]. This attribute was considered very important by potential investors and important by tourists who value the touristic units' staff quality [5].

The attribute on the seventh place is the condition of the constructions. This attribute is more important for investors because many households in depopulated villages are in an advanced state of degradation. This brings with it a higher level of investment for potential investors [6]. The calculation of this indicator also took into account the price of housing. Each village received a score depending on the number of houses and their condition. Even degraded constructions have been considered because they can bring certain benefits to potential investors, first of all they can be a source of building materials, wood and bricks that have a vintage look.

Eighth attribute by importance is represented by the GSM signal. In most of the villages studied, there is signal from at least one mobile phone operator. The score was given according to the number of mobile operators that have a signal in the respective areas and according to the signal strength in the three main categories GSM-2G, UMTS-3G and LTE-4G.

Peace and quiet is the ninth attribute. This attribute is especially appreciated by tourists living in urban areas. In the context of this research, most villages obtained high scores of this indicator because they are depopulated.

The last attribute is represented by the notoriety of the village or commune. In this case, the score was awarded based on the number of articles published in the written press or online, as well as the mention of villages in television reports.

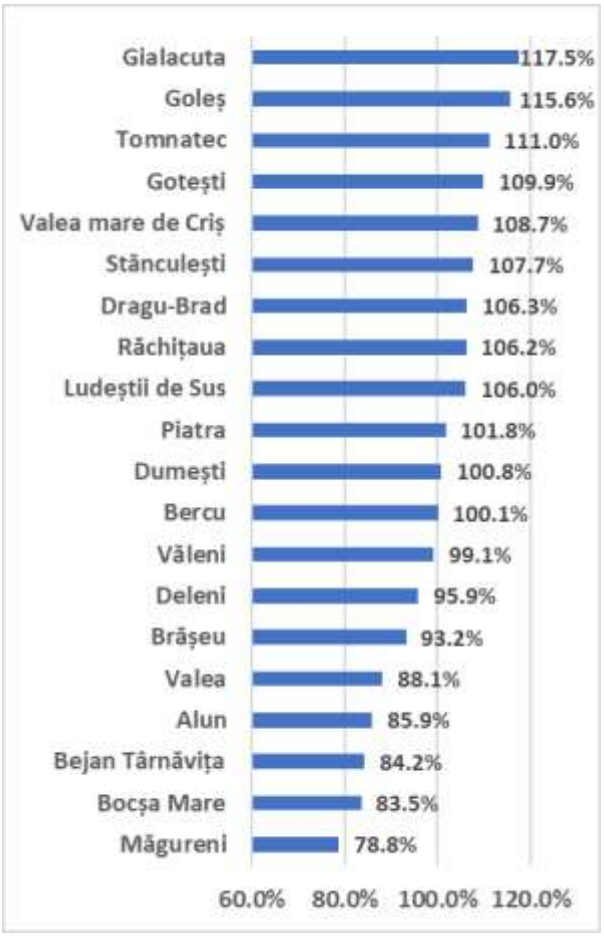

Fig. 2. Comparison of the analyzed villages according to the difference from the average potential of agritourism development
Source: Authors' own calculation.

From Fig. 2 it can be seen that 12 of the 20 villages analyzed obtained a score above average.

The scores obtained by each village for each attribute following field research were multiplied by the factor importance given by potential tourists and investors and the result represents the score of potential agritourism development for each analyzed village from the perspective of the opportunity for implementation of the agritourism development model applied in Roșia village from Balșa commune.

The villages of Gialacuta and Goleș obtained the highest scores and stood out at the top of the ranking. These villages have the greatest potential for applying the Roșia village. agritourism development model.

The villages of Ludeștii de Sus, Răchițaua, Dragu-Brad, Stănculești, Valea mare de Criș, Gotești and Tomnatec, obtained high scores by 6% -11% above average.

The villages of Văleni, Bercu, Dumești and Piatra obtained scores close to the average, so they have an average potential for implementing the proposed agritourism development model.

The villages of Bocșa Mare, Bejan Târnăvița, Alun, Valea, Brășeu, Deleni and Măgureni obtained scores significantly lower than the general average of the villages studied. This score does not necessarily represent the fact that they do not have high agritourism potential. This fact means that these villages are not suitable for the implementation of the agritourism development model applied in Roșia village from Balșa commune.

Another advantage of implementing this model of sustainable development is the fact that investors can use efficiently and productively the land areas purchased for the establishment of agricultural farms [14].

This study limitations are are related to the fact that only most depopulated twenty villages in Hunedoara County were analyzed. Another study limitation came from the evaluation of the landscape attribute may be biased by the author's subjectivism [18].

CONCLUSIONS

In conclusion, this study results shows that the agritourism development model realized in Roșia village from Balșa commune could be successfully applied in most of the other villages in Hunedoara County that have been analyzed in this paper.

It is observed that the proposed development model is best suited to villages that have a high degree of depopulation. This is due to the fact that land prices in these villages are substantially lower compared to land prices in villages that have a lower depopulation degree.

The main impediment identified in this study is the lack of public infrastructure that affects most villages presented in this study. Given the very small investments made by local and central authorities in the last 30 years to develop the infrastructure elements needed to save these villages, it is clear that the interests of the few inhabitants who still populate these

villages are not valued and sustained at all. Attracting and convincing investors to purchase all the households and lands in these villages in order to be able to implement an integrated model of agritourism development similar to the model applied in Roșia village it may be the only solution to save these villages.

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COMPARATIVE STUDY REGARDING THE SOCIO-ECONOMIC DEVELOPMENT POTENTIAL OF RURAL AREAS IN HUNEDOARA COUNTY

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Abstract

This paper aim to analyze and compare the socio-economic development potential of 17 territorial administrative units from the rural area of Hunedoara County, which have in their composition some of the most depopulated villages in the county. The commune's socio-economic status is analyzed from the perspective of five main indicators: endogenous potential, physical-geographical characteristics, economic activities, public infrastructure and human capital. From the interpretation and comparison of these indicators it results that at the level of the rural areas from Hunedoara County there are big differences between the territorial administrative units, especially in the case of the indicators of public infrastructure and economic activities. As expected, in the resulting hierarchy it can be seen that, the communes that are located at a considerable distance from the county's main urban centers and which are not crossed by main transit roads, have a low potential for socio-economic development. Even if some communes have a low score of this indicator, this does not mean that those communities have no chance of recovery. Public policies must be adapted to encourage the development of these communities through the implementation of the National Rural Development Program 20014-2020.

Key words**:** *socio-economic development, development potential, rural development, PNDR 2014-2020*

INTRODUCTION

An important aspect that should be mentioned is the fact that, except for Ilfov County, Hunedoara County is the most urbanized county in Romania, only 25% of population lives in the rural area [14].

The high share of people living in urban areas can be related with the process of mass industrialization that took place in the last century in Hunedoara County. This process happened due to the exploitation of the numerous gold, carboniferous and metalliferous deposits that can be found in the county [1].

Another cause of the small percentage of people living in the rural area is the high share of mountainous relief. Mountains occupies 68% of the county territory. The majority of depopulated communes are in the mountain area, at heights ranging from 300 m to 800 m. The rugged mountainous terrain and the lack of infrastructure affect the mobility of the population, especially in winter [5].

The communes found in mountain areas are severely affected by deep socio-economic problems [8]. These problems are particularly acute in isolated communes, which do not have the public infrastructure necessary for a decent living, with difficulties in accessing education, health and communication services [23].

The numerous important tourist objectives found on the Hunedoara County territory, represents a great advantage for investors that want to set up agrotourism pensions in this County [3].

An essential role in solving rural area's problems in Hunedoara County is represented by the National Rural Development Program 2014-2020 [11]. This program objectives were set based on a series of analyzes carried out at the country level, on each territorial administrative unit [21]. In order to facilitate the implementation of the program and to ensure that European funds are used

efficiently, the Romanian state authorities evaluate all funding projects applicants based on predefined specific indicators. In this way, investments in areas with high development potential are encouraged [2].

MATERIALS AND METHODS

Secondary data analysis means the reanalysis of previously collected data. As a data collection technique it is one of the broadly used in any type of research. If it is a reanalysis it means that the data was collected by other researchers, maybe with other research aim [19].

The sources of the secondary date could vary depending on the subject, from trade journals, references book, technical reports, or particular to this article, INS [20]. Lots of researchers use secondary data analysis because gathering primary data involves a higher costs, more efforts and more elaborate process. But at the same time, even if it is cheaper, may not be easy to access the data and its volume might overcome the researcher [12].

Secondary data analysis is very useful when it comes to longitudinal analysis which is not easy to be done because of the time and costs involved. In this case the data gathering is spread over a longer period of time. It is helpful when someone wants to measure different social changes because it shows patterns of change and even the causes behind them [18].

The first indicator taken into account for the realization of this comparative study was the indicator of tourism development potential. This indicator was calculated by state institutions to encourage the socio-economic development of territorial administrative units in rural areas that have high tourism potential. The indicators can be found in the annexes of the Government Emergency Ordinance no. 142/2008 amended and completed by Law no. 190/2009 as well as the subsequent amendments regarding the approval of the Plan of national territory planning Section VIII - areas with tourist resources [13].

According to the methodology for calculating these indicators, only the territorial administrative units that obtained over 14 points entered the list of communes with high tourist potential [10].

In order to be able to objectively compare communes socio-economic development indicator, we had to take into account the indicators for evaluating the socio-economic development potential of the territorial administrative units that was calculated in "Study on establishing the socio-economic potential of development of the rural areas" realized by the Academy of Economic Studies in Bucharest. The study mentioned above was conducted for the Government of Romania and provided "Technical assistance for the preparation of the programming period in the field of rural development 2014-2020" [21].

Within it, all the territorial administrative units in the rural areas of Romania were analyzed in the light of several indicators of socio-economic development.

RESULTS AND DISCUSSIONS

There is a high risk that in Hunedoara County will occur the first case in which an entire commune will remain without inhabitants.

In support of this statement, an argument that can be considered is the situation of Bătrâna commune, in which, between 2002-2019, the population decreased from 175 inhabitants to 98, which represents a 44% decrease. If we refer to the situation of the two villages, Răchițaua and Piatra from Bătrâna commune, we find that during 2011-2019 the number of inhabitants decreased from 10 to 3 in the case of Răchițaua village and from 9 to no inhabitants in the case of the village of Piatra.

Given that in just 17 years, the population of Bătrâna commune has decreased by 44%, it is possible that in the next 20 years, Bătrâna commune will become the first commune in Romania that has no inhabitants [22].

In addition to dramatic situation of Bătrâna commune, field analysis lead to the conclusion that all the communes analyzed are affected by the phenomena of depopulation and aging [4].

From the analysis regarding the structure of the population by age categories, it is found that in all 17 communes, more than half of the population falls in the over 50 years age category, and about 25% fall into the age group

over 70 years, a situation that illustrates a very high level of the aging phenomenon.
This situation is aggravated by the fact that the share of the population in the age range of 20-40 years is only approx. 20%, and that of the population up to 20 years old, is around 15% [22].
The aging population phenomena in the rural areas is manifested on the whole territory of Hunedoara county. Fig. 1 presents the evolution of the population median age, as a whole and on both sexes.

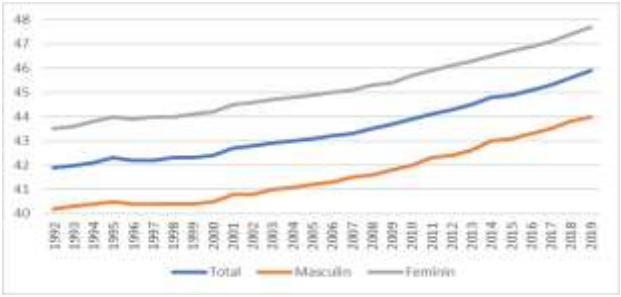

Fig.1. Evolution of rural population median age in Hunedoara county.
Source: Source: Authors' own design after NIS data.

The evolution of population average age in the rural area of Hunedoara County has an ascending trend. It can be observed that in the first half of the analyzed period (1992-2005) the average age of the population in the rural area of Hunedoara County increased by approximately one year, from 42 to 43 years. In the second half of the analyzed period (2006-2019) the average age of the population in the rural area of Hunedoara County increased by approximately 3 years, from 43 to almost 46 years [22].
One of the solutions that could help reduce the demographic decline is to encourage the development of touristic activities in rural areas in Hunedoara County [7]. Touristic activities development would lead to the creation of new jobs [3]. Also tourism would encourage at the same time the development of existing farms and the emergence of new farms [16].
Of the 17 communes analyzed in this paper, only four are not included on the list of zones with high tourist potential [9]. The presence on this list is important because the investors who will want to obtain financing from European Union by applying projects on measures 6.2 and 6.4 can obtain additional points if they make the investment in the communes that are on the list [7].

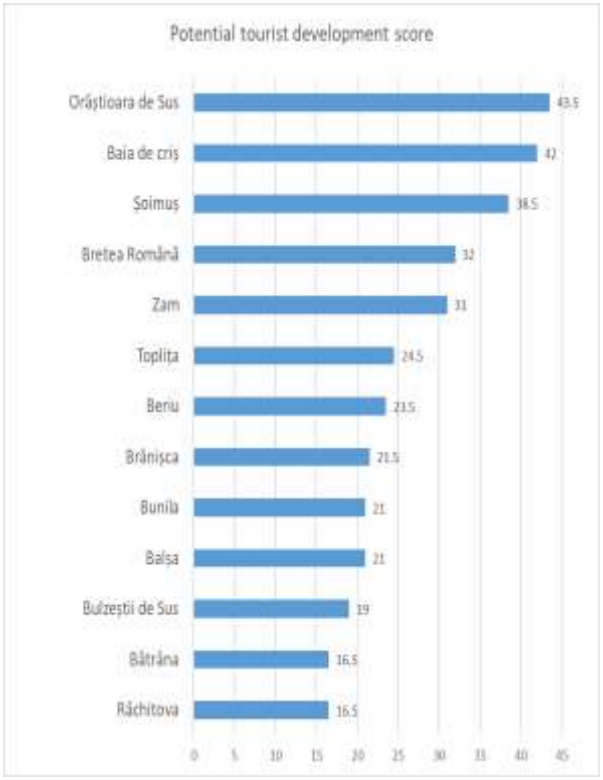

Fig. 2. Communes tourist development potential hierarchy
Source: Authors' own design based on the data from [9].

In Fig 2, we can observe that most of the analyzed communes have over 20 points on the tourist development potential scale. Only three communes have this indicator below the value of 20, these are: Bulzeștii de Sus with 19 points; Bătrâna and Răchitova each with 16.5 points,
The average value of this indicator is 26.9615. A large deviation from the average can be observed. The score of Bătrâna and Răchitova communes is almost 40% lower
than the average. At the opposite pole, the scores of Orăștioara de Sus, Baia de Criș and Șoimuș communes are over 40% higher than the average.
Figure 3 presents the socio-economic situation of the 17 communes from Hunedoara County where we can find the most depopulated 20 villages in Hunedoara County.
Each commune socio-economic status is analyzed from the perspective of five main indicators. Each of these main indicators is

calculated on the basis of secondary indicators specific to the analyzed aspects.

The endogenous potential indicator is calculated taking into account: the number of inhabitants, agricultural area, the number of animals expressed in UVM, forest area and the cultural heritage [6].

In this case, it can be observed that most of the analyzed communes have a good level of endogenous potential, only three communes have this indicator below the value of 0.4. These are Bunila, Bătrâna and Toplița. Of these, Bătrâna commune stands out negatively through a very low value of the indicator, of only 0.32, less than 60% of the general average of the other 17 analyzed communes. At the opposite pole, we can find the communes Beriu, Baia de Criș and Oraștioara de Sus whose endogenous potential exceeds the value of 0.6.

The physical-geographical indicator is calculated taking into account: the average altitude, fragmentation density, area of community importance sites and the share of the forest area in the UAT area.

In this case, we can observe that most of the analyzed communes have a good level of endogenous potential, only Răchitova commune have this indicator below the value of 0.4. The average value of this indicator is 0.4858 and the maximum and minimum values do not deviate from the average by more than 20%.

The economic activities indicator is calculated taking into account: the number of small and medium economic agents/1,000 inhabitants, the number of employed in small and medium companies/1,000 inhabitants, the number of arrivals in tourist units, the number of accommodation units, the share of farms over 5 ha in total farms, the share of the employed population in the secondary and tertiary sector in the total employed population and the share of farms over 5 ha. These indicators are very important in analyzing rural areas [15].

In this case, we can observe that most of the analyzed communes have the level of economic activities over 0.4.

The average value of this indicator is 0.4029 but a large deviation from the average can be observed, especially in the case of the four communes that have this indicator below the 0.4 threshold. These communes are Bulzeștii de Sus, Bătrâna, Orăștioara de Sus and Toplița. Of these, Bulzeștii de Sus commune stands out negatively through a very low value of the indicator, of only 0.09, 23% less than the general average of the other 17 analyzed communes. Also, Bătrâna comune has a low value of this indicator, only 0,16, 40% less than the general average of the other 17 analyzed communes.

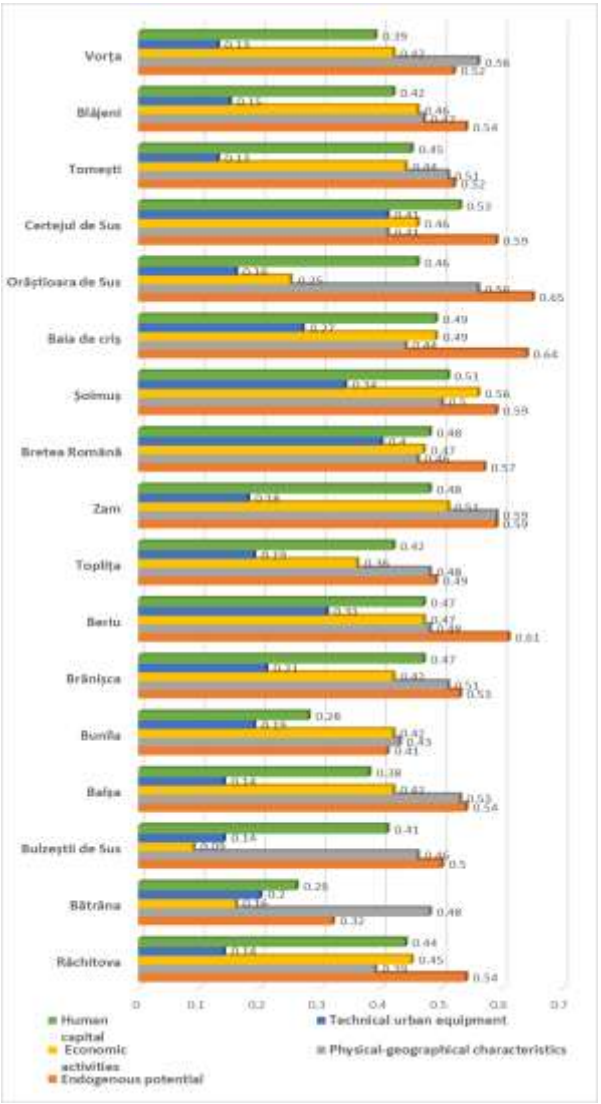

Fig. 3. Main indicators used for assessing the communes socio-economic development potential

Source: Own design based on the data from reference studies for the elaboration of PNDR 2014-2020 [21].

The technical urban equipment indicator is calculated taking into account: the share of public water-supplied dwellings in total conventional dwellings, the share of dwellings connected to the sewerage in total dwellings,

the share of dwellings connected to the gas network in total conventional dwellings and the public roads network density.

Unfortunately, regarding this indicator, the analyzed commune's circumstances are very poor. The average value of this indicator is only 0.217 and huge differences can be observed between the communes at the bottom of the ranking and those at the top. The communes can be divided into three categories: category under 0.2 with 10 communes, category 0.2-0.3 with 3 communes and category 0.3-0.41 with 4 communes. The human capital indicator is calculated taking into account: the population density, the share of people between the ages of 0-64 in the total population, the share of the population with secondary education (high school + professional) in the total population, no. of inhabitants/doctor, no. students/teacher and the share of population using internet in total population over the age of 66.

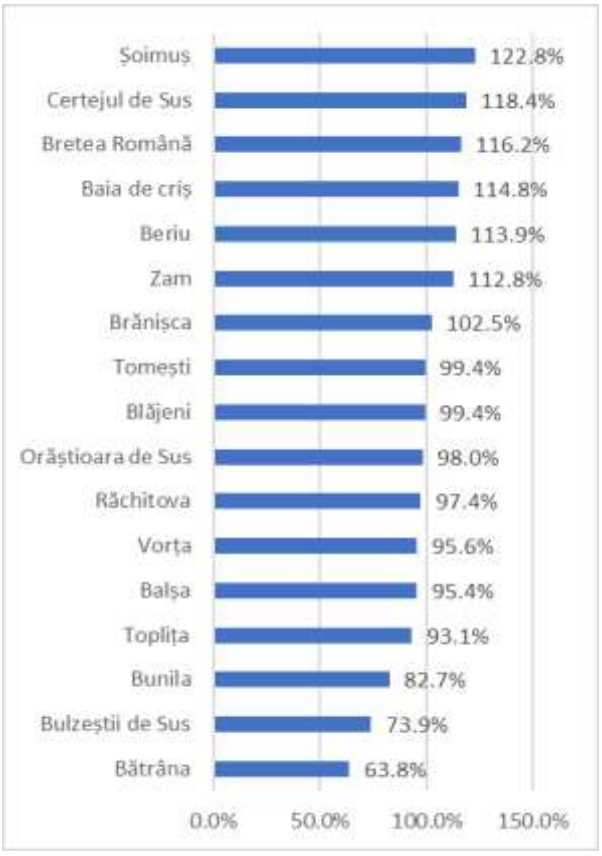

Fig. 4. Comparison of socio-economic development potential of analyzed communes depending on difference from the average value

Source: Authors' own calculation based on the data from reference studies for the elaboration of PNDR 2014-2020 [21].

This indicator average value is 0.4317 and we can observe a significant deviation from the average for some villages, especially in the minimum values. There are seven communes that are below average, and among them Bunila and Bătrâna communes indicator is lower than the average by 40% and 35% respectively. At the opposite pole, we can find the communes Șoimuș and Certejul de Sus whose human capital indicator exceeds the value of 0.5.

The arithmetic mean of these five indicators represents the general socio-economic development potential for each commune.

From the socio-economic situation of the 17 communes presented in Fig. 4 results the hierarchy of the analyzed communes according to the size of the indicators of socio-economic development potential. From this hierarchy it can be seen that most communes with high development potential are located near cities and major access roads.

Compared to the average socio-economic development potential of the seventeen analyzed communes, three categories can be formed. The first category contains communes with very high socio-economic development potential. There are six communes in this category, these are Șoimuș, Certejul de Sus, Bretea Română, Baia de Criș, Beriu and Zam.

In the category of communes with medium socio-economic development potential, there are eight communes: Brănișca, Tomești, Blăjeni, Orăștioara de Sus, Răchitova, Vorța, Balșa and Toplița.

In the category of communes that have a low potential for socio-economic development, there are three communes. The potential of Bunila commune is 17.3% lower than the average of the analyzed communes. The potential of Bulzeștii de Sus commune is 26.1% lower than the average, and the potential of Bătrâna commune is 36.2% lower than the average of the socio-economic development potential of the analyzed communes

At present, the communes in the mountainous rural area of the county have important areas of agricultural land that is not used because farmers have difficulties in selling their products [17].

CONCLUSIONS

In conclusion, the results of the analysis presented in this paper show that the rural area of Hunedoara County faces a serious demographic problem, the population is declining, the average age is rising rapidly and public infrastructure indicators in most communes studied are very low. It is disappointing that so many villages that have a high score of tourism potential have a low potential for socio-economic development.

If in the next 5 years, the agritourism potential will not be exploited, the existing farmers will not be supported and the necessary infrastructure will not be developed, there is a risk that over 30 years half of the communes analyzed in this study to reach the same tragic situation in which the Bătrâna commune is now, to have less than 100 inhabitants.

It can be said that there is a certain point that once exceeded leads to the appearance of a vicious circle that can no longer be stopped. Most of the young inhabitants leave the mountain area communes permanently because without public infrastructure, the living conditions are very difficult.

At the same time, as the population decreases and very few inhabitants remain, the state authorities can no longer justify the efficiency and opportunity of infrastructure investments that would benefit a very small number of people.

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IMPACT OF EUROPEAN FUNDS ACCESSING ON ECONOMIC AND SOCIAL DEVELOPMENT. CASE STUDY

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Abstract

The objective of the paper is to evaluate the impact of accessing the European funds on the economic and social development of Călărași county. The present analysis aims to highlight the particular aspects regarding the report between the degree of involvement in the process of accessing the European funds and the impact of this approach on the economic and social development of Călărași county. Starting from the premise that in the current programming period 2014-2020 Romania established through the Partnership Agreement assumed with the European Union, the Specific Objectives, the Priorities and the Financing Measures and related to the development needs of the communities in the county, all related to the Specific Objectives, Priorities and financing measures adopted, Călărași County Council drafted its project portfolio and priorities in accessing the European funds for the above-mentioned period. Following the evaluation of the project portfolio of Călărași County Council, it is worth noting that the institution understood that a community can develop itself much more efficiently and quickly by accessing non-reimbursable European funds, than in the absence of them. Călăraşi County Council put its imprint, through its projects, implemented or under implementation, on the promotion of the cultural and natural heritage and the development of the tourism infrastructure.

Key words**:** *development, European financing, project management, objectives, strategy*

INTRODUCTION

In its actions regarding the development of the county, Călărași County Council created the framework needed to encourage the local initiatives, taking into account all the communities of the county and focusing mainly on the areas that are facing the most difficulties, in order to ensure the necessary support to each community in part [3].

Through the implementation of its projects, Călărași County Council has always sought to improve the potential of all areas of the county through sustainable and balanced development, through major investments in infrastructure, in creating a solid business sector, in education, social and cultural activities, including through its involvement in job creation [9].

In its efforts, Călărași County Council aimed to encourage the continuation of the economic and social development process throughout the county and in particular to act to increase the economic and social level of the rural communities by providing the necessary conditions for this process [10].

The regional, national and global changes and challenges that marked and influenced the development of the county from the point of view of its future progress were not omitted. in order to prevent these situations, very clear objectives and strategic directions of action were defined, which came in order to ensure the development of the county, based on a realistic investment and on protecting its identity [5].

One of the elements considered critical of the strategic planning process that led to the establishment of Călărași County Council vision was to identify opportunities to orientate the institution in the development process and on which it must direct its efforts to reach its objectives [4].

The first step, in this direction, after identifying the defining characteristics of the county, the opportunities and challenges that it has to face, was to identify the elements needed to argue and formulate the vision for the development of the county, which will lead, when

establishing the vision and implicitly, of Călăraşi county strategy [11].
In its forecasts, Călăraşi County Council, appreciated that by 2020, it can become a county with a sustainable local economy, with an emphasis on innovation, tradition and capitalization of resources, tempting for potential investors, based on an ultramodern infrastructure and a developed partnership and entrepreneurship sector [7].
In the process of attracting non-reimbursable European funds, Călăraşi County Council has identified those objectives that address a full area of development needs, so that their actions lead to the achievement of the targets proposed in the County Development Plan [4].

MATERIALS AND METHODS

The objectives followed in the process of data collection were as follows: defining the vision of Călăraşi County Council in the process of accessing the European or national funding; the difficulties encountered and the impact on the development of the county due to the process of accessing the European or national funding; reducing the influence of risk factors on the whole community; imposing measures designed to bring added value to the projects implemented or under implementation.
In order to demonstrate the proposed objectives, the data collection activity was carried out at Călăraşi County Council, a public authority of county interest, which carries out activities in the field of local public administration, and which shows a special concern regarding the improvement of the living conditions of the inhabitants of the county.
After completing the data collection activity, we identified the impact of accessing the European funds on the economic and social development of the county.
For this purpose, the analysis of the current situation was used as methods, in consultation with the representatives of the institution, involved in the process of accessing the European or national funding, as well as collecting data, both meant to bring enough information to achieve the objective of the paper.
We oriented, in the data collecting process, on the programming documents related to the period 2014-2020, and implicitely, the financing programmes, the priorities and measures dedicated to the implementation of the project ideas of Călăraşi County Council.
The investigation methods used in the analysis process, are divided into two categories [8]:
theoretical methods - consisting of studying specialized materials in the field of public administration, financing programmes from the European or national funds; practical methods - applicative - consisting of data collecting, a process that proved to be particularly important in identifying the projects and funding programmes of Călăraşi County Council and their impact on the economic and social development of Călăraşi County.

RESULTS AND DISCUSSIONS

In Călăraşi County Development Plan, elaborated for the programming period 2014-2020, the priorities and intervention fields were identified at the level of Călăraşi county, in conjunction with the strategic objectives and development priorities foreseen at European level in 2020 Europe Strategy for the reference period [6].
From the information presented in Figure 1., it resulted that a special emphasis was given to the Regional Operational Programme 2014-2020 (27% of the implemented projects), through which problems related to road, health and social infrastructure were solved. In addition, following this initiative, the institution sought national funding sources (PNDL, CNI, ANL, Ministry of Tourism, representing, in total, 40% of the implemented projects).
Analyzing the situation, it is further remarked that Călăraşi County Council concerns were also aimed to improve the institution ability to provide transparent services, by carrying out an institutional level analysis through which vulnerabilities were identified and corrected, as well as by improving the employees' knowledge and skills, local elected officials/authorities in this area.

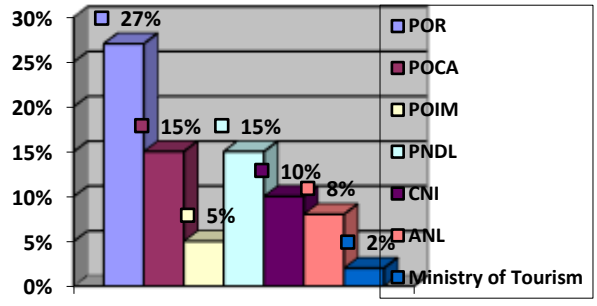

Fig. 1. Financing programmes by which funds were accessed by Călăraşi County Council in the period 2014-2019
Source: Own design based on [3].

Another concern of Călăraşi County Council aimed at the integrated solid waste management system in Călăraşi County by creating a selective waste collection platform in Ciocăneşti commune through the Large Infrastructure Operational Programme (POIM 15% of the implemented projects). The project continues, in the second phase and in the current programming period [2].
We present, below, the situation of the projects implemented or under implementation of Călăraşi County Council, from the point of view of the funds accessed on each Operational Programme, in the current programming period (Tables 1, 2, 3, 4, 5, 6).

Table 1. Funds POIM 2014-2020 attracted by Calarași County Council

	European Funds - POIM 2014-2020	**Project value**
1.	Integrated solid waste management system in Călăraşi county POIM Phase II	119,364,319 lei VAT excluded

Source: Own data of Călărași County Council [3].

The analysis highlighted the fact that, Călăraşi County Council accessed, during 2016 - 2019, European funds in value of 533,922,384.62 lei. The value of the national funds accessed by the institution amounted 372,449,011.19 lei.
The value of the financing contracts signed by Călăraşi County Council, both as a partnership leader and as a partner in different projects, was 146,594,426.70 lei, approximately 31,868,353.63 €. If we refer only to the year 2018, from the point of view of the value of the financing contracts signed by Călăraşi County Council, we find that it amounts to a value of 255,219,865.57 lei, approximately 55,482,579.50 €, which represents a qualitative leap on accessing the European funds by the institution.
Călăraşi County Council focused its efforts on creating partnerships and identifying financing sources, in order to improve accessibility in the cross-border area, both by building a bridge over the Danube between Călăraşi and Silistra, as well as by making its connections, as well as on the creation of a suitable port infrastructure on the Danube, in order to take over the transit of goods from the rail and road transport networks.
Another priority of the county administration for the period 2014-2020 is represented by the facilitation of the quick and safe access to all the areas and localities of Călăraşi county, in order to increase the labor mobility and to expand the business sector.
In the period 2014-2020 the ring road was rehabilitated under the National Local Development Plan (P.N.D.L.) [4]. Corroborating the information, during the period under evaluation, the total length of the county roads rehabilitated or modernized was 92.79 Km. In parallel, Călăraşi County Council supported the administrative-territorial units in the county to submit projects through the National Local Development Development, a programme of national interest, which emphasized the road, sanitary, social, educational and connection infrastructure to the water network/canal.
Analyzing the situation from the point of view of the achieved objectives and referring to the total length of the roads on which road markings and signs were initially planned, to be achieved this was 650 km, of which only 122 km were achieved up to date, only one road junction being traffic lighted in Călăraşi municipality of which 25 provided in the county.
Another notable objective of Călăraşi County Council was the modernization of the railway transport infrastructure by creating the intermodal transport premises.
It was assumed that it is needed to rehabilitate the railways that cross the county, as well as those that connect the most important railway node in the area, Ciulniţa and Călăraşi

municipality. It was desired to ensure the facilitation of access of persons and goods, from the rail system, to the naval system, by establishing a railway route to the Danube in Călăraşi municipality, as well as by the rehabilitation of the railway linking Oltenița municipality to Bucharest.

Table 2. Funds POR 2014-2020 attracted by Calarași County Council

	European funds - POR 2014-2020	**Project value**
1	Modernization and rehabilitation of county roads DJ 402 and DJ 302 under ROP 2014-2020, priority axis 6, Investment priority 6.1	128,868,255.92 lei
2	Modernization of county roads DJ 201B , DJ 305 route –ROP priority axis 6, investment axis 6.1 Open call for West Region and South Muntenia	133,987,301.49 lei 29,837,947 €
3	Modernization and rehabilitation of county road DJ 306 under ROP 2014-2020, Priority axis 6, investment priority 6.1 – SUERD	53,815,805.32 lei, 11,699,088 €
4	Electical power rehabilitation Cinema within Călăraşi County Culture and Creation Center ROP 2014-2020, Priority axis 3, investment priority 3.1	2,530,107.67 lei
5	Electrical power rehabilitation of Ciocăneşti Care and Assistance Center ROP 2014-2020, Priority axis 3, investment priority 3.1	6,259,750.55 lei
6	Electrical power rehabilitation of Section of catching and dermatological diseases within Călăraşi County Emergency Hospital ROP 2014-2020, Priority axis 3, investment priority 3.1	2,519,257.27 lei
7	Electrical power rehabilitation of Călăraşi Maternal Center ROP 2014-2020, Priority axis 3, investment priority 3.1	2,156,082.44 lei
8	Electrical power rehabilitation of Center of Community Services for Severely Disabled Children Călăraşi POR 2014-2020, Axa prioritară 3, prioritatea de investiții 3.1	3,555,607.83 lei
9	Electrical power rehabilitation of Emergency Reception Center "Sfânta Maria" Călăraşi, ROP 2014-2020, Priority axis 3, investment priority 3.1	3,586,336.39 lei
10	Increase of energy efficiency of „Dr. Pompei Samarian" Călăraşi County Emergency Hospital ,ROP 2014-2020, Priority axis 3, investment axis 3.1 SUERD	10,000,000 lei
11	Electrical power rehabilitation of Nicolae Bălcescu Technological High School, Oltenița municipality, ROP – Axis 3.1 SUERD	3,122,045 lei
12	Electrical power rehabilitation of Spiru Haret Secondary School, Oltenița municipality, ROP – Axis 3.1 SUERD	3,354,810 lei
13	Electrical power rehabilitation of Normal Schedule Kindergarten no. 5, Oltenița municipality, POR – Axis 3.1 SUERD	2,551,114 lei
14	Electrical power rehabilitation of Ștefan Vodă Secondary School, Ștefan Vodă commune, ROP – Axis 3.1 SUERD	3,178,269 lei
15	Electrical power rehabilitation , Călăraşi County Gendarmes Inspectorate , ROP – Axis 3.1 SUERD	3,975,609 lei

Source: Own data of Călărași County Council [3].

Table 3. Funds INTERREG VA Ro-Bg 2014-2020 attracted by Calarași County Council

	European funds - INTERREG VA Ro-Bg 2014-2020	**Project value**
1	Risk management and protection against floods in Călărași and Polski Trambesh cross border regions	Project total budget: 3,853,515.63 € Călărași County Council– Budget: 2,794,779.66 € (12,855,986.44 lei)
2	Improving the navigability safety on the Danube in Călărași - Silistra cross-border region	6,000,000 €
3	Development of joint tourist products and rehabilitaton of cultural heritage, project aiming the investment objective restoration of Demetriad House	Budget: 851,590.29 € Călărași County Council- Budget: 648,402.25 €
4	Improvement of risk management and partnership in Călărași - Dobrich cross border region, project aiming the modernization of joint dispatcher I.S.U - S.A.J	Călărași County Council - Budget: 313,302.81 € (1,441,192.26 lei)
5	Efficient management of emergency situations in Călărași - Veliko Tarnovo cross border region, project aiming equipment purchase for ISU Calarasi and for Calarasi Gendarmes Inspectorate	Călărași County Council - Budget: 364,024.14 € (1,674,511.04 lei)

Source: Own data of Călărași County Council [3].

Table 4. Funds POCA 2014-2020 attracted by Calarași County Council

	European funds - POCA 2014-2020	**Project value**
1	PRO: Performance and quality in the organizational management of Călăraşi County Council	494,880 lei
2	Improving the capacity of local public administration to provide services based on the principles of ethics, transparency and integrity	397,889 lei
3	Strategic planning and administrative simplification for a sustainable development of Călărași County	3,650,604.65 lei

Source: Own data of Călărași County Council [3].

Table 5. National funds attracted by Calarași County Council

	National funds	**Project value**
	National Local Development Plan (PNDL)	
1	Modernization of DJ 211D route Ștefan Vodă –L =24,752 km	42,082,824 lei
2	Modernization of DJ 411 Chirnogi – Radovanu – Crivăţ Length : 18,09 km	24,189,953.40 lei
3	Modernization, rehabilitation of DJ 403 Length: 38,80 km	59,357,184.26 lei
4	Modernization and rehabilitation of DJ 401C and DJ 412 Length: 38,80 km	31,751,043.10 lei
5	Modernization and rehabilitation of DJ 310	46,597,744.30 lei
	National Agency for Dwellings (ANL)	
6	Service house no 1 bis, Nicolae Titulescu boulevard, Călăraşi municipality	5,493,112.88 lei VAT excluded
7	Dwellings for young, destined to rent to doctors, Călărași county	3,055,398.33 lei
8	Extention of B building commercial spaces PT+ works execution	1,474,925.70 lei VAT excluded
	National Company of Investments (CNI)	
9	Rehabilitation of Călărași Administrative Palace	57,347,080.75 lei, VAT excluded
10	Construction of new building of Călărași County Emergency Hospital	97,803,699.72 lei VAT excluded
11	Rehabilitation, modernization, equipment of basement of building C of „Dr. Pompei Samarian" Călărași County Emergency Hospital	1,336,210 lei
	The Ministry of Tourism	
12	Tourist development of Borcea branch-Călărași – Leisure port	99,699,688,.64 lei
13	Creation of Multifunctional center in the tourist area of Călăraşi municipality	1,892,457.60 lei
	The Ministry of Culture	
14	Access 10 for Centenary	67,377.15 lei

Source: Own data of Călărași County Council [3].

Table 6. Private funds attracted by Calarași County Council

	Private funds - SERA Foundation	**Project value**
1	Creation of Center for diabled children	245,410 lei

Source: Own data of Călărași County Council [3].

Another important objective of Călăraşi County Council was the modernization of the naval transport infrastructure. In order to support this measure, it was sought to identify financing solutions, including by creating partnerships or attracting investors to develop industrial and commercial ports in Călăraşi and Olteniţa municipalities, which can support the economic development of the county along the Danube river [1].

The transport infrastructure has always been a priority for Călăraşi County Council, on ensuring the mobility of the labor force from the rural to the urban area.

For this category, Călăraşi County Council has taken steps to create bicycle paths to serve all areas of the town, by implementing the project "Promoting eco-tourism in the area of the Danube in Călăraşi by cycling and using non-motorized fishing boats for environment conservation".

Through this project, the mapping and signaling of four cycling routes were organized, the cycling competition was organized, set up as an eco-tourism event, the

fishing route was established on the Danube by consulting the relevant actors and the web portal was created for the promotion of the project and the tourist area. In addition, 10 bicycles and 5 rowing boats were purchased, which were and can be made available to the tourists interested in exploring Borcea branch area, and 5 persons, from the beneficiary employees, were trained as tour guides.

Another important objective of Călăraşi County Council was the improvement of the critical technical-urban infrastructure for the county: public utility networks by increasing the quality of life of the inhabitants of the county. At the level of the communes in the county there have been multiple interventions aimed at modernizing and extending the public utilities.

Another important step in the actions taken by Călăraşi County Council for the economic and social development of the county, was the construction, modernization and equipment of the cultural infrastructure, by creating an environment favorable to the cultural development of all the communities in Călăraşi. Thus, the work was continued at Călăraşi County Library, which will provide modern reading spaces, attractive for all age categories, that meet the standards of information and communication technology development, at an alarming rate of growth, in an information society.

During the development process, Călăraşi County Council did not neglect the development of the tourism infrastructure, whose purpose was to attract the investments of the private sector to the tourist area, by creating an adequate infrastructure for the development of this segment.

The offer of the accommodation structures of Călăraşi county is undersized to its potential, meaning that, apart from Călăraşi town, Oltenița town and the North-West area of the county that hold a few hotels, the tourist reception capacity is lacking in the county territory.

Călăraşi County Council has also directed its efforts towards the development of sports and recreational infrastructure. In this regard, Ion Comșa Stadium in Călărași was modernized and allocated significant financial resources, together with Călărași Town Hall, in order to obtain sports performances in the football area.

A particularly important emphasis was placed on providing modern health services, by improving the medical services offered to the patients, by employing doctors on deficient specialties, on equipping and rehabilitations.

Also, Călăraşi County Council expresses concern regarding the improvement of the educational infrastructure for all the localities of the county and the increase of the quality of the educational services, supporting the territorial administrative units to solve their problems.

A special emphasis was given to the implementation of a modern waste management system, with an emphasis on selective collection and reuse of waste for increasing the energy potential.

In order to develop the environment of cross-border cooperation**,** Călăraşi County Council implemented, in partnership with the local public administration in Bulgaria, a project regarding the construction of a Business Center on the Romanian shore of the Danube.

The purpose of the collaboration was to improve the relational framework with the partners from the cross-border area by developing the business sector and promoting the domestic products and services across the border. This collaboration brought multiple benefits to both communities.

CONCLUSIONS

Like any perfect public administration, the activity of Călăraşi County Council can be improved throughout. A weak point of the County Council, identified in the Development Plan of Călăraşi County for the period 2014-2020, is the transport infrastructure that remained on the same lines, not offering the ability to provide easy access to all the inhabitants.

In addition, in Călăraşi municipality, the transport lines served by the operator were established from the former steel plant - the largest employer 20 years ago, crossing the town from West to East, to the second major developed area, the one of the cellulose and

paper plant, respectively the prefabricated factory.

At present, these companies significantly reduced their number of employees, finding new jobs created in the North and South - Saint Gobain, Aldis. In these conditions, seeing the increasing mobility of the labor force from the rural to the urban area, it is needed to identify new routes of public transport. Another weak point is the insufficient unuse of the opportunity to develop the local communities by adapting them to the needs of the tourist consumption market, by capitalizing and promoting the natural and cultural heritage, as a form of tourist attraction, starting from the diversification of the tourism forms and capitalizing the tourism potential of the county. This step, in parallel, requires the development and diversification of the tourism products, while increasing the quality of services. Local public authorities have made massive investments, in recent years, regarding the accessibility, as well as infrastructure of public utilities and services.

Although in recent years, Călărași county has undergone an important development regarding accessibility, as well as the infrastructure of public utilities and services, the county remains deficient on port infrastructure, connectivity infrastructure with Bulgaria over the Danube, waste and wastewater collection infrastructure. In order to eliminate these weaknesses, the institution directed its efforts towards attracting European funds through investment programmes for these areas

However, the county remains deficient regarding the port infrastructure, connectivity infrastructure with Bulgaria over the Danube, wastewater and waste collection infrastructure. In order to solve these deficiencies, Călărași County Council must focus its efforts through sustained investment programmes in these areas.

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ECONOMIC AND SOCIAL IMPACT OF ASSOCIATIONS IN GROUPS OF AGRICULTURAL PRODUCERS - A CASE STUDY IN ROMANIA

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Abstract

The study presented in this paper starts from the fact that it is important to establish agricultural producers in associative forms to open them opportunities for economic development, by attracting local, regional or regional advantages. Thus, we analyzed the groups of agricultural producers established in Călărași county, regarding their structure by categories of activities, the evolution of the economic-financial indicators and the activity carried out. There were 19 interviews with management team and members of the 11 groups of agricultural producers in Călărași, in order to obtain information on the results obtained, the positive and negative aspects encountered in the activity, the advantages and disadvantages of functioning as a group of agricultural producers, future projects. Most of the positive aspects mentioned by the representatives of the groups were related to greater power they have in the negotiations with the input suppliers and in the capitalization of the production, the reduction of the production costs; exploitation of land surfaces that allow the application of modern technologies etc. The general conclusion is that in order to be successful, there must be cohesion in the producers group. If there is no cohesion, there is no success, so as in any association, the human factor is the most important.

Key words**:** *advantages, disadvantages, producers group, agricultural production*

INTRODUCTION

In the European Union, most producers have preferred to join groups, because together they can produce homogeneously, in much larger quantities, qualitatively and can sell, the product, finally, at a good price [13]. One of the world leaders in high performance agriculture is Netherlands. In this country, about 100 thousand small producers, who process agricultural land up to 10 hectares, have strengthened their power by joining groups [7]. For example, the prosperity of the flower growing sector is due to the cooperation, since practically all the producers in the sector are associated in groups. Thus, they have the necessary performance equipment in flower growing, successfully carry out the selection and multiplication of the perspective varieties. At the same time, florists get a higher engross price due to the fact that about 95% of the production is sold through the producers group [14].

A similar situation can be found in Belgium, the UK or Poland, where more than half of the milk produced on farms is sold through cooperatives [13]. In Netherlands, Austria and Denmark, this figure exceeds 95%, while in the United States and Canada about 90% of dairy factories cooperate [7].

In Romania, at the end of February 2020, 236 producers groups were active in the agricultural, forestry and agri-food sectors [8]. The relations of association and cooperation are diversified according to the variety of the connections that are established between agriculture and other sectors of the national economy, as well as within agriculture, between the companies and the units for storage, processing and sale of agricultural products [10]. The concentration of production on farms of optimum size, as well as the diversification and specialization of agricultural production are closely related to the development of the association and cooperation relationships along the technological flows of production of agricultural raw materials, but also of the processing and capitalization of the products [8].

The importance of the farmers association is emphasized both by the opportunities for financing through NPRD 2014-2020 and by increasing the competitiveness of the member

farms in these associative structures, supported by numerous facilities for processing and selling the agricultural products of the associated farmers [12]. According to the legislation in forcé, there are the following forms of association in the agriculture of Romania:

•*agricultural companies and other forms of association in agriculture* (Law no. 36/1991 on agricultural companies and other forms of association in agriculture, as subsequently amended and completed) [10];

•*associations* (GO no. 26/2000 on associations and foundations, approved by Law no. 246/2005, as subsequently amended and completed) [8];

•*agricultural cooperatives* (Law no. 566/2004 on agricultural cooperation, as subsequently amended and completed) [11].

Considering the provisions of GO no. 37/2005 on recognition and functioning of the groups and organizations of producers for selling agricultural and forest products, associative forms mentioned previously can be recognised as producers groups [9].

MATERIALS AND METHODS

In order to collect the data needed to study the importance of the association of agricultural producers, the specialized bibliography, the statistics elaborated by the Ministry of Agriculture and Rural Development, by Agriculture Directorate of Călărași County were studied and the survey-interview was used. There were 19 interviews with management team and members of the 11 groups of agricultural producers in Călărași county, in order to obtain information on the results obtained, the positive and negative aspects encountered in the activity, the advantages and disadvantages of functioning as a group of agricultural producers, future projects.

The interview was structured on 4 categories of items, such as:

1. Achievement of some activities to increase the group cohesion: if social activities were organized for its members - team building/ study visits/activities in communication? Is there cohesion in group?

2.If there is a sale manager who takes care only of the marketing of the group activity: do you have sale manager? If yes, who is he/she? Is he/she a person from outside or a member of the group? The production sale was simplified as a member of a group? Do you have promotion materials? Do you have *website*? *Facebook* page?

3.The association generates added value from economic point of view for its members: is there any difference regarding the level of income of partners before and after joining the group? Can you make plans (procurements, investments) better than before being a group of producers? Does the group have profit?

4.**The group has perspectives of development:** What future plans does the group have? What advantages does the association have within the group for your business? What risks do you see in the group functioning? Do you trust this association can be sustainable?

The information obtained by interview and the comparative analysis of some economic and financial indicators of the producers groups led to some conclusions and proposals regarding the importance of farmers association.

RESULTS AND DISCUSSIONS

The producer groups are legal persons for profit and their own economic management and farmers associations that jointly sell the obtained products [9]. These groups ensure the production planned and adapted to the demand of the market, according to the conditions of quality and quantity. It also promotes the supply and placing on the market of products obtained by their members. The group is responsible for optimizing production costs, setting producer prices and promoting the use of growing practices, production techniques and waste management practices that do not harm the environment [4].

A member of a producer group may be anyone who legally owns a production base, declares in writing his intention to sell his own agricultural production and pays the fee, in accordance with the group statute. Members are required to apply the regulations adopted

by the producer organization regarding production reporting and environment protection.

Also, they must only be part of a producer organization for selling one or more products subject to the common market organization, in accordance with the legislation in force, and to sell most of the production.

In Romania, although they were established relatively recently, there are few groups of economically sustainable agricultural producers compared to their number "on paper". Most of the time, they pass through very difficult situations since they were set up, and if they go by this stage, they cannot become economically relevant.

At the end of February 2020, 236 producer groups operating in the agricultural, forestry and agri-food sectors were registered in Romania [12]. These include the 11 groups of agricultural producers from Călărași county, established between 2008 and 2019, as shown in Table 1 [4].

It should be noted that the majority of producer groups have as their activity cereals growing and oil plants, with one group having the activity of raising and exploiting poultry meat and eggs, and two other groups adding vegetables and fruit growing.

Table 1. Structure of producers groups in Călărași county, in 2020

	Name	Address/Location	Date of setting up the group	Category of products
1	Association Consortium of Extension and Rural Development	Vâlcelele Commune, Călărași county	17.01.2008	Cereals and oil plants
2	S.C. Consortium Ceres Dor Marunt SRL	Ogoru village, Dor Mărunt commune, Călărași county	08.11.2010	Cereals Oil Plants
3	Dorobantu 2009 Agricultural Cooperative	Dorobanțu village, Dorobanțu commune, Călărași county	19.04.2011	Cereals Oil Plants
4	S.C. Euroavi S.R.L.	Dragalina commune, Călărași county	12.04.2011	Poultry meat and eggs
5	S.C. Sico Real Agro S.R.L.	Modelu village, Modelu commune, DN 21, km 17, Călărași-Slobozia, Călărași county	10.12.2012 Decision of withdraw no. 264289/04.09.2019	Cereals Oil Plants
6	S.C. Rod Bogat Unirea S.R.L.	Unirea village, Unirea commune, no. 273, CălărașiFetești road, Călărași county	11.06.2013	Cereals and oil plants
7	Alexandru Odobescu Agricultural Cooperative	Călărași, no. 49, Berzei street, Construction C1, room 2, Călărași county	03.12.2018	Vegetables-Fruits
8	Company Agro Group Spicul	Ștefan Vodă village, Ștefan Vodă commune, no. 21, Viorelelor street, Călărași county	20.09.2018	Cereals and oil plants
9	Agrosirbi Ciocanesti Agricultural Cooperative	Ciocănești village, Ciocănești commune, no. 4, Stejarului street, Călărași county	18.02.2019	Cereals and oil plants
10	Agricola Fundeni Agricultural Cooperative	Fundeni village, Fundeni commune, no. 1 Magnoliei street, Călărași county	15.03.2019	Cereals and oil plants
11	Colinele Dunarii Agricultural Cooperative	Oltenița municipality, no. 28, șoseaua Călărași street, room 4, Călărași county	23.08.2019	Cereals and Oil Leguminous Plants

Source: Processed according to the information obtained from the Division for Agriculture Călărași [4].

Table 2 presents the economic-financial indicators of the producer groups that submitted the balance sheet and profit and loss account at the end of 2018 (at the time of the analysis, the financial statements for 2019 were not prepared). Thus, the fiscal value, the net income, the registered arrearage, the statement of equity and the number of employees are presented [4].

Table 2. Economic-financial indicators, in the year 2018 (Lei)

Name	Fiscal value	Net income	Arrearage	No employees	Equity
Association Consortium of Extension and Rural Development	6,400	-6,027	3,160,153	0	146,048
S.C. Consortium Ceres Dor Marunt SRL	11,926,854	-1,780	82,210	0	724,758
Dorobantu 2009 Agricultural Cooperative	17,359,275	205,429	826,352	6	390,177
S.C. Euroavi S.R.L.	128,942,423	1,282,728	42,128,991	293	3,890,038
S.C. Sico Real Agro S.R.L.	7,278,856	5,970	155,745	2	75,918
S.C. Rod Bogat Unirea S.R.L.	9,311,052	185,224	4,686,710	2	982,671
Alexandru Odobescu Agricultural Cooperative	0	-247	247	0	9,753
Company Agro Group Spicul	0	0	3,050	0	500

Source: Profit and Loss Account the analysed groups.

Further on, the first four groups of agricultural producers are analyzed in terms of the evolution of the economic-financial indicators, in order to compare their activity and their economic sustainability. The implementation of a project financed by the World Bank and the Ministry of Agriculture, Forests and Rural Development through the Academy of Economic Studies of Bucharest, was completed by the establishment, in February 2005, of an NGO pilot association structure, called **"Consortium of extension and rural development"**, recognized as a producer group, in 2008. At the time of establishment, the number of members was 33, currently reaching 83 members with areas between 50 and 4,000 ha of arable land which is located in the plain area where it is predominantly chernozem. The total area registered within the group was 22,900 ha, and in December 2019 reaching 22,368 ha. The farmers are from Vâlcelele, Dragoş Vodă, Vlad Ţepes, Dragalina, Cuza Vodă, Grădiştea, Alexandru Odobescu, Borcea, Independenţa, Mânăstirea [2].

During the analyzed period (Fig. 1.) within Vâlcelele Consortium for Extension and Rural Development group, the fiscal value decreased from 4,635,2 thousand lei in 2011, to 67,9 thousand lei in 2015 and reached only 6,4 thousand lei in 2018. Regarding the net income, losses were registered throughout the analyzed period, the lowest being in 2018, after, the year 2015 ended with losses of 192,7 thousand lei. It is worth noting the high level of arrearage, which increased significantly over the whole period, from 345,7 thousand lei to 3,060,3 thousand lei in 2018, respectively, an increase with 885,2%. [2].

The equity register the highest value in 2018, of 146,1 thousand lei. The group does not have employees who are actually only responsible for its activity but is coordinated by a board of directors consisting of a chairperson and 3 vice-chairpersons. Although the economic-financial activity was not profitable during the analyzed period, during the interview we found the concern of the board of directors to find the resources necessary to increase the efficiency of the activity even from 2019, when, through the group, 96,828.8 cereal tons were given for sale and oil plants whose total value amounted to 72,800,2 thousand lei.

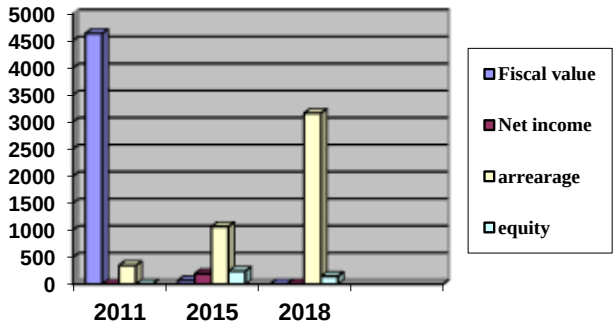

Fig. 1. Evolution of economic indicators at the Association Consortium of Entension and Rural Development- thousand lei
Source: [13].

The producers group established in 2010 in the town of Dor Mărunt from Călărași county with the name of Consortium Ceres Dor Mărunt SRL, with the object of activity the

valorization of cereals and oil plants, has a number of 6 associates and has recorded during the analyzed period an economic situation - financial profitability, the fiscal value increasing from 5,212,7 thousand lei in 2011, to 11,926,8 thousand lei in 2018, respectively, an increase with 228.8%. The net income registered a fluctuating evolution, from 12.8 thousand lei in 2011, to 276.1 thousand lei in 2015 and a loss of 1.7 thousand lei 2018 [14]. The arrearage decreased from 193.3 thousand lei in 2015, to 82.2 thousand lei in 2018. And equity increased from 19.7 thousand lei in 2011, to 724.4 thousand lei in 2018, respectively, an increase with 3,677.15%. (Fig. 2). The group has no employees who effectively handle only its activity but is coordinated by an administrator, who is also the representative of an associate company within the group. The administrator states that the association started from nothing, namely without any money. Everything that has been done over time has been done with the help of banks, which is remarkable to consider, knowing the reluctance of lending institutions when it comes to associative forms in the agricultural field, not to mention fear of farmers to borrow.

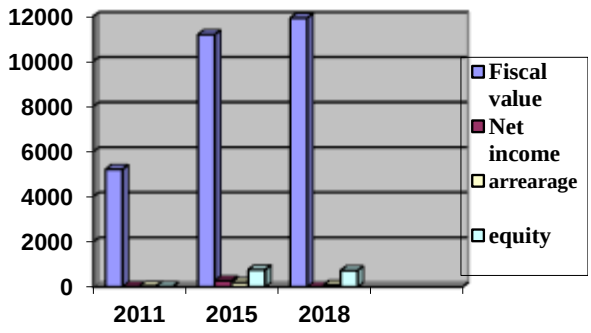

Fig. 2. Evolution of economic indicators at Consortium Ceres Dor Mărunt S.R.L.- thousand lei
Source: [14].

"If you expect to make a profit and work with cash, you lose the train. Everything has to be done at the right time, you don't have time to wait. Who knows when you meet such an occasion in your life? If that happens again, because you often don't have that chance." So far, they had difficulty accessing loans. The most common problem that the chairperson raises is that banks have not developed lending products that are specific to the producers groups and are therefore reluctant to loans.
Dorobanțu Agricultural Cooperative 2009, manages over 5,000 hectares of agricultural land at this time and already has some "achievements" at present. Established in 2009, by five important farmers in the area, who manage together 3,000 hectares, after eight years of activity, the cooperative reached over 400 members, many of them with small areas, between 2 and 3 ha of land [5]. Although the number of members is so high (many would frighten such a number!), it still works quite well. The proof is the investment of over 5 million lei in the grain storage spaces, made with European money, or the car park, which includes six trucks used for the transport of cereals produced by the cooperating members. Moreover, the main object of activity is to capitalize the agricultural production obtained by the farmers in the area, but also to buy the necessary inputs for carrying out the production activity. About the advantages of the association, the chairperson of the group mentions: "One is to sell 100 tons jointly and another is when you come up with 1,000 tons. The effect is the opposite, as the quantity increases and the price is higher" [9]. From the presentation of the economic-financial indicators (Fig. 3) results the efficiency of the activity carried out within the group, this group of producers being the most profitable among the groups with the same object of activity, the fiscal value being at the level of 2018, of 17,379,2 thousand lei and the net profit of 205,4 thousand lei.

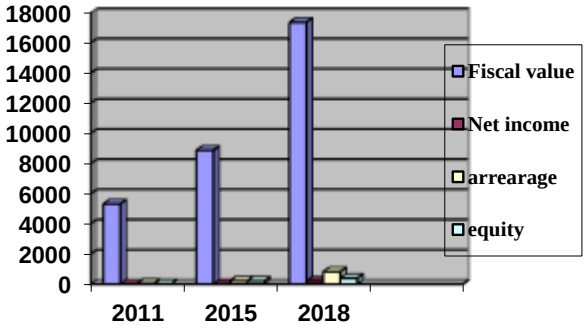

Fig. 3. Evolution of economic indicators at Dorobanțu 2009 Agricultural Cooperative -thousand lei.
Source: [5].

About the cohesion of the group, the chairperson of the group mentions that it is difficult to work with people, all the time it must be a dissatisfied one, as it is only well-known that where three Romanians gather, it does not work. But he managed to keep things under control, perhaps because he took his role as a mediator seriously. In fact, he even acknowledges that he deals with diplomatic discussions in a contradictory way, resolving amicably all the problems that arise, and this seems to be the key to success in the end. And not only the members do not leave, but there are new requests for joining the cooperative. "First of all, people became aware of the greater power they have in negotiating with input suppliers, getting discounts up to 38%, but also with traders. Or all these things matter. For now, there are enough farmers today, the key word being stability in everything we do." Established in 2011, Dragalina locality, "Euroavi" is a group of producers consisting of 7 farmers, breeders of native poultry in Călăraşi county, who joined to slaughter their products together and seek to ensure the best conditions, in own farms of the shareholders who have over 55 breeding halls, completely modernized and equipped with high performance machines. [6]. In an interview with one of the group associates, he mentioned "We are people who had the same agenda. We want to create, we want to do and we have confidence. If you ask me what is most important in a group of producers, as in any association, I answer that the human factor. And if the man you work with is of quality, then your success is assured. We are talking from the beginning. What do we want to do? We want to sell. And we understand from the beginning that association is the key." The data presented in Fig. 4., support the statements of the associates and demonstrate the efficiency of the activity within the group, which had in 2018 a fiscal value of 128,942,4 thousand lei and a net income of 1,282,7 thousand lei.

From the discussions held with the representatives of Rod Bogat Unirea group, it was found that an association in a group of producers is successful if its establishment and development include, at the same time, activities to increase the cohesion of the group, marketing activities and contracting a sales manager.

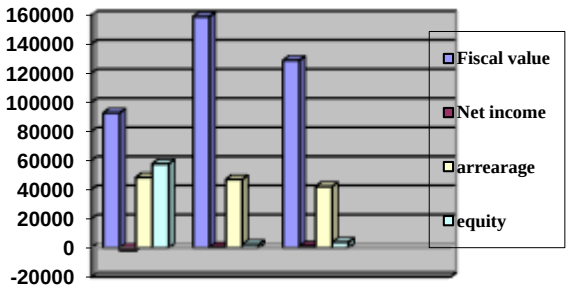

Fig. 4. Evolution of economic indicators at Euroavi S.R.L. -thousand lei
Source: [6].

The newly established groups, in the period 2018-2019, argue that it was necessary to resume to tricks in order to achieve economic success, and the presence of a man-engine in the organization depends on everything. Also, through the interview, the study identified other functional equivalents of these elements (kinship relationships, existing skills and promoting the leadership of some members), which lead to functional groups, but which have too much context to be considered to be widely replicable. Agriculture and small and medium-sized farmers in Romania continue to need association, but not only on paper and not only in subjective, family contexts, but in producer groups built on objective principles, which internalize the governance mechanisms specific to these forms of organization that have long supported farmers in western countries - voluntary and open association, democratic control, transparency, community concern, etc.

All organizations set up as forms of association in agriculture need a dedicated lending fund - according to the interviews conducted for the purpose of this study, cooperatives have problems accessing loans (usually bridge credits to cover members cash flow need) as banks are reluctant to provide loans for this form of hybrid and new organization in the Romanian capitalism. They do not yet understand what an agricultural cooperative is and how they operate and have not yet developed credit products that can be fit to the specific of the agricultural cooperatives.

The European funds for agriculture and rural development can be an incentive to bring the two sectors closer. The newly established producers groups need capitalization - need access to a dedicated and calibrated investment sub-measure on their specific; the group representatives mentioned objectives of procurement and investments in physical assets in the near and medium future.

CONCLUSIONS

From our analysis, the interviewees first of all want their daily activity to proceed without major problems, as a necessary condition for the group to be successful. However, this condition does not occur without at least one of the following two being present: the group has stable contracts with large retailers or its members to become actively involved and make investments when needed. The elements considered the most important for the success of a group of producers are the activities of increasing the cohesion of the group, those of marketing and hiring a sales manager. The three elements must be present at the same time in the development process of the group for it to be successful, and the only possible approach in which all these "ingredients" can be found together is to recognize the role of the human factor in each organization.

The future plans of the producer groups include investments in building construction, increasing the number of members, increasing the area of land owned, attracting EU funding for investments in the acquisition of efficient agricultural machinery and equipment, in the creation of storage and processing spaces.

Another activity that the representatives of the groups consider important is that of marketing. The groups that are successful are those that invested in marketing activities and hired a person responsible for this activity, who have a website, social media presence, drone films, leaflets, attendance at meetings with retailers, etc.

Also, the cohesion of the group is emphasized as being very important when people have to work together for a common good. However, there is also a group that had some problems, its members fail to work together for the good functioning of the organization, although it had remarkable financial results, which is why, at the end of 2019, it requested the withdrawal from the producer groups.

The establishment of agricultural producers in associative forms opens up new opportunities for economic development, by attracting local, area or regional advantages, and uses the collective power in order to increase the prosperity of the members, their families and the communities of which they belong. Regardless of the form of organization they belong to (associations, cooperatives or producer groups), members of associative forms have democratically established rights, and this represents one of the greatest benefits. Among the advantages of joining producers groups, their representatives mentioned: reduction of production costs (for example, they can purchase high-performance machines and equipment, which are used jointly by all members); the exploitation of land surfaces that allow the application of modern, competitive, production and waste management technologies, in order to comply with the environment protection norms that we are obliged to take into account as members of the EU; the possibility of planning and modifying the production according to the quantitative and qualitative demand on the market; easier access to the European funds and bank loans; facilitating communication between farmers, as well as between their representatives and government institutions (the association is a forum for discussions, exchange of views, problem solving between members, opportunities to help and access information, and representatives of associations are a relevant partner of dialogue with the ministry, in the elaboration of the decisions regarding the agricultural producers and their interests); increasing the negotiation capacity, in order to obtain better prices, both for the joint purchase of the raw materials needed for the production, and for the capitalization of the products, by providing larger quantities, in high quality conditions; promoting more efficient production, both on the internal and external markets.

Under the conditions of the strong competitive environment, these aspects, to which others

can be added, can increase the incomes of the agricultural producers and their awareness of the responsibilities that they have as factors with rights and obligations on the market.

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ANALYSIS OF THE ECOTOURIST PROFILE BEFORE THE COVID-19 CRISIS AND POST-CRISIS FORECASTS

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Abstract

During this period, world tourism is experiencing the biggest crisis, after the Second World War - the crisis generated by the coronavirus pandemic. Reservations were canceled, the accommodation and public catering units were closed, the flights were also canceled. The losses are valued at hundreds of billions of dollars, many tourism or service companies went bankrupt and employees lost their jobs. Our study was done before this crisis, but it becomes even more current, for the post-crisis period, when tourists and owners of tourism units will have to focus on nature, ecological tourism. The work we are proposing is the result of a study by university professors and master students from the Management and Agro-tourism specialty at the University of Agronomic Sciences and Veterinary Medicine of Bucharest. Based on research into their behavior, preferences and motivation, it has emerged that an ecotourist is characterized by a high level of education and training, above average income and willing to spend more in a destination during a stay extended.

Key words**:** *the ecotourist profile, sustainable tourism, ecotourists, COVID-19.*

INTRODUCTION

The study was carried out during 2010-2019 period, the target group consisting of 300 ecotourists: 100 from Hungary, 100 from Bulgaria, and 100 from Romania.

Applying the theory of sustainable development in tourism is a more recent approach that has been widely accepted by most international and national organizations. Since 1991, the concept of sustainable tourism has been defined by the International Union for the Conservation of Nature, the World Wildlife Fund, the European Federation of National and Natural Parks: "the development of all forms of tourism, tourism management and marketing that respect natural, economic environment, ensuring the exploitation of natural and cultural resources and for future generations" [1].

According to the OMT, "the development of sustainable tourism meets the needs of the tourists present and the host regions, while protecting and increasing the opportunities and opportunities for the future"[11].

Table 1. Content of Sustainable Tourism

Quality - sustainable tourism requires a valuable experience for visitors, while improving the quality of the host community's life, cultural identity, poverty reduction, and environmental protection	**Continuity** - sustainable tourism ensures optimal exploitation, the continuity of the natural resources on which it relies, and the preservation of the culture of the host community with satisfactory experiences for visitors	**Balance** - sustainable tourism ensures a balance between the needs of the tourism industry, the partisans of the environment and the local community, with economic and social benefits well distributed to all actors involved

Source: International Union for the Conservation of Nature, 1991.

It is seen as a way of managing all resources so that economic, social and aesthetic needs are fully satisfied, while preserving cultural integrity, essential ecological dimensions, biological diversity and the living system. "

There is currently no unanimously defined definition, "but there are agreed and predominantly accepted definitions, adopted and used"[7].

The International Ecotourism Society (1990), the most prestigious international organization in the field, defines ecotourism as: a responsible journey towards a natural area that contributes both to the preservation of the natural heritage and to the welfare of the local population [2].

In the definition proposed by the IUCN, "ecotourism is seen as: a respectful journey to the environment and the untouched natural sightseeing in order to admire nature and to feel good" [6].

Through ecotourism nature conservation is promoted, a negative impact produced by visitors and the involvement of the local population for beneficial socio-economic purpose [3].

Table 2. The characteristics of ecotourism

1	the main motivation of the tourists is to observe and appreciate the nature and traditional culture that dominate the natural areas
2	includes education and interpretation activities
3	as a rule, but not exclusively, are addressed to small groups organized by local or small business operators in the area
4	minimizes the negative impact on the natural and socio-cultural environment
5	supports the protection of natural areas
6	generating economic benefits for local communities, organizations and authorities that support nature conservation
7	creating alternative jobs and income opportunities for local communities
8	raising the awareness of the necessity of preserving natural and cultural values both among locals and tourists

Source: World Tourism Organization UNWTO [11].

After a large-scale process involving academic names at international level (Fennell, 1999; Weaver, 2001; Honey, 2008) [2, 4, 12] and the World Tourism Organization (1999), ecotourism has benefited from a unanimously accepted definition (Quebec Declaration, UNEP/OMT, 2002) [10].

Accordingly, "ecotourism is a form of tourism that respects the principles of sustainable tourism related to economic, social and environmental impacts, but also includes a number of specific principles" [5].

Table 3. The principles of ecotourism

1	ecotourism actively contributes to the preservation of natural and cultural heritage
2	ecotourism "includes local communities in their planning, development and operation activities and contributes to their well-being"
3	ecotourism "involves the interpretation of the natural and cultural heritage of the destination for visitors"
4	ecotourism is intended primarily for individual visitors but also for small organized groups

Source: World Tourism Organization UNWTO [11].

MATERIALS AND METHODS

The present study aims to present the current stage of development of ecotourism at national and international level and to come up with a set of directions that guide the efforts to capitalize through ecotourism of areas where the nature and the local culture occupy a central place, in accordance with the requirements of national law, as well as international conventions.

The work we are proposing is the result of a study by university teaching staff, master students and PhD students from the Management and Agro-tourism specialty at the University of Agronomic Sciences and Veterinary Medicine of Bucharest. The study was carried out during 2010-2019 period, the target group consisting of 300 ecotourists: 100 from Hungary, 100 from Bulgaria, and 100 from Romania.

Sustainable tourism "covers all forms and activities in the hospitality industry, including conventional mass tourism, cultural, mountain, coastal, spa, business, rural, etc." Sustainable tourism development "is a must, and the link between tourism and the environment is much stronger than in other industries "[8].

Tourism has often created negative economic, social or environmental effects, and their countermeasures can only be achieved through a professional management that attracts all stakeholders involved in tourism development into the decision-making process. Collaboration between authorities (which have legislative, economic, social instruments),

economic agents (initiating planning and tourism services), "advocates for environmental protection and preservation of cultural heritage, local service providers, tour operators and travel agencies and last but not least, tourists, as beneficiaries, is absolutely necessary for the sustainable development of tourism" [13].

RESULTS AND DISCUSSIONS

Ecotourism is viewed from different perspectives on geographic areas. Thus, if in North America "ecotourism develops in virgin natural areas, where human intervention is minimized, in Europe, where the natural landscape is generally linked to human presence and the local community, there are quite close connections between ecotourism and rural tourism." In recent years at European level, natural landscapes have become more important for biodiversity and ecotourism.
In Romania, ecotourism has a wide recognition - at governmental level, in the private sector and at the public level.

Table 4. The place and importance of ecotourism development strategy

Trends:	Motivations:
-increased leisure time; -increasing the mobility of the population; -increasing interest of the local population for tourism development; -socio- demographic; -changing the motivation of travel; -improving the image protected areas; -increasing demand for traveling in natural spaces; -increasing concerns for protection	-great benefits -protecting and conservation natural heritage and cultural; -increased experience travel. -the danger of some effects negative in case of a chaotic developments.

Source: Center for Responsible Travel CREST (2015) [1].

Ecotourism is recognized as being specific to rural areas within communities that have a tradition in farming, and covers both access to flora and fauna in the area, as well as to the social habits and lifestyles of people in the visited areas [7].
Exploiting the natural environment is one of the fundamental requirements of ecotourism. This statement "leaves a wide-open door to a wide range of activities, provided they comply with the conditions outlined above. " From this perspective, "ecotourism interferes with other forms of travel based on nature. "
Thus, in ecotourism activities can be included:
-Types of adventure activities (rafting, canoeing, equestrian tourism on pre-arranged routes, cross-country skiing, bike trips on arranged routes, etc.);
-Guided tours / hiking;
-Nature observation tours (flora, fauna);
-Excursions to experiment with nature conservation activities;
-Excursions to local communities (visiting cultural objectives, visiting traditional farms, watching traditional cultural events, eating traditional food, purchasing non-traditional food products, etc.).
Activities that, although occurring in nature, have an obvious negative impact on the natural or socio-cultural environment (off-road activities) cannot be considered as ecotourism activities.
The application of ecotourism as a model for the development of tourism and its principles has a double target: on the one hand the integrated capitalization of the exceptional natural and cultural resources, with the improvement of the "quality of life in the local communities, and on the other hand satisfaction of the motivations and requirements of the tourists in consistency with environmental conservation for future generations".
The development of ecotourism mainly targets four plans:
•economic, by increasing the capitalization of resources, especially the least known, to reduce the pressure on the most intensely exploited;
•ecologically, by ensuring the rational use of all resources, reducing and eliminating waste, recycling, preserving and protecting the environment, reducing the process of avoiding agricultural and forestry land in the agricultural and forestry;

•social, by increasing the number of jobs, maintaining traditional crafts, attracting the population into practicing different forms of tourism;
•cultural, by capitalizing on the elements of civilization, art and culture, expressing a certain cultural identity and developing the spirit of tolerance.

Through ecotourism it is possible to extend the spectrum of traditional economic activities without marginalizing or replacing them, so that the local economy is not subordinated to external and internal changes and influences. Tourism activities under the emblem of ecotourism offer specific opportunities, with the local population and the tourism industry having to use natural resources in a sustainable manner and appreciate the valuable natural and cultural objectives. By extrapolating it can be said that ecotourism requires an excellent opportunity for the development of the areas that have the resources and conditions necessary for its valorization, a safe alternative for the integration of the natural landscapes and the ecological biodiversity into the tourism activity [12].

Over the last six decades, tourism has experienced continuous expansion, with average annual growth rates ranging between 5 and 10%, becoming a major sector, providing global economic and development opportunities. According to the World Tourism Organization, international travel arrivals increased from 25 million in 1950 to 278 million in 1980, 527 million in 1995 and reaching 1,133 billion people in 2014. Also, international tourism receipts have risen from $ 2 billion in 1950 to $ 104 billion in 1980, $ 415 billion in 1995 to $ 1,245 billion in 2014.8. The tourism industry contributed $ 7.6 trillion or 9.8% to global GDP in 2014. Also, last year, about 277 million people were employed (directly or indirectly) in the tourism sector, and by 2025 their number is expected to grow to 356 million, and the contribution to the global economy is estimated to reach $ 11 trillion.

In line with the long-term OMT (Tourism Toward 2030) forecast, the number of international tourists' arrivals worldwide is expected to increase by 3.3% per annum over the 2010-2030 period. By 2020, international arrivals to tourists are expected to reach 1.4 billion, and by 2030 to 1.8 billion people.

Tourism is "not only an increase in the number of tourists, it has turned out to be a diverse and complex activity". Although mass tourism "remains the predominant form, other tourism activities related to culture, environment, education, health, etc. they came out". They reflect the preferences for environmental quality and "a much more energetic and participatory form of recreation". Skiing, hiking, cycling, canoeing etc. have become increasingly demanding activities, satisfying the need to be close to nature, moving, exploring and learning. Ecotourism, as a market niche in tourism, is considered to be "one of the fastest growing segments of the tourism industry". It is estimated that the interest for ecotourism is increasing from 25% to 30% and this is possible due to the continuous concern for nature protection, but also due to the growing interest of tourists for experiences in nature [13].

OMT also estimates ecotourism, natural tourism, cultural tourism and adventure tourism will have rapid growth over the next two decades, and it is estimated that spending on ecotourism products will grow in the future at a higher pace than the tourism industry in its whole. According to estimates by the International Society for Ecotourism (TIES), ecotourism could increase over the next six years to around 25% of the global travel market, and revenue could reach $ 470 billion a year.

Ecotourism attracts "those tourists who want to interact with the natural environment and want to widen the level of knowledge, understanding and appreciation".

One of the tendencies that fuel the growth of this form of tourism is the preference for travellers to choose educational holidays that enrich their existence. The desire to learn and experience the experience of nature is influenced by at least three major factors:

Changing attitudes towards the environment, which are based on recognizing interdependence between species and ecosystems;

-Development of environmental education in primary and secondary schools;
-Development of media on environmental issues.

In recent years, with increasing awareness and awareness of ecological and environmental concerns, travel enthusiasts have begun to move to new destinations that have little to do with economic development, such as Costa Rica, Botswana, Peru, Belize, the Galapagos Islands, etc. One of the most important trends influencing the demand for ecotourism, especially for soft (light) activities, is the aging of the population in developed countries, especially in those countries where the demand for the international ecotourism market is centred: North America, Europe North and less Japan. At the opposite end, the youth tourism market (Millennia, also known as Generation Y) is also an important source of ecotourism, especially for outdoor activities, offering good potential for future development of this form of tourism.

The tendency to depersonalize the workplace and the ultra-technological environment also contributes to an increase in demand for ecotourism holidays. The upward trend of ecotourism is also influenced by the growing desire of urban society to be more active. In a report on adventure tourism, the American Travel Industry Association (TIA) found that about half of the United States population had participated in the last few years in various forms of "active travel" included in ecotourism or adventure tourism. the tendency is determined by people's desire to overcome their limits, maintain their physical condition, and the need to spend quality time with friends or family. All these trends indicate not only an increase in demand for ecotourism, but also a transformation from a market niche into a major segment. If initially ecotourism was addressed to experienced tourists with high levels of income and education, the clientele would now expand to include a wide range of income, studies and travel experiences. Tourism is also a positive development in protected areas, with an increase in interest in this type of travel. It is estimated that worldwide protected areas receive 8 billion visitors annually, of which 80% are registered in protected areas in Europe and North America. Quantitative developments will be accompanied by a suite of qualitative mutations, the most important being listed below:

•increasing demand for tourism in protected natural areas, motivated in particular by increasing the role of these areas in preserving the natural ecosystems in most countries of the world;
•the diversification of the offer by the fact that at present the protected natural areas offer numerous opportunities for spending holidays, meeting the needs of the various tourists;
•Improving the services offered in protected natural areas has become a goal that many tour operators in these areas want to reach, due to the increasing demands of tourists arriving here;
•active participation is one of the significant trends of tourism in protected areas, motivated by the fact that tourists feel the need to actively involve themselves in the conservation, awareness and promotion of these areas;
•promoting ecotourism as the main tourism activity in the protected areas - their managers and tour operators around the world see ecotourism as the main tourist activity that takes place, on the one hand, with a low, almost minimal impact on the environment, and on the one hand another part through its educational role.

In the years to come, the quality of the environment, the lack of pollution, the cleanliness and the attitude of the local population will be more important for potential tourists than the variety of entertainment and shopping opportunities. In the world, this innocuous style of travel has begun to have more and more followers.

With the development of this form of tourism, the tourists' preferences have also changed a lot. In recent years, various market studies have shown a strong interest among consumers in tourism products and services that protect the environment and respect local culture and traditions:

-About 43% of Blue & Green Tomorrow's survey respondents said they would have considered the environmental footprint during their holidays in 2014;

-66% of consumers around the world have mentioned that they prefer the products and services of companies that have implemented corporate social responsibility programs, with 46% willing to pay extra for them;
-one in five consumers (21%) said they were prepared to pay more for a holiday to a company that has an impressive record of environmental and social responsibility activities; this percentage has seen an upward trend from 14% in 2012 and 17% in 2010 (research done by ABTA - the UK's largest tour operators' association);
-24% of research workers surveyed by Travel Guard in 2013 said that interest in "green" trips is now the highest level in the past 10 years;
-Nearly "two-thirds of US tourists who have made at least one trip in the last year consider the environment when choosing hotels, transport and food services (a survey conducted by TripAdvisor.com in 2013); "
-Consumers expect tourism companies to bring sustainable products into their tourism offer. A majority of 70% believe that companies should be more involved in protecting the natural environment, 75% of consumers want a more responsible holiday, and 66% would like to be able to identify a "green" holiday easily (2012 report, conducted by Travel Foundation and Forum for the Future);
-a significant number of international tourists are looking for experiences based on natural and cultural resources such as visiting historical sites (40%), cultural sites (23%) and national parks (20%) (National Tourism and Traveling Strategy, USA, 2012). This strategy has identified similar trends among US citizens traveling abroad: tourism based on nature, culture, heritage and outdoor adventure is an important segment of the foreign tourism market;
-95% of business people believe that the hotel industry needs to undertake "green" initiatives and that sustainability will become a defining aspect for the hospitality industry (according to a Deloitte report of 2015);
-35% of adults said they would like to try a holiday involving a volunteer component, and 6% said they had already done so (according to a Mintel survey in 2012).

On the other hand, sustainability has been increasingly integrated into the tourism industry, with an increasing number of operators in this field adhering to various voluntary environmental certification schemes. Following researches in the analyzed field, the following aspects were identified:
-85% of US hoteliers mentioned that they have implemented "green" practices within their units (according to a study by TripAdvisor in 2013);
-Most tourism structures (91%) agree that it is very important to operate in an environmentally friendly way, using clean technologies. Currently over three-quarters of them (77%) have acted to reduce the negative impact and optimize the positive impact of their work on the environment (according to a TripAdvisor survey, 2012-2013);
-73% of a sample of 120 multinational corporations in Europe and the US identified as the top priority "integrating sustainability into their corporate strategy" (Conference Board survey in 2013).
In addition to concerns about the sustainability of individual businesses, in recent years, special attention has been paid to protecting and improving the sustainability of the environment in tourist destinations. Progressively, various measurement tools and criteria have been developed to certify "green" destinations, through initiatives of the WTO, the European Union, Ethical Traveler, EarthCheck, Green Globe or Sustainable Travel International. In November 2013, the Global Sustainable Tourism Council (GSTC) launched the Global Criteria for Sustainable Tourism Destinations (GSTC-D), which is a common understanding of the minimum requirements for a sustainable destination.
Based on research into their behaviour, preferences and motivation, it has emerged that an ecotourist is characterized by a high level of education and training, above average income and willing to spend more in a destination during a stay extended.
Ecotourists cover a broad spectrum of travellers more and more motivated to experience, being interested in the natural environment of the places they visit, as well as in learning about local communities.

They are particularly attracted to rural areas where there is a mix of traditional landscapes and villages. They are in a constant search for various experiences that cannot be ensured through holidays for mass tourism. Generally, ecotourists want "content holidays", that is holidays to help them discover new skills and talents, experience new emotions through their various experiences. They expect unique experiences at that destination and the accumulation of information about its distinct specificity. They respect environmental factors, prefer to visit intact natural and cultural environments, and expect tourism product suppliers to demonstrate that they respect the local environment and operate in accordance with environmental principles.

Based on research into their behavior, preferences and motivation, it has emerged that an ecotourist is characterized by a high level of education and training, above average income and willing to spend more in a destination during a stay extended. People who are involved in ecotourism activities are proven to be more environmentally aware and more active than other "normal" consumers. Most travel alone or in small groups and prefer low-capacity accommodation.

Table 5. The main types of ecotourists

1	"hardcore" ecotourists - scientists or people traveling for educational purposes
2	ecotourist "table" - people who visit famous natural destinations
3	"occasional" ecotourists - tourists who come into contact with nature during a holiday, incidentally
4	"dedicated" ecotourists - people who travel to protected areas to understand natural and local history. Their main motivation is to choose a sustainable holiday, they are interested in comfort but are ready to accept the small inconveniences to support the protection of environmental factors

Source: Own calculation.

Based on these studies, it appears that the eco-tourism market is divided into four segments based on their behavior and motivation.

CONCLUSIONS

From the behavioral point of view, the soft/hard model prevails. A typology has been identified and ecotourists have been grouped into three categories:

a)"Hard" ecotourists: tourists with strong attitudes towards protecting and preserving the environment and who prefer to travel in small groups. They are interested in long journeys with a small number of services offered, are physically active and enjoy challenging activities. He generally organizes his own trip to feel that he is a unique journey, a real-life experience.

b)"Soft" ecotourists: travelers who prefer both ecotourism activities and traditional holidays and are motivated by the experience and quality that an ecotourism destination can offer them. They opt for tourism in organized groups, want to have a certain level of comfort and good quality services and are not very physically active.

This category tends to appeal to a travel agency that offers them unique, complex experiences in the context of protecting the traditions and culture of the community and the protection of the environment.

c)"Structured" ecotourists: these travelers are a combination of "hard" - because they prefer to interact with nature and practice physical activities - and "soft" as they are looking for short and multiple tours in larger groups with comfortable accommodation and dining.

From a demographic point of view, ecotourists were grouped as follows:

a) Young ecotourists: aged 18-44 years old, differentiated as follows:

-Young professionals who have high incomes, but only a limited amount of time to travel. They generally travel to the couple, although there is also a market for those who travel alone and are looking for unusual experiences. They choose the experience and comfort of a luxury ecotourism holiday, and their sustainability is not their primary motivation.

-Backpackers and young people who take a break. They travel around the world, have a very small budget, and sometimes resort to couchsurfing (a cheap way to travel through the hospitality of people from all corners of the world who open their homes for travelers or excursionists, with the only benefits of interacting social and winning new friends). Such a vacation gives tourists the opportunity

to experience the way of life of the locals and to try the traditional products. They can also combine their journeys with volunteer work on various conservation projects. Most of these young people will travel to that region for long periods of time.

b) Families with children older than 8 years who are looking for experiences where they can relax and enjoy with their children, being very interested in the activities that combine fun and adventure with learning. For this segment of ecotourists, the health and safety of that destination is also very important.

c) "Empty-Nesters" - these are people aged 45 to 65, who enjoy good health, have time to travel alone, without children, and often have a high financial potential. They are experienced travelers and have high expectations regarding the quality / price ratio of tourism services, but still, if they are, they are willing to pay more for high quality eco-experiences.

Our study was done before this crisis, but it becomes even more current, for the post-crisis period, when tourists and owners of tourism units will have to focus on nature, ecological tourism.

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LONG-TERM TRENDS OF SCIENTIFIC AND INTELLECTUAL POTENTIAL OF AGRICULTURAL FOOD COMPLEX

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Abstract

The scientific and intellectual potential of the agri-food complex is a driver for ensuring food security and the independence of countries. The work aims to study long-term trends in the quantitative and qualitative development of scientific and intellectual potential, as well as the development of measures to increase the competitiveness of national agriculture. The article discusses indicators of state regulation of scientific and technological development of the agro-industrial complex. Theoretical and methodological aspects of the concept of developing the scientific and intellectual potential of the agri-food complex based on the synthesis of a pool of theories: knowledge economics, theories of innovative development, theories of economic growth are developed in the article. Disproportions in the functioning of the scientific and intellectual potential and its structure are revealed by the results of the analysis. It is substantiated that the level of scientific support of agrarian science in Russia is characterized by a tendency to increase the share of costs per unit of result compared with international best practices. Measures are proposed to develop employee competency standards in the context of the structural transformation of the agricultural economy. The study formulated organizational, legal, economic, and social measures to stimulate the influence of scientific support of the agri-food complex on improving the efficiency of agricultural production in the context of the transition to an export-oriented model of the agricultural economy.

Key words**:** *scientific and intellectual potential, agri-food complex, knowledge economy, development trends, digital economy*

INTRODUCTION

Currently, in the context of the structural restructuring of the economy, the development of the scientific and intellectual potential of the agri-food complex is becoming particularly relevant. The pace of innovative development depends on the effectiveness of the functioning of the institutional environment. The efficiency criterion is an increase in the volume of innovation in agricultural production, which is determined by a set of factors and conditions for using the scientific and intellectual potential of the agri-food complex. The dynamics of employment in the labor market and an increase in the share of high-tech high-performance jobs show the need for additional institutional regulation to predict the socio-economic development of the agri-food complex. With the digitalization of agricultural production, manufacturing emphasis is shifting to the creation of highly productive jobs.

The economies of developed countries increasingly rely on the knowledge, innovation, and new technologies, which are now considered the driving force behind economic growth. The scientific and intellectual potential is closely related to the production potential of the agricultural economy. The level of the current development of the scientific and intellectual potential of the agri-food complex and the degree of its contribution to the economic growth of national economies depend on the totality of conditions that the state creates for its development and use. Such conditions are related to the existing institutional environment, investment, business climate, and the quality of public administration [12]. The qualitative level of development of scientific and intellectual potential can be estimated by the degree of technological novelty of agricultural innovations, increased labor productivity, cost reduction, and other factors [31].

The National Project "Science" [26], the Project "International Cooperation and Export" [27], the State Program for the Development of Agriculture and the Regulation of Agricultural Products, Raw Materials and Food Markets (as amended on March 31, 2020 [8] prioritized. development and transfer of innovations, diffusion of innovations, biologization, increasing the investment attractiveness of the industry, increasing the level of material and technical equipment by updating the fleet of agricultural machinery, improving the efficiency of use of fixed assets and investments [14].

To comprehensively solve the existing problems of scientific support of the agro-industrial complex, it is necessary to create conditions for the formation of competitive scientific and technical results, as well as for transferring scientific results to production and their subsequent involvement in economic circulation.

By the Strategy for Scientific and Technological Development of the Russian Federation, approved by Decree of the President of the Russian Federation dated December 1, 2016 No. 642 [33], the current stage of economic transformation is determined by the insufficient degree of connection between science and industry. Many sectors of the national economy, including the agrarian economy, are characterized by a weak level of coordination between research and development institutions and economic sectors, which impedes the scientific and technological development of Russia [13]. Recently, scientific and educational centers have been spreading, combining the capabilities of universities, academic institutes, and high-tech companies [9]. A significant problem is the uneven distribution of scientific and intellectual potential across industries and regions and interregional imbalances in the effectiveness of research activities in agriculture and the agri-food sector.

The theoretical and methodological basis for the qualitative and quantitative development of the scientific and intellectual potential of the agri-food complex is the theory of the knowledge economy. The study of the problems of the formation and development of the knowledge economy, the measurement of its contribution to production processes at the micro-, middle-, macroeconomic and international levels has been studied by many domestic and foreign scientists of various schools and areas. Among them, we note the research of Russian scientists L.I. Abalkina, A.V. Buzgalina, V.L. Inozemtseva, G.B. Kleiner, D.S. Lviv, V.L. Makarova, Yu.V. Yakovets. An integrated approach to the problem of measuring the parameters of the knowledge economy is proposed by E.D. Weissman [34]. In her work, an approach is proposed to assess the relationship between the level of innovative development, growth of labor productivity, and competitiveness of industries and regions using the knowledge economy. The knowledge economy of agriculture as an independent concept exploring the real changes in production processes is in the process of formation.

Domestic scientists researched to determine the effectiveness of the knowledge economy. B. Milner hypothesized that this type of economy appears if knowledge is a market product and its effectiveness can be estimated [24]. This approach does not include the study of economic risks and the impact of the social environment. A. Kozyrev developed a methodology for assessing the effectiveness of innovative production by profitable, comparative, and costly methods [21]. The cost of scientific research cannot fully justify the price of the final intellectual product. According to V. Makarov and A. Warsaw, the demand factor is the driver of the knowledge economy [22]. We share this paradigm and believe that the development of the knowledge economy is based on the modern concept of stimulating demand for innovation Demand-Driven Innovation Policy, DDI. In contrast to the concept of stimulating supply, the concept of stimulating demand uses direct methods for developing demand for innovations: public procurement, industry regulation, and the implementation of these tools based on foresight technological forecasts [11]. L. Mindeli and L. Pipia divided the knowledge economy into 5 aspects: resource, knowledge asset generation, productive, network, and

learning. They characterize the estimated data, focusing on poorly studied aspects of the knowledge economy [25]. The multidimensional nature of the knowledge economy does not allow to formulate of the totality of the evaluation criteria. There are also a lot of difficulties in applying foreign methodological programs related to the lack of analogs in domestic areas, and therefore the research horizon is becoming much narrower. Therefore, a wide range of work is underway to create indicators that can standardize all analyzes of economic research.
In connection with the existing world problem of ensuring food security of national economies, food accessibility in most developed countries, studies are being conducted on the problems of developing innovative activities in the agro-industrial complex and the growth of agricultural production based on the application of scientific achievements [2]. Innovative systems in the process of creating and commercializing new products, services, and processes. It is about optimizing the structure and activities of technology transfer centers, including the formation of relevant alliances. Al-Hassan R., Egyir I, Abakah J. revealed imbalances in the development of the scientific and intellectual potential of developing countries [1].
At the present stage, the determining trends in the deployment of innovative processes are the processes of globalization and regionalization. Therefore, these two global trends must be taken into account in the formation and development of the innovative activity of the Russian Federation [20].
Barrett C., Barbier E., Reardon T., Bush L., Bain C., Popescu A. [4, 5, 30] are devoted to the study of global economic trends and their influence on improving the efficiency of the scientific and intellectual potential of agriculture.
In the studies of Autor D.H. [3], Gandhi R., Veetaraghavan R., [17] Dasgupta S., Mamingi N., Oliver Y., Robertson M., Wong M. [6] trends in the development of production processes in agriculture based on the knowledge economy and information technologies are identified, directions for accelerating the transfer of innovations are substantiated.
An attempt is made to study the long-term trends and dynamics of the development of the scientific and intellectual potential of the agri-food complex in the context of the structural transformation of the agricultural economy.

MATERIALS AND METHODS

The methodological basis of the study was government laws, decrees and government decrees, scientific works of domestic and foreign scientists - economists and agricultural experts on the issue under study. In the research process, monographic, abstract-logical, analytical, economic-statistical, and expert research methods were used. The information base of the study used information from the Federal State Statistics Service, the Higher School of Economics, the Ministry of Agriculture of the Russian Federation, as well as special reference books.
The scientific and managerial literature presents a variety of approaches and methods for assessing the scientific and intellectual potential of sectors of the national economy. The purpose of the article is to analyze and evaluate long-term trends in the quantitative and qualitative development of scientific and intellectual potential, factors affecting the policy of its improvement, as well as the development of a set of practical measures to increase the efficiency of agricultural production on a scientific basis.
The information base was the data of departmental statistical monitoring for the period 2013-2018 according to form No. 2K "Information on the number and level of professional education of employees of agricultural organizations". To assess the level of professional education employed in the fields and sectors of the agro-industrial complex, analytical, monographic, abstract-logical methods, the method of economic observation, economic induction and deduction, selective observation, and the system method was used.
International experience in assessing innovative development based on the achievements of scientific and technological

progress accumulates a set of indicators: Knowledge Economy Index; Global Innovation Index, Global Competitiveness Index, Human Development Index and others [18]. These indices were proposed by the UN, UNESCO, the World Bank, the European Commission, and others. The proposed integrated indicators do not fully take into account the specific features of each country. According to the calculation of the indices, the highest expenses for science and education and the stimulating conditions for introducing innovations are typical for Sweden, Denmark, and the Netherlands. Among the countries of East Asia can be noted China, Singapore, Japan. The share of innovative enterprises in OECD countries is 49%, in Germany, Finland and Sweden it is 55%, in Russia it is 10%. Russia is in 55th place in the knowledge economy index. In agriculture and the agro-industrial complex as a whole, the situation is aggravated not only by the insufficient effectiveness of state regulation measures but also by the low innovative activity of agricultural producers, associated with well-established views on innovation and high risks of agricultural production. Positive foreign and domestic experience in assessing the knowledge economy and scientific and intellectual potential allows us to highlight effective and resource-based approaches.

Blyakhman L.S., Merson F.L., Peat E.M. are oriented towards a productive approach [23]. At the macro level, an assessment is made of the financial results obtained by the economy from goods with elements of intellectual property. The resource approach is an assessment of the effectiveness of the use of natural, material, financial, information resources. Several studies combine resource and productive approaches. Assessment of intellectual potential is proposed based on an integral indicator that accumulates, including the results of scientific and intellectual activity. As for indicators in this approach, we can distinguish the volume of innovations or implemented innovations, and resources - a depreciation of fixed assets, capital productivity, turnover of working capital, the share of the salary of research personnel in the cost of production). With this interpretation, we present the author's definition of the category of scientific and intellectual potential of the agri-food complex, which is a measure of the efficiency, effectiveness, productivity of an innovative economy for the socio-economic development of industries and regions. We share the opinion of Sandu I.S. the fact that the main indicators of scientific research in agriculture are the number of organizations performing research and development, the number of people engaged in research and development, the cost of research and development, the volume of scientific and technological work [32].

The study offers an analysis of long-term trends in the development of scientific and intellectual potential, an assessment of its contribution to the innovative development of agriculture. The article tests the hypothesis about the dependence of the level of production of innovative products in agriculture of the Russian regions on the quantitative and qualitative composition of researchers in agriculture.

RESULTS AND DISCUSSIONS

In the current conditions of the development of agriculture and the agro-industrial complex of Russia, of particular interest are the problems of increasing innovative activity in the agricultural sector of the economy, including based on the qualitative and quantitative development of scientific and intellectual potential.

A system for assessing scientific and intellectual potential should be built taking into account the specific characteristics of the economy of a particular region. On the whole, Russia has a developed scientific and educational structure, which in some areas has world-leading positions. In our country, state funding for higher education and research prevails, and a significant share of the extractive industry is also an important factor. In various sectors of the economy, there are significant imbalances in technological processes compared to foreign countries. Specific features of identifying the knowledge economy in the regions are strengthened due to the characteristic structural differentiation of

regions by type of production [15]. Thus, different regions are characterized by differentiation in the growth rate of agricultural production depending on changes in the dynamics of scientific and intellectual potential.

The scientific and intellectual potential of the agri-food complex of Russia is represented by specialists with higher education numbering 40,998 people, who are trained by 54 higher education institutions of the Ministry of Agriculture of Russia, including 31 agricultural universities, 22 agricultural academies, and one agricultural institute and 34 higher education institutions of the Russian Ministry of Education and Science. Agricultural research and educational organizations are located in 58 constituent entities of the Russian Federation.

The dynamics of the number of people employed in agriculture in Russia, the Volga Federal District, and the Saratov Region is shown in Fig. 1.

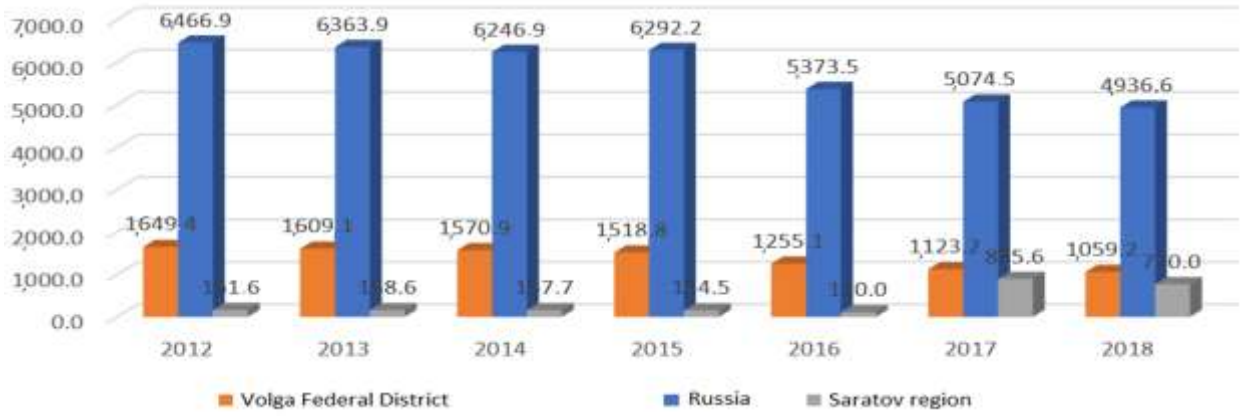

Fig.1. The average annual number of employees in the direction "Agriculture, hunting and forestry" in 2012-2018, thousand people
Source: Design based on the Rosstat data.

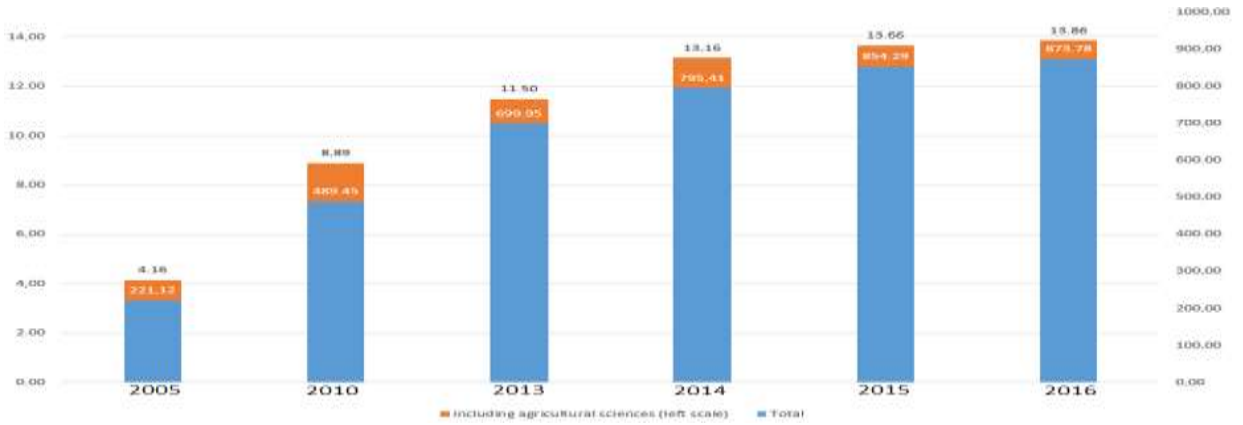

Fig. 2. Dynamics of domestic current expenditures on research and development in Russia, billion rubles
Source: Design based on the Rosstat data.

According to statistics, domestic current expenditures on research and development quadrupled by 2016 compared to 2005 and amounted to 873.78 billion rubles (Fig. 2). Costs in the field of agricultural sciences increased 3.3 times. The costs of basic research grew 4.1 times, for applied research - 2.8 times, for development - 2.3 times. A high increase in costs by 8 times was in the field of agricultural sciences was in the higher education sector. The largest amount of funds is allocated in the public sector. In the business sector, funding for research and development is reduced compared to 2005 [19].

Figure 3 shows the share of domestic agricultural research and development costs in different countries.

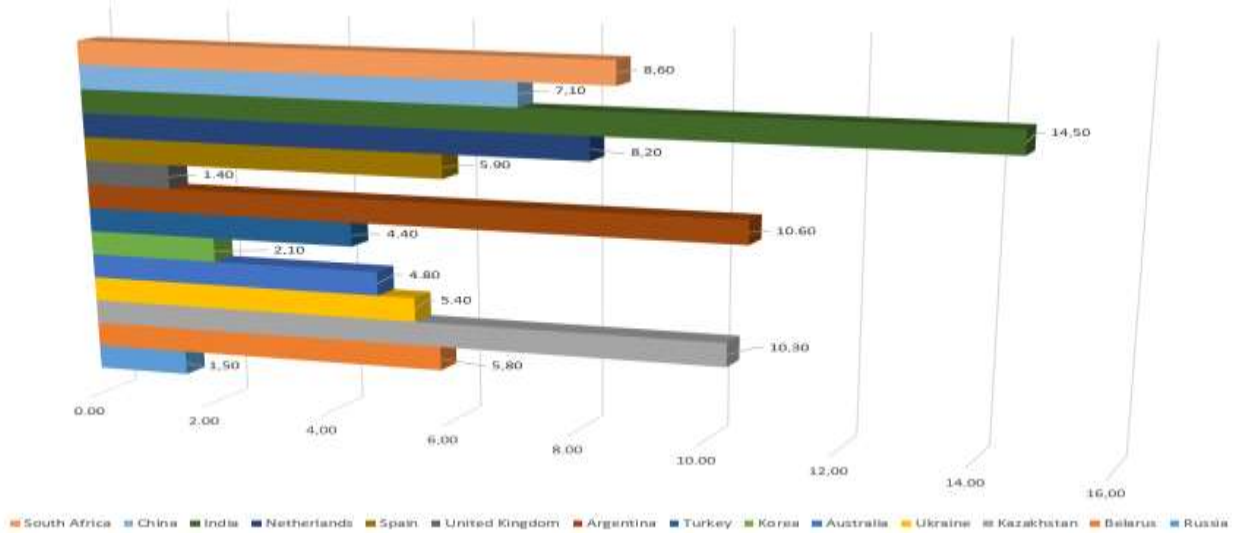

Fig. 3. The share of domestic expenditures on research and development in the field of agricultural sciences in various countries in 2017, percent
Source: Design based on the Rosstat data.

The size of financial investments does not fully correspond to the importance of the agro-industrial complex for ensuring the food independence of Russia. For the period 1994-2015 the structure of scientific activity in the field of agricultural sciences has changed: the cost of basic research has increased by 2.6 times with a decrease in funding for applied research by half [16]. Thus, the share of basic research in the total volume of domestic current expenditures on research and development has increased from 22% to 58.9%, while applied research has decreased from 48% to 27.1%.

This situation contributed to the increase in imbalances and the gap between the stages of the research cycle, the loss of applied competencies demanded by business and the ability to solve priority scientific and technological problems.

Figure 4 shows the number of researchers in general and in the field of agricultural sciences. In 2016, 11.1 thousand Russian researchers were employed in the field of agricultural sciences, of which 1.5 thousand people had a doctorate degree, 4.5 thousand people had a PhD degree.

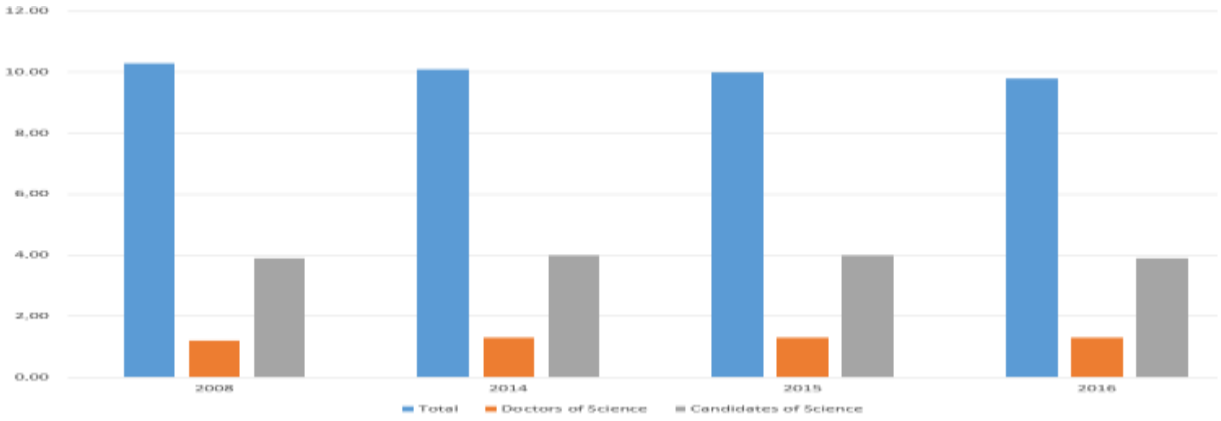

Fig.4. Number of researchers in the field of agricultural sciences, thousand people
Source: Design based on the Rosstat data.

The most important problem of Russian agricultural science is the aging of scientific personnel and the deformation of their age structure. This situation leads to the loss of continuity of generations, slowing down the transfer of knowledge, skills, and experience to young specialists.

Analysis and evaluation of patent activity in agriculture are characterized by growing dynamics. The number of patent applications

filed nearly tripled. By the thematic structure, until 2000 basic agricultural sectors dominated, in 2013 = 2015 the share of food production technologies increased. The priority thematic area remains the development in the field of biochemical processes.

By 2015, patent activity in agriculture amounted to 33 applications filed under the Treaty on International Patent Cooperation (PCT), which is 0.13% of their total number in the world. This result is significantly lower than similar indicators of both large and technologically advanced economies of the USA, Korea, China, Great Britain, the Netherlands, and developing countries of India and Brazil. Patenting of developments is an international form of protecting the results of intellectual activity for their commercialization. The current situation in this area speaks of an unstable innovative climate and insufficiently effective directions for stimulating innovative activity.

During the period from 2005-2016, there is a tendency for the steady growth of investment injections in fixed assets. In the economy as a whole, it increased by 11,028.7 billion rubles. or 4.1 times. Interest in innovation in Russia has been growing in recent years. However, in various industries, its level varies. So, for example, in the field of food production, including drinks, the indicator of innovative activity of organizations in the economy increased by 2016 compared to 2010 by 0.6%. The proportion of organizations implementing technological innovations underwent similar changes: against the background of an annual decline in the economy as a whole since 2012, this indicator in food production increased in 2016 compared to 2012 by 0.7%.

In turn, other indicators show a steady growth trend. For example, the costs of technological innovation of organizations over the entire period increased throughout the economy as a whole by 883,786.5 million rubles (or 3.2 times), in food production - by 14,953.0 million rubles. (or 2.9 times). The volume of innovative goods works and services increased over the study period both in the economy as a whole and in food production by 3.5 and 2.0 times, respectively. The growth in the number of advanced production technologies developed and used is also characteristic: in the economy as a whole, an increase of 76.1%, in the field of food production - by 3.6 times. This analysis shows pronounced imbalances between the costs of scientific and intellectual potential and indicators of its functioning. The level of scientific support of agrarian science in Russia is characterized by a tendency to increase the share of costs per unit of result compared with other sectors of the national economy and international best practices.

However, despite the difficulties in organizing the innovation process in agriculture, large-scale projects that bring good results are spreading in modern times. Further development of the sector largely depends on the pace of development of innovations and the competitive position in world markets [28, 29]. Thus, based on the analysis, a hypothesis is proved that the level of production of innovative products in the Russian regions depends on the quantitative and qualitative composition of researchers in agriculture. The process of the digital transformation of agriculture is associated with the need to increase not only the quantitative but also the qualitative level of scientific and intellectual potential. Currently, there is a problem in motivating the choice of work in agriculture, the consolidation of specialists in rural areas. Also, in the context of the development of the digital economy, the problem of matching workers' qualifications to current requirements has become more acute.

In the current transformation of the agricultural economy, there is an acute problem between the existing scientific and intellectual potential of agriculture and the efficiency of its use. These imbalances are associated with a lack of competencies in light of the introduction of modern digital technologies in agriculture. The cause of the gap may be the scientific and intellectual potential of poor quality, which is inefficiently managed. Deloitte highlighted global HR management trends: organizational change; career and training in real-time, continuously; attraction of talents; employee experience is defined as a holistic view of life and work, new leaders with flexible solutions. digital HR and HR analytics; social diversity

and integration; workforce expansion. Thus, following the above trends, agribusiness can reach a new “crest” of the technological wave.

To develop the scientific, intellectual and human potential of the agricultural sector of the economy, it is proposed to develop training standards and competency maps by industry, formulate qualification requirements for employees, create a personnel certification system for agricultural production, and develop approaches to the development of information support for the scientific and technological policy in agriculture.

The development of the scientific and intellectual potential of the agri-food complex and its influence on the development of production processes is regulated by a set of laws, programs, and legal acts.

Measures for the qualitative development of scientific and intellectual potential are reflected in the State program "Integrated Development of Rural Areas", a departmental project "Promotion of Employment of the Rural Population" has been developed, which provides for the planning of training and retraining of personnel as part of measures to increase the production of value-added in the agricultural sector. By this project, it is planned to ensure the level of employment of the rural population, including those who have undergone additional training (retraining), up to 80 percent of the working population; as well as a decrease in the unemployment rate of the rural working-age population to 5.7 percent by 2025. In the direction “Development of the labor market (human resources potential) in rural areas”, the following targets have been formulated: an increase in the number of workers studying under student agreements, as well as an increase in the number of students involved in agricultural practices for practical training (cumulative total)

The Federal Scientific and Technical Program for the Development of Agriculture for 2017-2025 is aimed at providing the population with high-quality and competitive agricultural products of domestic production.

The priority subprograms are “Development of selection and seed production of potatoes in the Russian Federation”; “Creation of domestic competitive broiler-type meat crosses; "Development of selection and seed production of sugar beets in the Russian Federation."

This Program presents the target indicators and indicators. Target indicators include increasing innovative activity in agriculture; attracting investment in agriculture; increasing the level of security of the agro-industrial complex with infrastructure facilities, providing the industry with training programs for new and promising areas of training and specialties that are in demand on the labor market.

The indicators of the Federal Scientific and Technical Program for the Development of Agriculture for 2017-2025 are classified according to three main measures: “Creation of scientific and (or) scientific and technical results and products for the agricultural sector”, “Transfer of scientific and (or) scientific and technical results and products for practical use and advanced training of participants in scientific and technical support for agricultural development Commercialization of scientific and (or) scientific and technical results and products for the agricultural industry industrial complex. In the framework of the event "Creation of scientific and (or) scientific and technical results and products for the agro-industrial complex", 4 indicators appear as prospects for the development of the scientific and intellectual potential of the agro-industrial complex: an increase in the number of publications on the results of research and development in scientific journals indexed in the Scopus database or in the database "Network of Science" (WEB of Science), in relation to the previous year, an increase in the number of protected results of intellectual activity in the field of agricultural technologies in relation to to the previous year; an increase in the number of protected results of intellectual activity in the field of agricultural technologies abroad in relation to the previous year, the number of licensing agreements of enterprises with scientific and educational, as well as other organizations engaged in and (or) facilitating the implementation of scientific, scientific, technical and innovative activities in the field agriculture [7].

In the Russian regions, there is a pronounced differentiation in terms of level, quality, and human resources by the specific needs of the region. In the context of structural innovation transformation, an increase in the quality level of scientific and intellectual potential is associated with the introduction of qualitatively new knowledge and competencies at all levels of management, the creation of innovative principles and teaching methods. It is also necessary to develop tools for assessing the degree of qualification of employees, identifying trends in the most popular specialties, and creating new requirements and standards for training specialists for the agricultural sector of the economy in terms of their professional competencies. The solution to this problem is possible through the development and implementation of new staffing strategies. Thus, improving the management of scientific and intellectual potential requires the implementation of a package of measures at the federal, regional, and sectoral management levels [10]. Organizational, legal, economic, social and other measures include:

1) the implementation of long-term programs for staffing agriculture at the federal, regional and municipal levels of agricultural management;

2) the creation of an effective monitoring system for staffing the development of rural territories on a regional basis based on the development of information technologies;

3) increasing the financial stability of agricultural producers by increasing labor productivity based on the growth of the technological level of production, as well as improving the economic mechanisms of managing organizations;

4) the formation of a new prestigious image of an agricultural worker, the creation of conditions for increasing the level of labor motivation of workers in the agricultural sector of the economy; propaganda of workers' specialties, legal consolidation of social guarantees for agricultural producers;

5) the introduction of a system of training and advanced training of personnel potential by the requirements of digitalization of agribusiness;

6) integration of educational institutions with agricultural unions of employers and business representatives, bringing the educational system closer to the interests and needs of agricultural producers, introducing new specialties and training areas by the needs of agribusiness.

Implementation of the proposed measures will allow preparing promising specialists for the needs of the agricultural sector in the context of structural transformation, providing the agri-food complex with highly qualified personnel to solve its priority tasks.

CONCLUSIONS

The article discusses the tools of state support for research and development in agriculture. Theoretical and methodological principles of the formation of a concept for the development of the scientific and intellectual potential of the agri-food complex based on the synthesis of theories of economic growth, theories of the post-industrial, information society and knowledge economy are developed.

Resource and productive approaches to assessing the scientific and intellectual potential of the agri-food complex are considered. The study analyzes the trends in the development of scientific and intellectual potential from the position of its contribution to innovative development. It is proved that the level of scientific support of agrarian science in Russia is characterized by a tendency to increase the share of costs per unit of result compared with international best practices. A hypothesis is proved that the level of production of innovative products in the Russian regions depends on the quantitative and qualitative composition of researchers in agriculture. The necessity of identifying the trends of the most popular specialties, the formation of new requirements and standards for the training of specialists for the agricultural sector in terms of the development of professional competencies is substantiated. The trends of the transition of agribusiness to a new technological level are formulated. Organizational, legal, economic, and social measures have been developed to increase the qualitative and quantitative level of the

scientific and intellectual potential of the agri-food complex.

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SUSTAINABILITY OF RURAL AREAS THROUGH INNOVATIVE ACTIONS

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Abstract

At EU level, there are a number of concerns among specialists to promote and create some specific information to support sustainable revitalization of rural areas as a place of work and work. We note that it is necessary to start a new regional policy, to increase rural prosperity and the viability of rural areas, given that there can be a balanced territory to ensure socio-economic and environmental sustainability. For agriculture and rural growth, the new regional policy aims to better mobilize all local and regional actors for investigations in the distribution and transport network. In our study, we aim to follow the way of achieving the objectives of the new policy, to target the intelligent villages for 2020, to take care as a starting point of definition and to apply "intelligent tools" based on the reality of the area under consideration, Chiscani Commune, Braila County. In order to be able to use functional, efficient and sustainable tools, it is not desirable to realize or analyze the reality of Chiscani Commune, Braila County, if the role of local and regional authorities can be applied in the application of a policy framework, knowing the concept of "intelligent villages" such as and the notion of "smart rural area" and include initiatives in the local rural agenda so that synergies can be encouraged and created and spread in small communes, in smart rural areas.

Key words**:** *smart village, smart rural areas, smart cities*

INTRODUCTION

Bottom-up approaches to local development, such as LEADER and, more recently, through community-led local development (CLLD), believe that innovation brokers should play a catalyst role for the potential of rural areas.
Innovation brokers are those who identify the strengths and opportunities of the village/ rural area concerned and bring together the relevant institutions (third level, local authorities, funding sources, etc.), to coordinate present and future activities and potential sources of financing. It is their responsibility to involve and inform the community and to get its support to develop a vision, take responsibility and share the benefits [7]. These innovation brokers can stimulate product development by small businesses and can help remove obstacles to the functioning of the internal market, encouraging proximity consumption and short supply chains with agri-food products. Local and regional authorities are in the ideal position to perform this function; In some cases, they already play such a role, through development councils, business support offices, public procurement procedures, etc. it is essential to have access to funding for small-scale projects, accessible to local authorities. It should also include support for innovative projects and initiatives that can be tailored to the specific needs of rural communities across the EU, including in outlying regions. Chiscani City Hall and Braila County Prefecture can be a real facilitator by integrating a "smart" approach in the planning and spatial planning strategies. Such strategies may include the assessment of regional resources and capabilities, the identification of sites that offer the possibility of grouping services and the adoption of economic policies that facilitate this approach.

MATERIALS AND METHODS

The starting point of our analysis is the Cork Declaration, which defines ten guidelines that strongly support the European policy and

which we want to identify in Chiscani Commune, Braila County, as follows:

- What is the situation of the investments in the connection to the broadband networks in Braila and Galati counties? There are measures planned to overcome the digital divide through fast and reliable broadband investments. Thus, ICT infrastructure is proving to be a determining factor for the potential of Union regions in the area of area development. We refer here to the lack of access to the most important public services.
- Are there any measures in the Local Development Plan to combat long-term depopulation? Revitalizing rural areas through actions that encourage and support sustainability, renewal of generations and the ability of rural areas to attract newcomers is a vital goal.
- Are the initiatives of the local authorities known to take simple, easily reproducible and accessible actions even for very small communes, which do not have intelligent actions?
- What are the challenges facing peripheral rural regions, which, in addition to the problems related to broadband infrastructure, are facing major difficulties in terms of connectivity in the field of transport and energy, knowing the concept of "testing in rural areas" and integration into the initiative for smart rural areas, for the development of general initiatives, with implications for rural areas;
- Peripheral border regions are facing increasing difficulties and the need to strengthen opportunities and programs for cross-border cooperation to address these challenges [3].

RESULTS AND DISCUSSIONS

We consider that the starting point in the existence of the smart village is related to the provision of Internet networks, more precisely, the access of the individual households in the rural area, a computer connected to the Internet (Fig. 2 and 3).

The expansion of broadband networks in rural areas and the challenge of connecting up to the last kilometer are directly linked to the dominant position on the market and the role of traditional providers. It has succeeded in giving it local speed in agriculture to create a time-resolved problem that will allow the rule to stimulate the introduction of alternative operators for general access to generations and encourage innovative investment for the initiative local actors.

In Fig.1, it is shown that 51.9% of the number of rural households have access to a home computer in 2017, up 14.4% from 2013 [2]. This growth is much faster than the urban average. Given the location of the study in Chiscani Commune, Braila, where agricultural activities are a priority, we believe that farmers and the agricultural sector as a whole should be the main beneficiaries of the digital training measures, in order to facilitate the implementation and development of digital tools and methods in this sector [2].

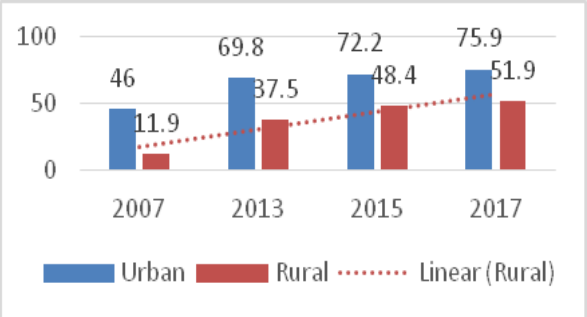

Fig.1. The share of households that have access to a computer at home, between 2007-2017
Source: own processing based on statistical data, NIS, 2020 [2].

The emergence of the new Wifi4EU program, meant to improve internet connectivity in local communities, but we note that the projects were selected on the basis of the "first come, first served" principle, and did not have the expected effects.

In our localization, the project selection process should take into account more of the additional obstacles that the local rural authority faces, because it does not have financial resources such as the urban.

authorities, when we talk about co-financing.

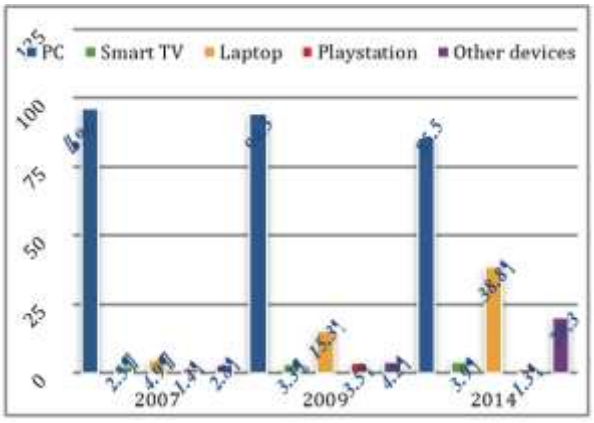

Fig. 2. Evolution of the number of households that have access to the Internet at home, in the rural area during 2007-2014
Source: own processing based on statistical data, NIS, 2020 [2].

Although urbanization leading to the emptying of rural areas is a general phenomenon in Europe, the trend is also dramatic in Romania. The territory of Romania has a population density of 84.5 inhabitants/km^2, one of the lowest in Western Europe, as well as Spain, Greece, Cyprus [2].

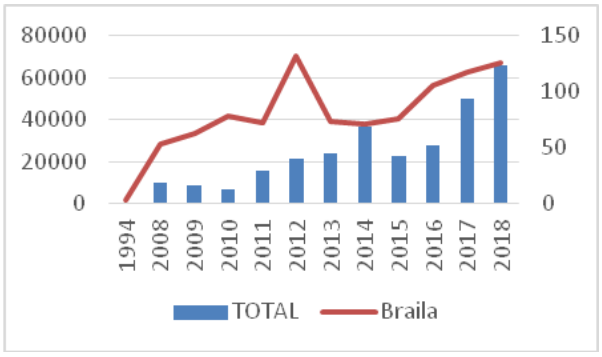

Fig. 3. Evolution of the number of immigrants in the 2008-2018 session, in Braila County
Source: own processing based on statistical data, NIS, 2020 [2].

The lack of young people means that the population does not recover, and the regions lose entrepreneurs who could generate jobs and stimulate the local economy. Measures in Spain have recently been proposed by reducing taxes for areas with less than 8 inhabitants/km^2. Countries where governments have supported entrepreneurship by improving business infrastructures and facilitating access to loans to finance investments have the best economies.
The successful economic model in Europe is characterized by a dynamic private sector, which promotes entrepreneurship and social responsibility, and is supported by a simple and efficient regulatory framework.
It promotes profit-oriented economic activity, along with social and environmental responsibility. The 2000s promoted the European social model and became the official project of the European Union, reiterated in the Lisbon Agenda as a solution for the development and growth of employment in Europe.
In our study, the Chiscani City Hall, in the survey we carried out in 2019, showed that it does not have a development plan oriented to family businesses with simple actions, accessible to future entrepreneurs even for very small companies, which do not have smart actions.
We consider that the future Local Development Plan of the Chiscani Commune should include objectives with short-term results, namely [4]:
(a)Supporting immigration is the key to repopulating the area, creating layer-ups and increasing jobs. Entrepreneurs and family businesses need an economic environment in which they can thrive, and this entrepreneurship should be rewarded (Fig. 4).
(b)Providing support for honest entrepreneurs who have failed to quickly get a second chance;
(c)Applying the rules according to the Think small principle;
(d)Adaptation of public instruments to the needs of SMEs: facilitating the participation of SMEs in public procurement and the more judicious exploitation of the possibilities offered to SMEs to benefit from state aid
(e)Encouraging and supporting SMEs to take advantage of the growth of global markets.
Among other examples of opportunities for the rural environment, it refers to the production of wind, solar, as well as biomass and biogas for electricity production, the role of biomass (for example wood) and/or biogas for heating. We emphasize here the need to give local and regional authorities the power to initiate and manage targeted environmental measures and to allow them to introduce territorial contracts, jointly signed with the rural fuel/electricity suppliers of local origin. We present in Fig. 5, the evolution of the different types of energy at

national level. We observe the increase of the importance of the different energy, wind and solar after 2013.

An explanation would be the simplification of the access procedures to the sources of financing, it is necessary in the current period of rural development, because there is a considerable gap between the number of requests for expression of interest and the much smaller number of complete applications, which is due difficulties in meeting the requirements of such an approach [6].

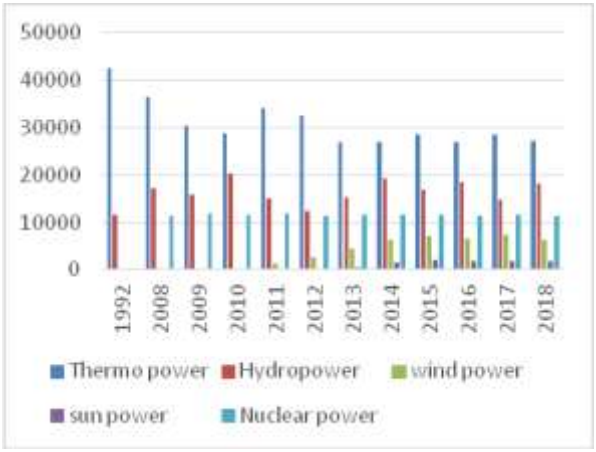

Fig. 4. Connectivity to different types of energy in the period 1992-2018 in Romania (KW/h)
Source: own processing based on statistical data, NIS, 2020 [2].

At European level, there is a digital platform, when high-speed broadband connections are available in every home in the rural area, generally available in the specialized center. A number of benefits and care centers, care cannot solve the digital divide, but it does require a role to play in situations, revitalizing a satellite to centers, providing jobs and training opportunities for rural residents.

We do not intend to present a model of functions for a digital platform, as a point of care for electronic services, such as: electronic health (online consultations), electronic legal advice (legal advice), electronic governance (electronic vote, tax declaration) online, applications for social benefits), e-commerce (online banking, agricultural products sales, etc.) specific to the analyzed rural area.

Fig.5 Connection to the smart rural area
Source: own processing based on statistical data, NIS, 2020 [2].

According to the model of smart cities, one can consider the smart rural area that must adopt a comprehensive country approach and an innovation, which should take care to include all dimensions of the family.

We mention that this configuration is based on the results of the survey carried out in 2019, conducted at the level of a focus group, with representatives of local companies and the local community but also of the conclusions of the SWOT analysis in 2019.

The concepts of "smart city", respectively "smart rural area/smart village" (Fig. 5) should not be viewed as contradictory, but should be viewed as complementary, each supporting and enhancing the success of the other [6].

Strategically, a rural area does not end at its administrative border, but interacts with neighboring, rural or urban entities and plans its development in harmony with its environment. Consideration should be given to establishing mutually beneficial relationships between the rural and urban population, without the rural environment becoming a mere service provider for urban areas [9].

A housing system, to be considered as a whole, will not be viable without ensuring the viability of all its elements, from large cities to small villages.

The smart cities model can rely on a large number of actors to promote and carry out different initiatives, while this is not valid in rural areas, where the level of human and administrative resources is generally more limited. These differences should be reflected in the elaboration of the future policy framework and funding possibilities.

The European Innovation Partnership (IEP) Program on "Smart Cities and Communities", which seeks to promote and consolidate experiences in smart areas of the EU, but

regretted, so far, rural areas have not been included as well. before activating these activities.

The connection and existence of sustainable transport networks are the most important essential to be able to connect the digital figure, to be able to provoke care indications that can be confronted in the area on the point of seeing the dispersed population and the higher costs.

The European Smart Satellite Documentation mentions the provision of Europe's Interconnection Mechanisms (MIEs) which may allow an opportunity to extend to the EU to provide an office and request more details on how to handle these finances and can be used for a connection support to rural areas, especially for the more famous remote rural areas.

There are a number of economic, social and ecological opportunities of local energy production (electricity and heat), as well as the possibility of creating synergies with the help of regional and rural regions and with the CAP (pillar 2).

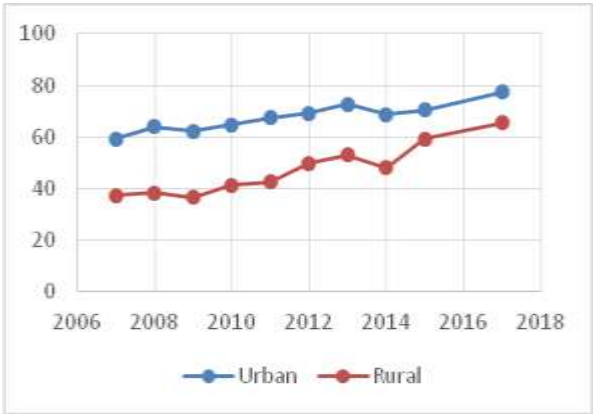

Fig. 6. Evolution of the number of people (16-74 years) who used the computer, by residence environment, on the frequency of its use

Source: own processing based on statistical data, NIS, 2020 [2].

There should be no time gap between urban and rural in terms of using a PC, especially if we are talking about accessing a financing program, in order to maintain an upward dynamic and the current level of development. Specialists believe that in order to be successful, funding applications must encourage networking and clusters and participation in them, as well as cooperation - these issues are usually needed in smart rural areas to enable the expansion of activities and learning.

CONCLUSIONS

Smart areas could be based on their socio-cultural heritage to develop and manifest a well-defined sense of belonging to the entire infrastructure, especially the general services needed to carry out an economic activity, and to attract the relocation of urban enterprises.

A challenge for local and regional authorities is the need to stay informed about and have access to funding opportunities. An important role in sharing information, supporting networks and providing examples of good practices, including through the work of the European Commission's Broadband Platform, is provided by educational institutions, training and education centers.

For a mobilization in accessing the financing programs, we propose the establishment of an annual award recognizing the achievements of the smart village or the most successful smart zone in the EU. Existing networks such as the European Enterprise Network (EEN) and their local partners in the Member States could also be used to provide up-to-date information on a range of topics relevant to entrepreneurs in villages and rural areas.

Progress is still unsatisfactory and uneven, with disparities still remaining, especially between urban (Braila) and rural (Chiscani). The dimension of the challenge is demonstrated by the fact that in 2019, many of the households in Braila county did not yet have a fixed broadband network, and 90% of them were in rural areas. In our opinion, efforts are needed to guarantee the same capacity of the high-speed telecommunications network throughout the region, as a prerequisite for then competitiveness and economic growth of rural areas.

At EU level, the goal is to have connections faster than 30 MB/s by 2020, throughout Europe, including in rural and remote areas. This is, however, only an average value at EU level, with considerable variations between different states and areas, especially in rural areas and in the most remote regions, where speeds of 10 MB / s are encountered quite

often, even in more economically developed member states.

10 MB/s is the usual speed for a typical household, in order to benefit from the most popular online services. The lack of broadband connections fast enough represents a serious challenge for territorial cohesion at present.

At European level, efforts will be intensified to develop high-speed internet in rural areas, recognizing internet access as a public interest service by setting acceptable minimum standards for broadband connections, which, beyond reliable Internet access [5].

In Switzerland and Finland, where access is guaranteed up to the "last kilometer". In any case, this should be considered at least as an ex ante conditionality for any kind of financing for smart villages [8].

Based on the obtained results, the following recommendations are made:

A first recommendation would be to encourage collaborations between local public administrations and companies for reusing the developed solutions, while facilitating their interoperability. Support the provision of training courses for different age categories on how to use digital technologies and adapt teaching to target groups, given the digitization of certain public services at local or other levels (form requests, tax returns, electronic invoices, traceability, CAP, etc.) [1]. It is currently discussing the concept of digital literacy, which will allow all citizens to have access to these training courses in order to carry out elementary tasks in the new digital environment, and calls for them to benefit from funding through structural funds and funding. European investments;

Testing in rural areas. For the local authority, testing in rural areas means evaluating policy options, in order to be sure that the most equitable solutions for rural areas are adopted.

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THE STUDY OF THE RELATIONSHIP BETWEEN RURAL POPULATION SPENDING ON PEASANT HOUSEHOLDS WITH THE MAIN SOCIO-ECONOMIC INDICATORS: A CASE STUDY OF VOLYN REGION, UKRAINE

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Abstract

The paper investigates the interdependence and interrelation of the value of monetary and non-monetary expenditure incurred for the maintenance of private peasant farms functioning, with other socio-economic factors and differentiation of rural population food consumption in the regional context, namely on the case of the Volyn region of Ukraine. Based on the results of our study, it was found that households in which incapacitated persons predominate directly to provide much more financial, labor and other resources for the functioning of their own peasant households, that is, in such households, the activity on their own peasant households is dominant , the main one. The results of the study give grounds to claim that the peasant farms in Ukraine lose their previously dominant function – self-procuring of foodstuffs for personal consumption, transforming, gradually acquiring a new qualitative value, which in the case of successful economic decisions to further develop this organizational and legal form of management effectively adapt it to new economic conditions.

Key words**:** *rural population, peasant households, the decile factor, coefficient of elasticity, per capita monetary expenditures, sex-age pyramid of the population*

INTRODUCTION

Under the realities of economic conditions today, personal forms of farming have become the dominant of the private economic sector in rural areas and have taken the leading position in agricultural production. One of the prominent roles in the basis of the rapid growth in the number of personal farms, in our opinion, is played by the high motivation of their owners, since the activity of these forms of management provides a favourable symbiosis of the functions of the owner and the employee. At present, only in 2016, with the adoption of the Law of Ukraine «On Personal Farming» of 15.05.03, i.e. by the legislative consolidation of the principles of their functioning, personal peasant farms have moved from the sphere of informal to the sphere of formal institutions, in fact, forming the food security of the country.

Thus, it should be noted that in the current conditions of management of the guarantor and the basis of material well-being of the average peasant is the very personal farm, which has lost its subsidiary role.

Theoretical and applied principles of functioning and development of personal peasant households of the population are considered in the scientific works of I. Lukinov, P. Sabluk and O. Onyshchenko [5], O. Chaianov [2], I. Tofan and O. Ahres [9], L. Shepotko etc. We have made an attempt to investigate insufficiently studied aspects regarding the peculiarities of socio-economic conditions of personal peasant farms functioning in rural areas of the Volyn region of Ukraine.

The purpose and objectives of the publication are to investigate the interdependence and interrelation of the value of the monetary and non-monetary expenditure incurred for the maintenance of the private peasant farms functioning, with other socio-economic factors and differentiation of rural population food consumption in the regional context, namely on the case of the Volyn region of Ukraine.

MATERIALS AND METHODS

To measure income inequality, all rural populations (that is, all rural households) are pre-ranked by their own income (or expenditure). All peasant households were divided by their income (expenditure) into five groups called quintiles or ten groups called deciles. The first group includes the poorest peasant households, and the latter (fifth or tenth, depending on the distribution option) – the most affluent peasant households.

The decile factor was defined as the result of the income ratio (or expenditure) of the higher decile group to that of the lower decile group, where the lower decile group is 10 % of the poorest households and the highest group is 10 % of the richest rural households.

In order to study the dependence of the demand for goods and services necessary for the functioning of personal farms on household incomes across the entire household, we conducted a study on its elasticity. And when comparing the elasticity of consumption of goods and services required for the functioning of peasant households (*E*) of two population groups with different income levels, the A. Marshall`s formula was used [1]:

$$E = \frac{(x_i + 1) - x_i}{x_i} : \frac{(y_i + 1) - y_i}{y_i},$$

where y_i і x_i - income and consumption of the population group with lower incomes;

$(y_i + 1)$, і $(x_i + 1)$ - income and consumption of the population group with higher incomes [4].

It is worth noting that the coefficients of elasticity were calculated by determining the percentage increase in money expenditures of the population on the purchase of goods needed for the personal farms functioning, calculated on the one percent increase in total monetary expenditures in each of the income groups. The weights of the households by individual income groups in their total numbers are selected as weights.

RESULTS AND DISCUSSIONS

Based on monetary incomes and aggregate resources, the population carries its costs and forms a certain level of goods and services consumption. It should be noted that since the incomes of a household tend to decrease, the actual state of the financial support of the population is more accurately and adequately characterized by the cost indicators.

The rate of change in the share of the vast majority of elements of monetary expenditures in urban and rural households in the Volyn region of Ukraine is practically the same. However, the dynamics of some of them do not fall within the general trend. Thus, the share of nominal expenses for maintaining a personal peasant households in the total amount of monetary expenses during 2013-2018. in rural households in the Volyn region it decreased by 6.1 percentage points from 15.9 % to 9.8 % (but in 2018 it was 5.8 times higher than in urban households), and in non-consumer money expenditures – by 6.5 percentage points and amounted to 47.4 % (Figs. 1 and 2).

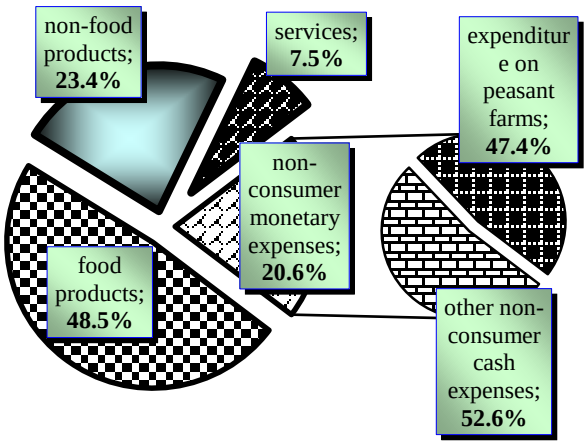

Fig. 1. Share of elements of average per capita monetary expenditures of the rural population of the Volyn region of Ukraine (average per month), 2018, % Source: Author's results based on [6; 7].

In addition, the share of average per capita money expenditures of rural households on maintaining a personal (deflated) calculation in

the Volyn region of Ukraine decreased by 6.5 percentage points over the period under review, and by 1.4 percentage points in urban households in the region.

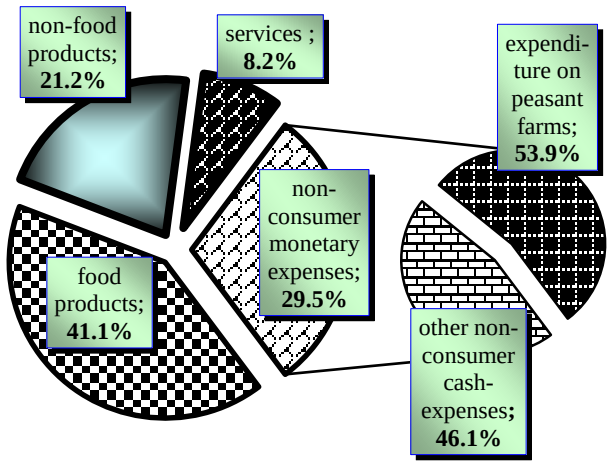

Fig. 2. Share of elements of average per capita monetary expenditures of the rural population of the Volyn region of Ukraine (average per month), 2013, %
Source: Author's results based on [6; 7].

Although the nominal average per capita monetary expenditures for the peasant households for 2013-2018 in urban households in the Volyn region of Ukraine increased by 33.7%, but in real terms they decreased by 2.2%. In rural households in the Volyn region of Ukraine, the real value of these expenditures for the studied period increased by an average of 1.9 times per person. In general, it can be stated that in the Volyn region of Ukraine in 2018 the differentiation of the costs of maintaining peasant farms from smaller to larger income groups, formed by average per capita total expenditures, is abrupt and therefore makes it impossible to distinguish clearly expressed trends.

Estimation of the costs of managing peasant farms, depending on the number of workers, shows that the majority of such expenditures are made by households of the Volyn region of Ukraine, which include 2.8 times more households with two workers in other sectors, and in 1.2 times more – with three employees. The presence of a larger number of workers creates much more significant opportunities for expanding the functioning of the personal economy. However, the results of the analysis show that in the vast majority of such households, activities in their own personal peasant economy are not basic. In general, it can be stated that households of the Volyn region of Ukraine, all members of which are disabled, spend 2.2 times more on their own peasant households than households all members of which are of working age. In addition, households with one incapacitated person spend 8.5 times more on the costs of running their own farm than households with one working-age person. At the same time, the share of cash expenditures for own peasant economy in households formed from disabled persons is 10.8 %, which is 5.2 percentage points more than for the whole households of the Volyn region of Ukraine. The above gives grounds to argue that households in which incapacitated persons predominate direct to providing much more financial, labour and other resources for the functioning of their own peasant households, that is, in such households, the activity on their own peasant households is dominant, the main one.

In particular, in the Volyn region of Ukraine, the share of persons of working age in the age structure of peasants is now 24.4 %, which is 1.4 times more than in urban settlements [8]. Therefore, the issue of «village aging» is a particularly urgent issue – a destructive increase in the proportion of older people of working age, which has led to a significant increase in the mortality rate of peasants and is an important structural factor that will further slow down the natural increase of the rural population.

As of early 2019, the gender and age structure of the rural population of the Volyn region of Ukraine is characterized by a predominance of women whose share has decreased by only 0.6 percentage points compared to 1989 and is 52.4 %. The pattern is that the older the age group (from the age of 50), the greater the quantitative advantage of women. Particularly noteworthy is that the violation of the sex ratio in favour of women is aggravated at the age of 55-59 and becomes extremely threatening among the elderly (Fig. 3). The obvious conclusion is that the level of aging of women in rural areas is now much higher than that of men.

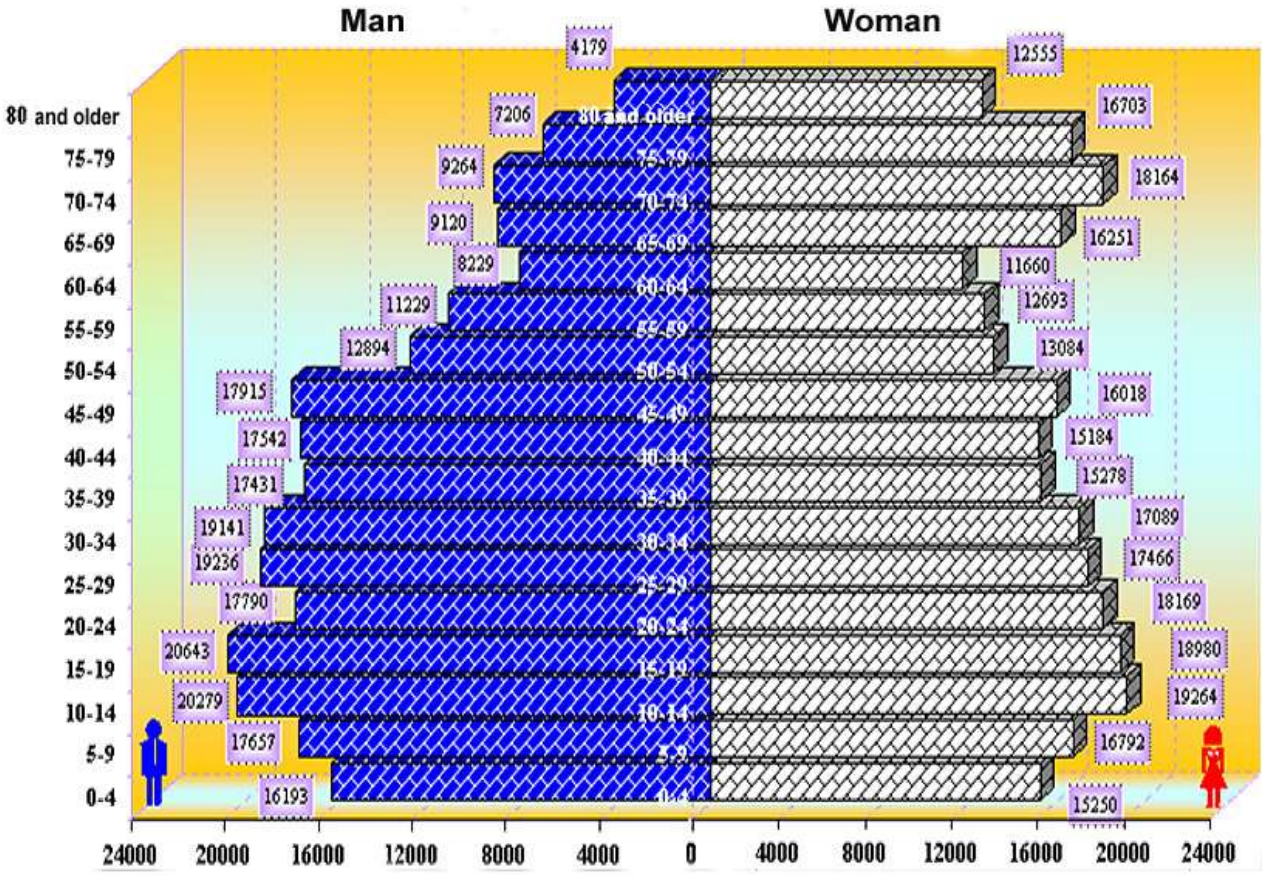

Fig. 3. Sex and age pyramid of the rural population of the Volyn region of Ukraine, as of the beginning of 2019
Source: Built by the Authors based on [8].

Thus, the modern process of man (including labour) of the potential of villages observed on the sex-age pyramid (Fig. 3) requires knowledge of the destructives used, which point to the most recent negative interests, and require that what they think is important, but they think the question is right. The definition of this option is as follows:

- narrowed base due to the small number of young people, including new-borns;
- contours and open contours, which is a consequence of uneven demographic losses of the past [3];
- narrowed and severed tips, which is a sign of high rates of overall mortality, along with significant population aging.

According to most researchers, as well as in our opinion, the reduction of inflow of youth caused by destructive demographical processes in the countryside causes a narrowing of the general level of mobility of the population, slows down the processes of changing the professional qualification of the working or willing to work, and causes the emergence of other important factors, the stimulants of the quality of economic growth, including the functioning of personal farms. Also, significant aging is one of the indicators of exacerbation of the problem of labour shortages, as the increase in rural labour productivity is not able to fully compensate for the natural decline in employment. We believe that under such specific conditions, the extension of the full economic and social activity of the elderly population, rather than the regulation of fertility, is the main way to achieve optimal economic conditions for the functioning of peasant farms in Ukraine.

According to the analysis of the decile grouping of the whole household of the Volyn region of Ukraine by average per capita money expenses, it is found that from smaller to larger income groups, the average per capita cash expenditures on the peasant economy are increasing, in particular, the decile ratio of the peasant households` spending funds to 2018 amounted to 4 (6.6 in total for the rural population of Ukraine). The results of the

analysis of the differentiation of cash expenditures on peasant farms in the context of decile groups formed by average per capita total expenditures in the Volyn region of Ukraine, showed that the ratio of funds to such expenditures is 7.2 (in general for the rural population of Ukraine as a whole - 5.8), and specific the weight of identified expenditures in the first and last deciles is 6.2% and 7.7%, respectively (for the rural population of Ukraine as a whole -9.1% and 7.2%, respectively), i.e. significant differentiation is not traced. In addition, it has been established that the growth rates of average per capita cash expenditures on own farms in rural households of the Volyn region of Ukraine are slightly higher, and in urban areas – almost coincide with the growth rates of income from them.

We have calculated the integrated coefficient of demand`s elasticity for goods needed for the activity of households, depending on the monetary income in the Volyn region of Ukraine for 2018 was 71.21%. The obtained results give reason to claim that the growth of money incomes of the population of the Volyn region of Ukraine by 1% leads to an increase of money expenses for the purchase of goods and services for the functioning of the peasant farms by 0.71%.

When comparing the elasticity of demand for agricultural commodities for 2018 in the Volyn region and in Ukraine as a whole, it is found that the national average is slightly higher. The increase in the monetary incomes of the rural population of Ukraine as a whole by 1% causes the increase of their monetary expenditures for the purchase of goods and services necessary for the functioning of the private peasant farms by 0.84%.

Since the functioning of the personal economy is largely aimed at self-supplying the rural population with food, we believe that particular attention should be paid to one of the most important characteristics of the living standards of the rural population – the assessment of the dynamics of food consumption by them.

It should be noted that during 2013-2018 significant changes occurred in the consumption of food by the rural population of the Volyn region.

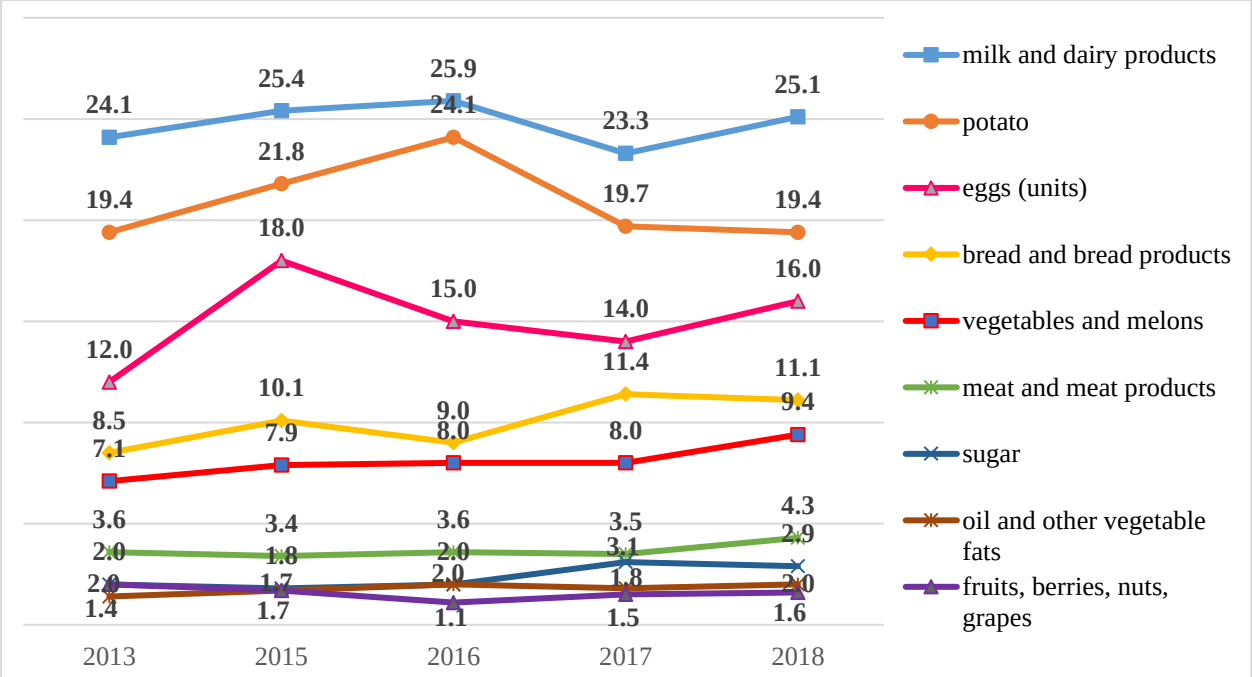

Fig. 4. Average per capita consumption of food in rural areas of the Volyn region of Ukraine for 2013-2018, on average per month, kg
Source: Own research based on [6; 7].

First, it is necessary to notice the significant increase in average per capita consumption of such foods as fish and fish products - 2.7 times (or 1 kg per month), sugar - 1.5 times (or 0.9 kg. Per month), oil and other vegetable fats - by 42.9%, vegetables and melons - by 32.4%,

eggs - by 33.3%. However, the average per capita consumption of fruits, berries, nuts, and grapes decreased by 20.0%, i.e. by an average of 0.4 kg per month (Fig. 4). On the whole, based on the results obtained, it can be argued that the rural population of the Volyn region eats somewhat better than the urban one since the energy value and nutritional value of their food rations are more important. However, the food consumption of the urban population is characterized by a higher saturation of more valuable types of food, so the quality of the diet in them is higher.

CONCLUSIONS

The results of the study give grounds to claim that the peasant farms in Ukraine lose their previously dominant function - self-procuring of foodstuffs for personal consumption, transforming, gradually acquiring a new qualitative value, which in the case of successful economic decisions to further develop this organizational and legal form of management effectively adapt it to new economic conditions. We see further possible prospects for the development of farms in directing their internal potential to expand non-agricultural businesses in rural areas, in particular, agro-tourism, artistic crafts, crafts and more.

We believe that the directions of further development of personal peasant farms should be differentiated, depending on the number of able-bodied persons providing for its functioning. For example, peasant households whose activities are provided only by persons with disabilities require the development and implementation of a system of progressive social measures; and peasant farms operating at the expense of the small number of persons who are mainly in working age are in need of measures aimed at ensuring sufficient production for internal consumption.

In our opinion, particular attention is paid to the development of an effective mechanism for the gradual, but effective, the transformation of personal peasant farms in which three or more persons of working age are involved, into high-commodity forms of management with a significant share of market sales.

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ECONOMIC INPUT OF NON-WOOD FOREST PRODUCTS OF ANIMAL ORIGIN TO THE TURNOVER OF FOREST DISTRICTS IN ROMANIA

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Abstract

In Romania, forest management is focused on wood harvesting and marketing, non-wood forest products (NWFPs) having a low importance. Even so, across the country there are more than three hundred fifty NWFPs of interest, forest fruits, mushrooms and truffles, forest seeds, game products, fish from the mountainous water, honey and tree saps being among the most common ones. The main aim of this study was to highlight the economic contribution of NWFPs of animal origin to the turnover of the forest districts in Romania. Secondly, the potential of these products was assessed by using an Analytical Hierarchy Process implemented in Expert Choice Desktop software. By using a set of eight criteria, game products proved to be more promising in comparison with honey and fish from the waters included in the national forest fund. On average, NWFPs of animal origin have a very low (less than 1%) contribution to the turnover of the forest districts in Romania. The brief multi-decision analysis could represent an alternative for the forest managers aimed at highlighting the best alternative in a chosen scenario.

Key words**:** *AHP, economic contribution, forest district, NWFPs*

INTRODUCTION

In Romania, forest management is made by specialized units (*i.e.* forest districts) following economic, ecological and social targets. The forest districts (470 in total) are both private and state-owned, the vast majority of them (313) belonging to National Forest Administration Romsilva, which has in total more than 16,000 employees [17].

Among others, forests are regarded as important revenues for the forest owners and managers, several wood and non-wood forest products (NWFPs) being marketed. For example, across Romania, more than three hundred fifty NWFPs (mainly forest fruits, edible mushrooms and truffles, medicinal and aromatic plants, game and fish products, honey, tree saps) are collected every year [6], [7], [8], [18], [19], [20].

The harvesting and marketing of NWFPs originating from the national forest fund are regulated by specific legislation (especially Article no. 58 of Law no. 46 from 2008 – Forest Code) and the activities are monitored by the staff of the forest districts. All these products belong to the landowners, except the fish from mountain waters, farms and ponds included in the forest fund and wildlife species of hunting interest [9].

As regards the harvested quantities of the main categories of NWFPs, in the last decade, around 4,000 tons of forest fruits, 550 tons of edible mushrooms and around 10-20 tons of forest seeds were collected every year by the employees of the forest districts or their subcontractors [4]. The highest shares of the yearly harvested quantities of forest fruits and mushrooms are exported as raw materials in several European countries. A similar trend was also observed in the case of some game and bird species of hunting interest, such as common quail (*Coturnix coturnix* L.) and Eurasian skylark (*Alauda arvensis* L.) [3], or red deer (*Cervus elaphus* L.) and fallow deer (*Dama dama* L.) [10], which are preferred by the foreign hunters.

Other examples of NWFPs of animal origin consist in bee honey and fish from waters and farms managed by the forest districts. According to a recent report, honey production in Romania had increased in the last two decades [16]. A significant share is obtained from black locust (*Robinia pseudoacacia* L.)

and linden (*Tilia* spp.) dominated hardwood forests [5], [13], especially from the ones distributed in the southern part of the country for which the honey production could reach 320 kg/ha [12].
In the case of the fish from the waters included in the national forest fund, half of the yearly production (*i.e.* 500-600 tons) is obtained by the thirty trout farms managed by Romsilva [1], [2], the main three species of breeding interest being river trout (*Salmo trutta fario* L.), rainbow trout (*Oncorhynchus mykiss* Walbaum) and brook trout (*Salvelinus fontinalis* Mitchill.) [14], [15], [17]. An example of a trout farm is given in Figure 1.

Fig. 1. Lepșa trout farm, Focșani Forest District (Romsilva), Vrancea County
Source: original photo.

For some forest districts, the marketing of NWFPs is regarded as an important alternative to wood selling, especially for those that are managing small areas (Figure 2) with not so valuable wood and with several harvesting restrictions caused, for example, by the network of protected areas. In this context, the chief of the forest district is very interested to diversify the sources of income and to move the pressure from wood harvesting to NWFPs picking.

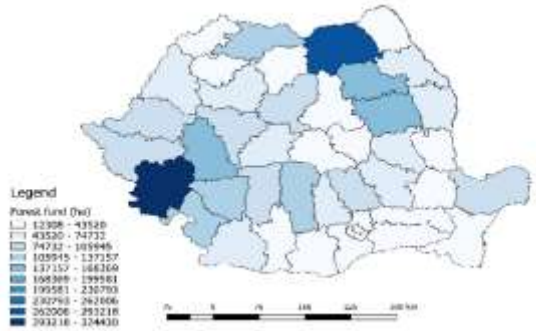

Fig. 2. State-owned forest fund managed by Romsilva
Source: Romsilva [17].

The main aim of this research was to highlight the economic contribution of NWFPs of animal origin to the turnover of the forest districts in Romania. Secondly, the potential of selected non-wood forest products was assessed.

MATERIALS AND METHODS

Data regarding the contribution of certain non-wood forest products to the turnover of the forest units from Romania were centralized from the website of the National Institute of Statistics [11].
In order to investigate which NWFPs of animal origin could have the greatest potential for marketing, an Analytical Hierarchy Process (AHP) was conducted. The analysis was used in a similar study aimed at highlighting the most promising NWFPs across Ialomița County [6]. Within this study only three alternatives (*i.e.* game meat, fish and honey) and eight criteria were taken into consideration. The criteria consisted in: **criterion 1**: *portfolio of derived products* (assessed on a scale from 1-the lowest to 3-the highest), **criterion 2**: *price of final product* (from 1-the lowest to 3-the highest), **criterion 3**: *market demand* (from 1-the lowest to 3-the highest), **criterion 4**: *tools needed for harvesting* (from 1-the most to 3-the least), **criterion 5**: *harvesting costs* (from 1-the highest to 3-the lowest), **criterion 6**: *transportation from the harvesting place to storage center* (from 1-the most complicated to 3-the least complicated), **criterion 7**: *perishability* (from 1-the most to 3-the least) and **criterion 8**: *potential for the development of the harvesting process* (from 1-the least to 3-the highest), respectively.
The analyses were done by using Expert Choice Desktop (v. 11.5.1683) software package.

RESULTS AND DISCUSSIONS

The contribution of the NWFPs of animal origin to the overall turnover of the forest units, at national level, for the timeframe 2011-2018, is given in Table 1.

Table 1. Contribution of NWFPs of animal origin (thousands lei)

Year	Turnover	Game products	Fish products	Honey
2011	1,523,819	7,037	9,594	97
2012	1,626,799	6,377	8,302	43
2013	1,846,977	5,709	9,330	37
2014	2,017,621	6,998	10,478	29
2015	2,107,590	5,903	11,094	10
2016	2,254,830	5,229	8,993	40
2017	2,476,255	5,170	9,061	64
2018	3,002,986	5,040	8,607	97
Mean	2,107,110	5,933	9,432	52

Source: National Institute of Statistics [11].

On average, the total contribution of the NWFPs of animal origin (fish products, game products and honey) harvested from the national forest fund accounted for 0.7%, fish products having the highest share. In the considered timeframe, the overall contribution decresed from 1.1% (2011) to 0.5% (2018). AHP alternative ranking is given in Table 2.

Table 2. AHP alternative ranking

Criterion	Game products	Fish products	Honey
1	3	2	1
2	3	1	2
3	3	1	2
4	1	3	2
5	3	1	2
6	1	3	2
7	2	1	3
8	2	1	3

Source: Own data.

By using the above-mentioned eight criteria with equal shares (*i.e.* 12.5%), game products proved to be the most promising non-wood forest products, followed by honey and fish products (Figure 3).

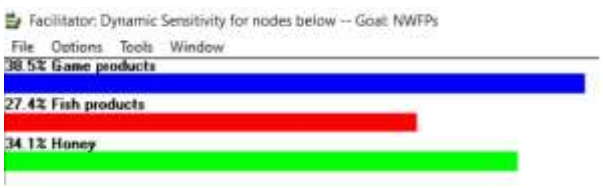

Fig. 3. The ranking of the three NWFPs
Source: original photo.

Among the four sensitivity graphs, Expert Choice Desktop provides also the so called head-to-head graph between pairs of alternatives (*i.e.* NWFPs). An example is given in Figure 4, on the left part of the graph being highlighted the criteria for which the game products recorded higher values (with blue color) in comparison with honey, while on the right is the vice-versa situation (highlighted in green). In the bottom of the graph, the overall result of the comparison on the pairs of products is highlighted with color grey. This graph is especially useful in the case when tens of criteria are included in the same time into analysis, especially when criteria are grouped according to certain research objectives.

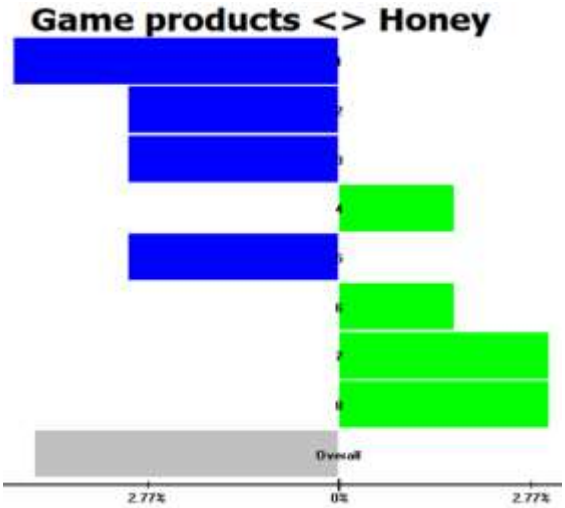

Fig. 4. Head-to-Head sensitivity graph
Source: original photo.

CONCLUSIONS

On average, between 2011 and 2018, marketing of non-wood forest products of animal origin harvested from the national forest fund had a very low economic contribution (*i.e.* 0.7%) to the turnover of the forest districts in Romania. The contribution decreased from 1.1% (in 2011) to 0.5% (in 2018). This brief multi-decision analysis provides an alternative for the forest managers and forest owners aimed at highlighting the best alternative in a scenario when all NWFPs are equally available. The model could be developed, by providing additional criteria (with equal or unequal shares) and/or alternatives. In order to switch the focus from wood harvesting and marketing to non-wood

forest products picking and commercialization specific infrastructure aimed at storing and preparing derived products has to be develop with priority in many forest districts as possible. By doing this, the portfolio of derived products that are of great interest on national and international market will increase and, consequently, the income of the forest districts will grow.

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BEHAVIOURAL FACTORS AND ECOLOGICAL FARMING. CASES STUDIES

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Abstract

The main objective of the paper is to identify and understand how the Romanian farmers relate to ecological farming in terms of ecological practices and ecological products. To achieve this objective, qualitative research methods were used: hybrid forum method and in-depth interviews. The obtained results reveal that in the county Cluj-Napoca, the stakeholders opt for building an operational social system (balanced functioning of the education, production, research, distribution systems within multi-dimensional political programmes/projects). At the same time, the stakeholders from Suceava opt for building an operational social system where the ecological practices are the core of agricultural systems.

Key words**:** *ecological farming, farmers' ecological behaviour, ecological practices, social system operation*

INTRODUCTION

Behavioural factors largely influence farmers' decisions to adopt or continue to use the ecological farming practices "farmers' decisions to adopt more sustainable practices, such as organic farming, have their peculiarities" [5].
The studies concerned with the proecological behaviour, mainly those focusing on the behavioural factors, stemmed from the need to formulate effective policy measures for ecological farming development, for increasing food production [6, 7, 8].
The European Commission's proposal [8] to create voluntary eco-schemes, together with the existing agri-environment and climate measures, indicates a budgetary shift to more voluntary approaches to incentivise more sustainable practices.
The scientific researches concerned with the importance of behavioural factors identified many determinants of the ecological farming practice adoption; for instance, the name of an agri-environmental measure may influence the choice/adoption of an ecological/sustainable/ bio practice by farmers [13].
The behavioural factors are influenced:
- by "macro" variables - for instance, farmer's personality, risk tolerance "farmers differ in their personal and farm characteristics" and "farmer personality and risk tolerance affect whether they adopt a particular sustainable practice" [11];
- by "micro" variables - for instance, farmers' perception of the benefits and costs of using an ecological practice "farmers' perceptions of the benefits and costs associated with a specific agricultural practice are immediately related to the decision-making in question: some practices may be seen as entailing high benefits and low costs, while others may be perceived as less profitable" [1, 9].
The decision to practice ecological farming is built into a tri-dimensional framework: dispositional factors, social factors and cognitive factors [13].

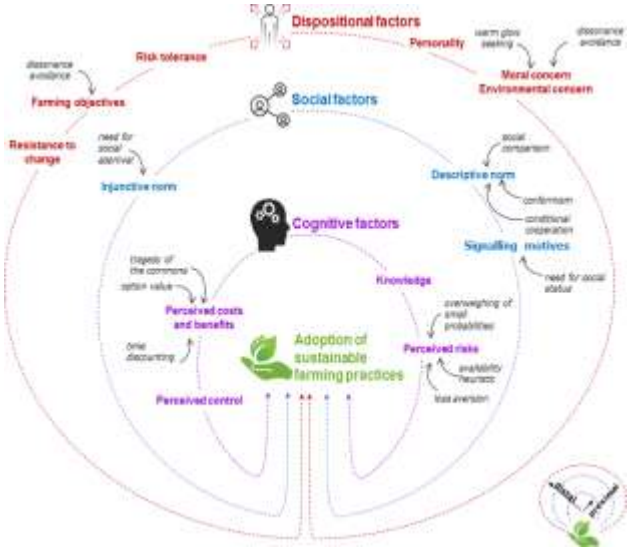

Fig. 1. An integrated framework of behavioural factors affecting farmers' adoption of environmentally sustainable practices
Source: Dessart, F.J. et al, [5], page 422

These three factors or characteristics are:
- personal characteristics defined by internal variables related to a certain person, such as personality, motivations, values, beliefs, preferences and general objectives: "Dispositional factors relate to an individual's general propensity to behave in a certain way" [10].
- the social characteristics refer to farmers' interactions with other people (e.g. other farmers or advisors) and include social norms: "Interpersonal relationships influence farmers' decisions to adopt more sustainable practices. Social factors include social norms and signalling motives" [5].
- the cognitive characteristics include farmers' perception of the benefits, costs and relative risks associated to a certain sustainable practice or if they consider that they are knowledgeable enough to adopt these practices: "The adoption of sustainable practices is influenced by how farmers learn, understand and perceive these practices, particularly the associated difficulties, costs, benefits and risks. These cognitive factors are very specific" [5].

MATERIALS AND METHODS

To achieve the objective of this paper, two qualitative research methods were used: hybrid forum method and in-depth interviews.

The concept of hybrid forum is a democratic and dynamic way to think and act together when many actors and controversial issues are involved. The hybrid forums can be described as public discussions with the aim of constructing a common project around a defined challenge. This is quite different from the traditional Focus Group. In the latter the groups aim at having a common discussion to have a better knowledge on one given theme; while in the hybrid forum, the actors will "not just express themselves or exchange the ideas, or even making compromises" [3] but they will discover, learn and construct together the ideas. Thus, by definition, the controversies are at the core of the Hybrid Forum, because their existence triggers the process of learning and co-producing something new.
The hybrid forum method was applied in Cluj area: the first part was animated by the presence of ten stakeholders (5 men and 5 women) who were selected so as to ensure a representative of each link in the ecological farming system. The second part was represented by a debate with the participation of 43 stakeholders involved in ecological farming – studies, promotion, production, marketing and consumption.
In-depth interviewing, a qualitative research technique, provides a more complete picture of what happened in ecological farming; for instance, we asked participants about their experiences and expectations related of ecological practices.
In order to collect information, 10 stakeholders from the area of Suceava county were interviewed.

RESULTS AND DISCUSSIONS

Cluj County

a) Short presentation
Cluj county has an area of 6,674 km^2, accounting for 2.8% of Romania's territory. The relief of the county mainly consists of hills, which account for two-thirds of the county's area, the remaining one-third consisting of mountains [4].
The natural environment is favourable for the development and modern farming, yet not fully

used due to the lack of investments in this sector.

Map 1. Cluj County
Source: own representation with GIS application.

In the land fund structure, agricultural land accounts for 65% and forestland 38%. In terms of land use categories, the agricultural land area is divided mainly between arable land (38%) and pastures and hayfields (57%). The main cultivated crops are the following: cereals (maize, wheat, barley and two-row barley), oilseeds (sunflower, rapeseed), potatoes, vegetables (tomatoes, onions, cabbages, etc.) as well as annual and perennial fodders. Cattle, pigs, sheep and goats are raised in this area. Yields are quite low, both in crop production and in livestock production, due to the high dependence of the farming sector on the environmental factors, to the absence of adequate policies, to old-aged labour force, etc.

Table 1. Evolution of the area cultivated under ecological farming system in Cluj county

	2015	2016	217	2018
Agricultural land area - ha	432,835	429,567	432,835	43,835
- cultivated under ecological system - ha	4,133.9	5,858.1	6,629.1	8,829.5
%	0.96	1.36	1.53	2.04

Source: own calculation based on data provided by Cluj Environmental Protection Agency [4].

The crop structure follows the relief pattern: thus, in the plain and hills, grains are mostly cultivated (maize and wheat), while in the high hills and mountainous area, fodder crops are mainly grown. This county has a good tradition and favourable conditions for raising cattle and sheep.

Cluj County is in the top ten counties with land areas cultivated under ecological system in Romania, steadily increasing in recent years.

b) Behavioural characteristics

The interviewed stakeholders from **Cluj County** were a relevant source of data and information because, by the nature of their activity, they have strong functional relations with the farmers who have dairy farms, sheep farms, mixed crop-livestock, field crop and fruit or vegetable farms. The stakeholders were selected so as to ensure the representativeness of each link in the ecological farming system – from production to promotion, from academic/university research to personalized ecology services for a healthy lifestyle; farmers who produce ecological products and conventional and ecological products; it was also envisaged to ensure the representativeness of ecological associations and rural associations, of traders in ecological products; territorial organization was a criterion in selecting the stakeholders involved in the ecological chain by including representatives of local councils that encourage ecological agriculture and inter-rural organizations interested in land conversion and in the conversion from conventional farming to organic farming.

The data obtained from the discussion of Hybrid Forum type can be summarized as follows:

- ***personal characteristics,*** mainly those related to educational capital are relevant in adopting ecological behaviours, in developing a pro-environmental attitude. Stakeholders used the education concept, in the sense in which the educational capital is the accumulation of knowledge through full training (kindergarten - higher education), amplification of knowledge and high specialization and efficient utilization of knowledge. The inter-generational educational capital, identified in farmers' opinions, is a key element in supporting promotion. The educational capital should exist both at producer and consumer level. During the

Hybrid Forum a "motival tree" "motivational tree" was built, with complete ramifications of the educational process: starting from the need to be aware of the relationship between the ecological product and the environment, stakeholders addressed the need to professionalize the occupation of ecological producer;

- ***social characteristics,*** perceived in terms of operational social system - balanced functioning of education, production, research, distribution systems within multi-dimensional political programmes/projects; the operation of the system is also caused by the absence of clear political objectives in this field.

Another factor is represented by farmers' organization into various types of organizations and associations for ecological producers This factor is perceived as a necessary institutional construction for entering on the market, manly represented by supermarkets.

The determining factor in adopting agro-ecological practices is the examples provided by foreign (Dutch, German) investors to rural communities:

- ***cognitive characteristics*** - evaluation of the perception and knowledge of the environment in different stakeholders and the perception of benefits of agricultural practices by the stakeholders involved in the demand chain – it was found out that the farmers have basic knowledge on the environment and benefits of agricultural practices. Furthermore, they are aware of the physical barriers to obtaining an ecological product: land fragmentation, proximity to plots on which conventional farming is practiced.

Suceava County

a) Short presentation

Suceava county's area totals 8,553.5 km^2, accounting for 3.6% of the country's area, being the second largest county in size in Romania.

The county has two main relief units: mountain area, accounting for 64.5% and plateau, accounting for 34.6% [2].

Map 2. Suceava County
Source: own representation with GIS application.

The natural environment offers the possibility for the development of a diversified agriculture, yet this potential is not fully used. In the land structure, the agricultural land accounts for 41%, while forestland 53%. In terms of land use categories, the arable land is divided between arable (52%) and pastures and hayfields (47%).

Table 2. Evolution of area cultivated under ecological farming system in Suceava county

	2015	2016	217	2018
Agricultural land area - ha	354,821	354,820	354,820	354,820
- cultivated under ecological system - ha	14,860	7,502	7,815	10,258
%	4.2	2.1	2.2	2.9

Source: own calculation based on data provided by Suceava Environmental Protection Agency [12].

The agricultural land is mainly farmed by small-sized farms, with 2.49 ha on the average. Suceava county is in the top ten counties with areas cultivated under ecological farming system.

b) Behavioural characteristics

The interviewed stakeholders in **Suceava County** were a relevant source of data and information because, by the nature of their activity, they have strong functional relations with the farmers who have dairy farms, sheep farms, mixed crop-livestock, field crop and fruit or vegetable farms.

From the analysis of respondents' answers, we could notice the following behavioural characteristics that can induce the adoption/development of ecological practices:
- ***social characteristics*** - the organizational status induces the adoption of environment-friendly practices; for instance, the inter-communal organization LAG Bazinul Dornelor, where ecological farms, farms in conversion and conventional farms can be found, alongside with a sustained activity to stimulate the first two types of farms;
- ***cognitive characteristics*** - the existence of a tradition of respect towards the environment, of environment friendly behaviours in the mountain area enhances the ability to use ecological farming methods/systems.

CONCLUSIONS

"Behavioural factors synonymously with psychological factors, i.e. the cognitive, emotional, personal and social processes or stimuli underlying human behaviour" are relevant in adopting/developing ecological farming practices [2].
The two studies conducted in the rural areas where ecological farming has a significant share, compared to other rural areas, captured the main characteristics that have contributed to getting closer to ecological practices, i.e. developing a proecological behaviour, pragmatic concerns to practice an environment friendly farming system and to healthy farm production.
The social and cognitive characteristics are present in both interviewed groups:
- ***the social characteristics*** for the group from Cluj materialize into the projection of an operational social system - balanced functioning of education, production, research, distribution systems; for the Suceava group, the most important characteristic is of organizational type – the inter-communal organizations are a favourable framework to support the ecological farming practices, from their creation to their development;
- ***the cognitive characteristics*** relate to farmers' perception of the benefits, costs and risks associated to a certain ecological practice; the respondents from the Suceava group focus on the traditional skills required by ecological farming.
For the subjects in Cluj group, the personal characteristics based on education are also important.
The environmental policies are a common point of the opinions and assessments made by the two groups, and essentially the need to adjust the current political act according to the options, expectations and behavioural characteristics specific to the social actors. Which means that "there is still room for decision makers to fully realize the potential of behavioural perspectives for agricultural policy" [5].

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TERRITORIAL DIVERSITY RESEARCH TRENDS WITHIN THE CONTEXT OF AGRICULTURAL POLICY

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Abstract

Common Agricultural Policy (CAP) represents not only one of the most important EU policy, holding a large share of overall EU funds, but is also one of key drivers of EU rural spatial development. It is important therefore, to look into its impact and how it can best respond to the specific challenges for agriculture and rural areas. There is an increasing number of studies on the CAP impacts on the farming indicators such as agricultural production efficiency, employment, profitability, structural issues. However, very little attention has been paid to territorial diversity among rural areas in each country. The main aim of this paper is to examine the existent situation of the topic researches conducted at EU level between 1994-2020 regarding the CAP, taking into account the territorial diversity. By analysing the current literature through Web of Science and Science Direct scientific databases we were able to obtain information on the research topic previously mentioned from several perspectives, using a list of predetermined key words, starting from "territorial diversity". The conclusions drawn from our study will serve as support in creating an analysis at the Romanian level regarding the implementation of the CAP.

Key words**:** *territorial diversity, Common Agricultural Policy, policy instruments, financing agencies*

INTRODUCTION

Common Agricultural Policy (CAP) represents not only one of the most important EU policy, holding a large share of overall EU funds, but is also one of key drivers of EU rural spatial development [2].

It is important therefore, to look into its impact and how it can best respond to the specific challenges for agriculture and rural areas.

The European Commission is increasingly concerned with assessing the social, environmental and economic impact that its initiatives and policies have had and can have. Therefore, at the EU level there have been numerous researches that evaluate the impact of its policies. The analyzed researches propose numerous evaluation processes for measuring the impact. These are based on a base of methodologies found in the specialized consulted literature [10].

The changes that have been observed in the CAP over time can be explained by the continuous adaptation of the political instruments that could be analyzed. The analysis of the economic and social effectiveness of these instruments was an essential factor in the changes that took place within the policy. The initial policy tools proved inefficient to the new context, and the policy change allowed the development of more effective tools, which can be targeted to problem areas, with lower development [7].

The European Union offers funding for a wide range of projects and programs, the CAP impact analysis being one of them. In addition to EU funding, the research analyzed also received help from national public and private institutions.

There is increasing number of studies on the CAP impacts on the farming indicators (ex: agricultural production efficiency [11], employment [5], profitability [13], structural issues [14]. However, very little attention has been paid to territorial diversity among rural areas in each country [1].

The main objective of this paper is to analyses the scientific literature regarding the implementation of the CAP taking into account the territorial diversity (spatial disparities), as

well as in the case of Europe, but also in terms of the other state.

Unfortunately, in Romania not many aspects regarding the evaluation of the agricultural policy were studied, and they are mainly focusing on differences and the similarities between the European model of agricultural and rural development and the state of play in the Romanian rural areas [4]. Only a small number of studies examined the effects of the EU's rural development program on rural communities in Romania, such as on vitality of rural areas [8] the number of newly established enterprises in rural communities [9], or on rural remote areas [6].

MATERIALS AND METHODS

As a method of data collection, we used the scientific databases Web of Science, Science Direct and Google Scholar. The 107 articles were found with the help of carefully selected keywords, as: territorial diversity, CAP, policy instruments, policy implementation, evaluation. The results obtained can be adapted to the desire to analyze the specialized literature considering the implementation of the CAP, taking into consideration the key factor: territorial diversity.

RESULTS AND DISCUSSIONS

The 107 selected articles were analyzed according to years, countries, authors, projects, types of documents, funding agencies and Web of Science categories.

Of the 107 analyzed documents, 91 of them were published in the form of articles (85.05%), 21 proceedings papers (19.63%), 2 book chapters (1.87%) and 1 early access (0.94%). Figure 1 presents the situation of the articles considering the period in which they were published, starting with 1994. A significant increase in the number of articles published each year, from 1994 with 2 articles per year (1.87%) can be observed, since 2015 their number has increased, reaching 15 (14.04%), showing a greater concern in the ex-post evaluation of the 2007-2013 programming period.

The ascension registered between the analyzed years also determined an increase of the awareness of the importance of this subject and the need to have them analyzed for the improvement and consolidation of the National Programs of Rural Development, for a better distribution of the funds and to act on the deficient areas, avoiding thus super investments [12]. We can observe a greater care given for the programming period 2014-2020, compared to 2007-2013.

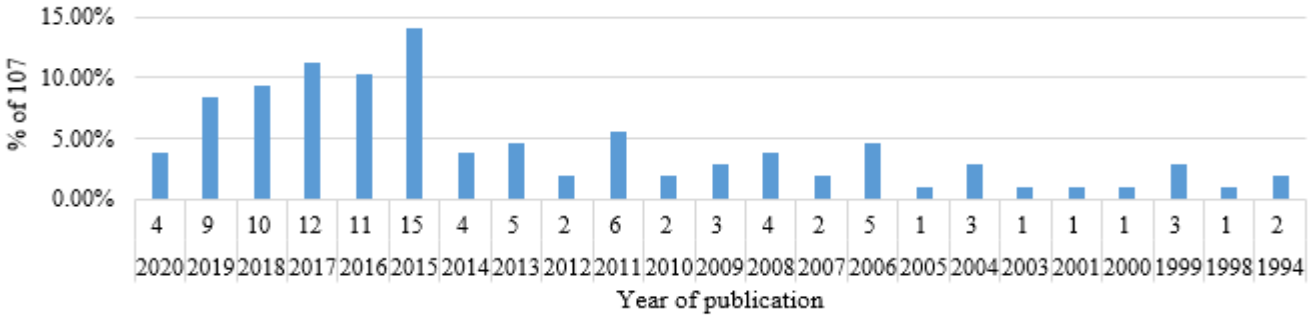

Fig.1. Year of publication
Source: Web of Science.

The analyzed articles include 25 fields of activity, among them are: agronomy, urban studies, veterinary sciences, environmental engineering, business, economics, environmental sciences, geography, and finance. In Figure 2 we have selected the first ten areas of interest for the CAP evaluation research.

As it can be seen, a very large number is covered by fields such as environmental studies (26.17%), economics (21.50%), agriculture (18.69%), ecology (7.48%), which gets a big emphasis in the CAP and on the funds allocated for these sectors of interest

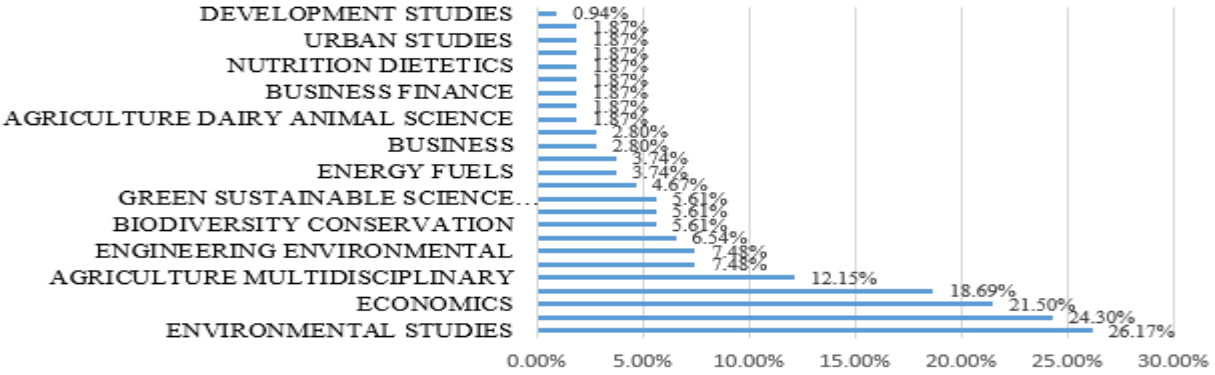

Fig. 2. Web of Science categories
Source: Web of Science.

The analyzed studies also received funding from some funding agencies such as (Fig. 3): European Union (7.48%), National Science Center Poland (1.87%), NERC - Natural Environment Research Council (1.87%), Agricultural and Environment EU Policy (0.94%). The funding received for these research shows the involvement that the EU, national and international institutions [3] have in analyzing the impact of the CAP on the territorial diversity. The desire to get involved in such studies is driven by the desire to improve the distribution of funds and to determine the areas that need the most action.

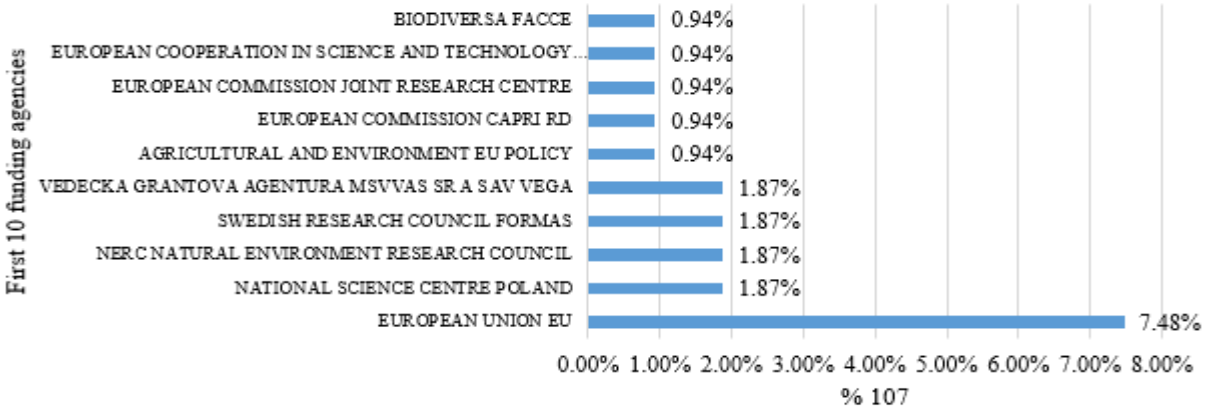

Fig.3. Funding agencies
Source: Web of Science

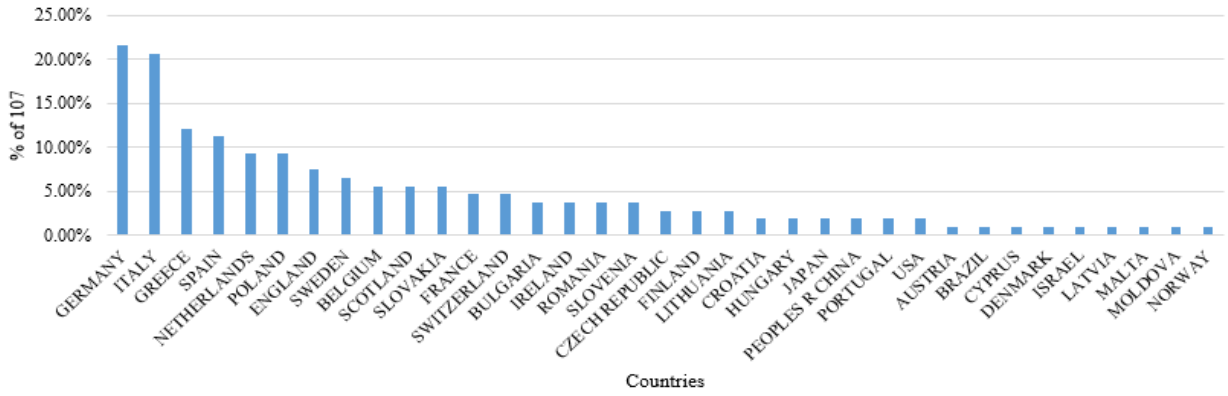

Fig. 4. Articles per countries
Source: Web of Science

The impact analysis and implementation of the CAP was researched by specialists from 36 countries (Fig. 4). The countries most involved in analyzing this impact were: Germany

(21.50%), Italy (20.56%), Spain (11.22%), England (7.48%). In Romania, not much emphasis was placed on the impact

CONCLUSIONS

The present study is based on topic research made on the existent situation on the territorial diversity among rural areas, in accord with the Common Agricultural Policy.

In order to achieve this, we relied on scientific literature and used the Web of Science database collection. In order to search only for the articles that we were interested it, we use some predetermined key-words such us: territorial diversity, CAP, evaluation implementation, policy impact, policy instruments. According to this, we have identified 107 articles that analyze territorial diversity.

The subject is an actual one and the number of articles published in the financial framework 2014-2020, 65 articles, highlights this.

Another part consist in analysis of the areas of interest for the CAP research and a very large number is covered by fields such as environmental studies (26.17%), economics (21.50%), and agriculture multidisciplinary (18.69%).

analysis, registering a percentage of only 3.74%, with a number of only 4 articles for the analyzed topic, hence the need to focus on the impact analysis of the CAP and to act in areas that do not benefit from the necessary investment.

In analyzing CAP implementation by territorial diversity, the countries most involved in the studies where Germany (21.50%), Italy (20.56%), Spain (11.22%), from 36 countries. In case of Romania, we identified only 4 articles (3.74%).

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ISSUES AND TRENDS OF PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT GOALS IN ROMANIA

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Abstract

The paper resumes research on the current dimensions and implications of a sustainable development. Taking in consideration some of the latest theoretical insights and strategic approaches of the European Union for progress towards the Sustainable Development Goals (SDG), a few trends and issues are analysed, also in the particular case of Romania. The close inter-correlation between most of the SDGs is highlighted, since they cannot be all reviewed here. For a more practical purpose, there will be analyses on the required and actual evolution in reducing the Romanian gap of some SDG progress indicators. Monitoring SDG 12 in an EU context focuses on progress made in decoupling environmental impacts from economic growth, in decreasing energy consumption and in tackling waste generation and management. The conclusions refer to conceptual or applied sustainable development insights and policy recommendation for promoting a more sustainable production and consumption pattern in a circular economy.

Key words**:** *sustainable development, goals, environment, resource productivity, circular economy*

INTRODUCTION

The science and the politics of sustainable development have been at the centre of national, regional and global concerns for about three decades. This proves the fact that governments and all significant organizations have progressively realized that there must be assured a dynamic harmony and synergy between the natural environment and the economic, social, and technological development.

Therefore, the idea of the Sustainable Development Goals (SDGs) has quickly gained ground because of the growing urgency of sustainable development for the entire world. Although specific definitions vary, sustainable development embraces the so-called triple bottom line approach to human wellbeing. Almost all the world's societies acknowledge that they aim for a combination of economic development, environmental sustainability, and social inclusion, but the specific objectives differ globally, between and within societies [17].

The sustainable development endeavours have been and are constantly challenged also by more and more frequent or stronger financial or environmental constraints, increasing the need for developing also new conceptual and political approaches such as the green growth and the circular economy.

The most important concerns raised by sustainable development principles, such as: projecting the social-economic development for the actual carrying capacity of ecosystems; decoupling the economic growth from the environmental destruction; preserving in the long-term the general system viability with all its components, have become stringent nowadays, due to the planned transition to a green economy [11].

The sustainable path of development for a modern, efficient and equitable society and economy requires all the countries to adopt the SDGs while investing further in skills, innovation and emerging technologies, helping to drive the transition to greener production and consumption patterns.

As stated in the recent European Union strategic and reflection paper, for the progress towards the SDGs, there should be urgent action dedicated to "stop global warming and the loss of ecosystems and biodiversity, which

are threatening our well-being, the prospects for sustainable growth, and life itself on this planet. While we have the capacity to do so, we do not have the luxury of time" [4].

The main objective of this paper is a conceptual-methodological grounding and analysing of some objectives and policies designed for progress on the Sustainable Development Goals, also for transition to a greener, sustainable economy in the European Union and ultimately in Romania.

MATERIALS AND METHODS

The methods and materials used are based on:

• A literature review of the main issues linked to the SDGs;

•Explanation and definition of the relevant concepts;

•Figures exhibiting the kind and direction of inter-dependence between the SDGs;

•Analysis and synthesis of the strategic Sustainable Development Goals in the European Union;

•Computations, with data indicators and graphics, for a comparative analysis of the trends and dynamics.

RESULTS AND DISCUSSIONS

Conceptual and methodological grounds

The United Nations General Assembly (in September 2015) has urged countries from all the world to adhere to the 2030 Agenda for Sustainable Development (United Nations 2030 Agenda) with its 17 Sustainable Development Goals (SDGs).

It is a statement that world leaders are committed to struggle for the global environment and development, in order to ensure that people can leave in a healthy climate, in peace and prosperity.

Together with the Paris Agreement (on climate change), the SDGs are credited with the path to a superior world and the nexus for global cooperation on the economic, social, environmental and governance issues of sustainable development.

The 17 SDGs may be observed and remembered easily as represented with their symbols in Fig. 1.

Fig. 1. Sustainable Development Goals (SDGs)
Source: [4].

There are four main conceptual elements considered in the SDGs:

(i)The human wellbeing is intimately connected to the health of natural ecosystems;

(ii)Environmental challenges at global scale jeopardise not only development of the poorest, but also the entire prosperity of development in the long run;

(iii)For the global sustainable development, it is most important to tackle or mitigate any inequalities regarding the distribution of development benefits;

(iv)Essential issues to be considered are the sustainable management, maintenance and preserving of the natural capital [19].

Although the SDGs are now stringent and globally acknowledged so were the Millennium Development Goals in the past, driving the policies of sustainable development with important outcomes.

However, there are still many global challenges that have become increasingly pressing, jeopardizing the prospects of environmental, social and economic well-being. For instance, there is a stronger and stronger pressure and constraints on the main natural resources, from fresh water to fertile land, driven by the more and more demanding human activity for economic development.

As signalled by recent studies, the world is developing towards the quick equalling or exceeding its environmental limits. This occurs since between 1900 and 2015, the total consumption of material resources at global scale has increased fourteen times, and the preview is to more than double in the future, by 2050 [6].

Other increasing risks of unsustainable developments are linked to human actions having affected and still threatening the biodiversity and ecosystems; in just 40 years world vertebrate species populations have declined by 60% on average [21].

Unfortunately, the threat is present in all the parts of the world, including the European Union states, where only 23% of species and 16% of habitats are considered to be in good health. This is since the traditional animal-based food has a particularly high land-use footprint [7].

At the same time, due to high energy consumption, to the intensive resources exploitation eventually affecting of ecosystems, there is a rise at a high rate of the global greenhouse gas emissions. In the European Union, the transport is causing about 27% of the total greenhouse gas emissions; numerous cities or urban areas (including Bucharest, the capital of Romania) have exceeded the EU air pollution limits.

Agriculture and especially food production are still significant consumers of water and energy and pollutants, counting for approximately 11.3% of the EU greenhouse gas emissions.

Also, when considering the social pillar represented by sustainable development goals, such as the SDGs1-3, even in the European Union, around 22.5% of the EU population is considered still at risk of poverty or social exclusion and there is quite a high ratio (6.9%) of Europeans suffering severe material deprivation. The impact of the financial crisis 2008-2011 was quite dramatic so it was only in 2017 that income inequality in the EU Member States started to decrease.

This poverty and inequality status has many social consequences, translating into important differences, in the well-being and quality of life, between the regions and EU Member States. There are, for instance, challenges in securing affordable energy for all Europeans, with millions struggling to keep their homes warm [8].

All these challenges are complex and strongly interlinked, meaning that addressing one may have positive implications for others [4].

This is also the reason why the SDGs are more or less inter-correlated in addressing the most important issues of sustainable and healthy economic development. In gaining speed and efficiency in implementing the SDGs, it is very important, in our opinion, to analyse and emphasize the links and correlations that exist within or between them.

There are several recent studies that have tried to demonstrate and to assess the degree of integration of the SDGs, considered as a holistic approach to sustainable development.

Using techniques of network analysis, an early study showed that the SDGs are a more integrated system than the Millennium Development Goals [14].

One interesting way from the viewpoint of this research, is to recognize five groups as represented (Fig. 2):

(i)SDG 1-5 deal with multiple dimensions of poverty (food, income, health, education, gender);

(ii)SDG 6-9 deal with development infrastructure (water, energy);

(iii)SDG 10-12 deal with the fairness-efficiency balance;

(iv)SDG 13-15 deal with ecological infrastructure;

(v)SDG 16 and 17 deal with institutions [20].

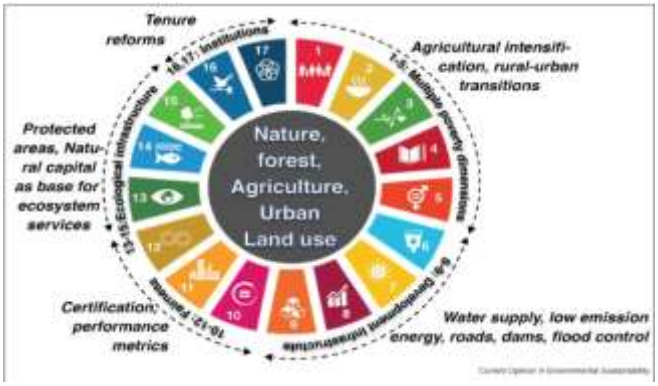

Fig. 2. The main SDG groups nexus
Source: [21].

Links between sustainable development and human development are "mutually reinforcing both on pillars of sustainable development as well as on the idea that SDG conception is based on elemental analysis of human development, while sustainable development is enriched by qualitative elements contained in evaluation of human development" [3].

Another outstanding issue of sustainable development is the need to increase resource-

efficiency, by promoting responsible production and consumption (SDG 12) which is considered as one goal most associated with trade-offs in meeting other SDGs [16].
Research, such as the following in this paper, should always aim to build or integrate links from agricultural or industrial consumption and production to the environment–related SDGs concerned, dealing for instance with food security (SDG 2), water and sanitation (SDG 6), climate change (SDG 13).

Fig. 3. Synergies and trade-offs among the SDGs, with focus on SDG13
Source: [1].

However, although the SDGs articulate a set of aspirations for human development, „their language reflects what was globally acceptable for all countries, without necessarily adequately capturing local perspectives. Individual nations have to translate these aspirations into local and national visions of a development pathway and decide on specific actions towards achieving the goals" [18].
Last but not least, the SDG13 (of the climate action) deserves a lot of attention nowadays since the climate action is essential not only for the sustainable economic development but for the survival of the human societies and civilizations.
At present, climate change is already affecting food systems, while agriculture is among the sectors most dramatically affected by climate change. The impacts on food systems are considered to be widespread, complex, geographically and temporally variable, with a high degree of uncertainty.
A recent study examines SDG 13 and its links to food system actions, with particular attention to agriculture in developing countries. It stresses on the special attention needed to identify and make work all the trade-offs and synergies amongst SDGs (Fig. 3).
The main conclusion is that there must be a transformative approach in food systems to address first the climate change challenge while addressing also some other SDGs. The transformative approach should have elements of technical, political, financial and capacity development character, but also the further impact of the transformative actions must be understood to avoid most negative implications [1].

Progress towards the SDGs in the EU and in Romania

The EU was one of the leading forces behind the United Nations 2030 Agenda and has fully committed itself to its implementation.
It is quite obvious that the European Union project identifies itself with the principles of a sustainable development – the development that meets the needs of present generations without compromising the ability of future generations to meet their needs.
For instance, environmental protection in parallel with economic development, i.e. the main paradigm of sustainable development, is deeply rooted in the European Union environmental law. The EU environmental principles are used in many of government and public authority decisions.
The main EU principles of environmental law are:
(a)The precautionary principle; the precautionary principle allows protective measures to be taken without having to wait until the harm materializes. This principle is valuable in managing risk where there is uncertainty about the environmental impact of an issue.
(b)The prevention principle; this principle requires preventive measures be taken to anticipate and avoid environmental damage before it happens.
(c)The principle that environmental damage should be rectified at source; working

alongside the prevention principle, this ensures damage or pollution is dealt with where it occurs.

(d)The polluter pays principle; according to this principle, the person who causes pollution should bear the costs of the damage caused and any remedy required. It plays a significant role in environmental management, directing accountability for harm.

(e)The integration principle; this principle requires that environmental protection is integrated into all other policy areas, in line with promoting sustainable development [2].

These EU environmental principles work together to ensure high environmental standards by directing how decision-makers should interpret the law.

In the context of sustainable development, the issue of competitiveness has new valences, since the challenge facing the contemporary world, and especially European Union member states, is an even more efficient allocation of available resources to ensure they bring the best possible result, not only in the sense of increasing GDP but also in terms of raising the standard of living for all citizens [15].

Thus, the reflection paper "Towards a Sustainable Europe by 2030", stresses some competitive advantages of the EU enabling the leadership role model for others. They correspond to the sustainable development goals as referring to the:

-high social, health and environmental standards;

-considerable investment in research and innovation;

-strong welfare systems.

According to the latest monitoring report and as suggested by the overview figure (Fig.4), it is considered that the EU has made good progress especially in the SDGs represented at the top of Figure 4; this part is characterized by significant progress towards the goals.

This improvement refers to gains in both actual and perceived health (SDG 3), reductions in certain dimensions of poverty and social exclusion (SDG 1), and increases in the quality of life in cities and communities (SDG 11). It may be observed in the Figure 4 that all these synergistically linked SDGs are placed in the top, close to each other.

As translated in the specific indicators, the progress means that both life expectancy and self-perceived health continued to grow in the EU, while European people seem to move towards healthier lifestyles. At the same time, severe material deprivation and low work intensity rates kept falling, so more citizens became able to fulfil their basic needs.

Fig. 4. Overview of the EU-28 progress towards the SDGs over the past 5 years
Source: [9].

It should be noted here also the particular situation in the case of Romania, as EU member state. Romania is making some progress towards achieving the United Nations' Sustainable Development Goals (SDGs). There are a few specific SDGs where Romania's progress is more evident, according to a recent report, during the last five years [5]. These Sustainable Development Goals are mainly the following:

-SDG 17 "Partnership for the goals", since all its associated indicators show improving performance";

-Good progress performances are found for SDG 1 "No poverty" and SDG 13 "Climate action".

However, it should be acknowledged from the start that current levels for some of these indicators in Romania are still significantly lower than the EU average, such as:
-SDG 4 "Quality education", with all indicators below the EU average;
-SDG 1 "No poverty";
-SDG 3 "Good health and well-being".
In the last five years (2015-2019), there was economic improvement in the European Union, due to a constant economic growth (of the EU's GDP). This economic development progress seems to have been fostered by the rise of investment and employment (monitored by the indicators of SDG 8 'Decent work and economic growth').
However, the EU economic growth was not always followed by good, welcome developments in using natural resources and in impacting the environment, as noticed from the lower, or downside positions of the SDG 7, SDG 12, SDG 13 and SDG 15 in the progress overview (Fg. 4).
Since having some research work and outcomes on the necessity and relevance of increasing resource efficiency on sustainable economic development, it is important to focus on the assessment of SDG 12 "Responsible consumption and production", with its issues in the EU and in Romania, as based on own calculations and analyses from the recent data on the most relevant indicators.
A decoupling of the resource use and of the environmental impacts from the economic development involves a rise of the resource efficiency in all economic sectors. The "gains in resource efficiency, measured by the resource-productivity indicator, underpin all the valuable ideal concepts of economy and development: sustainable development, the green economy and the circular economy, and the strategies dedicated to their objectives". [12].
As compared with last year, the SDG 12 "Responsible consumption and production" shows moderate progress while for the consumption of energy and material there was a relative decoupling from economic growth.
Previous research showed that, in Romania, a downward Resource Productivity (RP) trend was registered in 2000-2012, simultaneously with an upward trend of the RP in the European Union, increasing the resource productivity gap compared to the EU average. So far we had not managed to get closer to the goal of National Sustainable Development Horizon 2020: reaching the current average level of EU countries, for the main indicators of sustainable development [13].
Other research also stated that "increasing resource efficiency, namely the resource productivity of the European Union by 15-30% was essential to deliver the resource efficiency agenda established under the Europe 2020 Strategy for a smart, sustainable and inclusive growth" [11].

Table 1. Indicators of progress assessment towards the SDG 12 "Responsible consumption and production", in Romania and in the EU

SDG / Sub-theme	Indicator	Unit	Romania				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 12 - Responsible consumption and production										
Decoupling environmental impacts from economic growth	Consumption of toxic chemicals	million tonnes	N/A	:	N/A	:	2013	390.3	2018	310.9
	Resource productivity	EUR per kg, chain-linked volumes (2010)	2010	0.58	2018	0.49	2010	1.88	2018	2.04
	Average CO2 emissions per km from new passenger cars	g CO_2 per km	2010	132.1	2018	121.5	2014	123.4	2018	120.4
	Energy productivity	EUR per kgoe	2010	4.2	2018	5.1	2013	7.9	2018	8.5
Energy consumption	Primary energy consumption	million tonnes of oil equivalent (Mtoe)	2010	38.4	2018	32.5	2013	1 577.4	2018	1 551.9
	Final energy consumption	million tonnes of oil equivalent (Mtoe)	2010	27.8	2018	25.5	2013	1 116.5	2018	1 124.1
	Share of renewable energy in gross final energy consumption	%	2010	23.9	2018	23.9	2013	15.4	2018	18.0
Waste generation and management	Circular material use rate	% of material input for domestic use	2012	2.6	2017	1.8	2012	11.5	2017	11.7
	Generation of waste excluding major mineral wastes	kg per capita	2012	1 162	2016	1 084	2012	1 716	2016	1 772
	Recycling rate of waste excluding major mineral wastes	% of total waste treated	2012	26	2016	38	2012	55	2016	57

Source: Extracted from Table E.1, in [5].

However, the progress report and own analysis based on the data in Table 1 shows that recent increases in the EU's resource and energy productivity are mainly a result of strong GDP growth and do not actually reflect significant more sustainable consumption patterns of natural resources.
As for Romania, there is even a larger scope of reform and of progress required in this respect, since the previously mentioned considerable gap (of 70% from the EU average) in the Resource productivity, has been perpetuated. Nevertheless, as regards the Energy

productivity, the growth rate was a bit larger in Romania (21%) than the EU-28 average (12%), leading to a slight decrease (of about 5%) in the gap of Romania's energy productivity from the EU average.

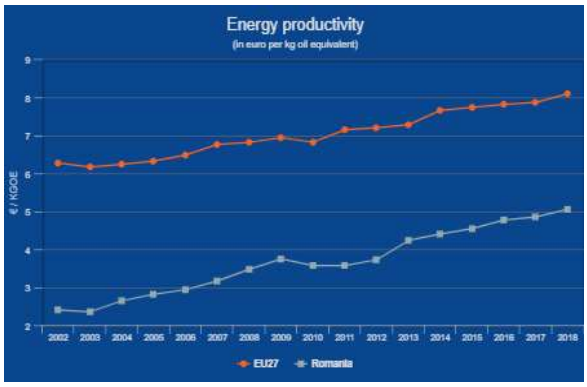

Fig. 5. Progress of the energy productivity, in Romania and the EU
Source: Eurostat [10].

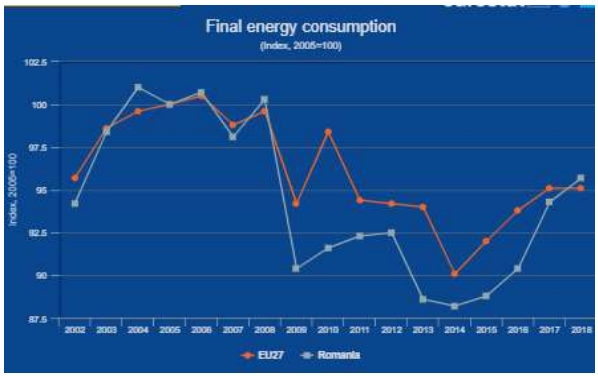

Fig. 6. Evolution of the final energy consumption, in Romania and the EU (Index, 2005=100)
Source: Eurostat [14].

On the other hand, maybe the most negative issue of progress is the increase, in Romania and in the EU, of both the Primary and Final energy consumption, this signifying a remote from the EU target of 20 % higher energy consumption efficiency by 2020 (Fig. 6).
Furthermore, the decline in CO_2 emissions from new passenger cars has slowed down recently in the EU (2.5%), but in Romania the decline was slightly higher (8%), converging to the current EU average level of CO_2 emissions from new passenger cars (120 g CO_2 per km). This Romanian progress is on the track but not sufficient since the EU target for this SDG12 and SDG13 indicator is to have emissions ≤ 95 g CO2 in 2021.
Considering the links and the synergies of the SDGs, it should be mentioned here that this indicator, together with the 23.4% Share of renewable energy in gross final energy consumption (higher than the 20% EU 2020 target) is also a factor of progress towards the SDG13 'Climate action' in Romania. Another matter of concern, in the progress towards the SDG12 at the EU level is that despite the increases in circular material use and recycling, the total waste generation (excluding mineral wastes) continued to grow in the EU [9]. However, the situation is quite reverse in Romania, where, in the analysed period years (2012-2016) there was a slight decrease (of about 6%) in the total waste generation (excluding mineral wastes), but, on the other hand, the recycling rate of waste is still too low, although increasing (30% in 2016, in Romania) as compared to 57% in the EU.

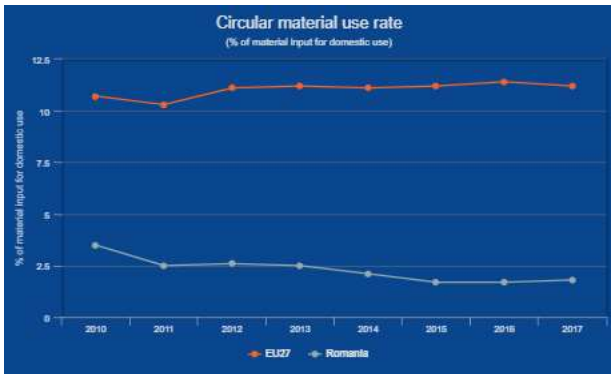

Fig. 7. Progress of the circular material use rate, in Romania and the EU, 2010-2017
Source: Eurostat [14].

One of the most serious factors of concern is the lack of progress in the circular material use rate, especially in Romania, where it was already very low but it decreased, from 2012 to 2017 from 2.6% to 1.8% of the material input for domestic use, while in the EU the circular material use rate slightly grew from 11.5% to 11.7% (Fig. 7). Unfortunately, this trend shows that the resource efficiency outcomes are still poor in Romania and there is still a long way towards the green economy required for sustainable production and consumption paths.

CONCLUSIONS

There are 17 Sustainable Development Goals (SDGs) and their related targets, which represent the core of the UN's 2030 Agenda for Sustainable Development. The SDGs aim to

provide a new policy framework worldwide towards some generally agreed objectives such as: fighting inequalities and all the forms of poverty, while at the same time tackling climate change.

In this paper it was first highlighted the context of the SDGs where the European Union has an advanced starting position and also competitive advantages in promoting the socio-economic and environmentally sustainable development. Politically, the EU is committed to stand as a striker for implementing the UN's 2030 Agenda, even in difficult times of global crisis, mobilizing the member countries in keeping a Green Deal.

There is a brief analysis and evidence of general EU progress towards almost all the SDGs in this paper. However, in some goals it has been more obvious or significant, while in some cases (within goals), there may be also skids from the sustainable development objectives.

The research also focuses on the situation of Romania, (as an EU member state having some national targets) and the more sensitive issue of mixed progress, regarding the sustainable consumption and production patterns or the SDG 12. Here, resource efficiency and circular economy actions aim to decouple economic growth from resource use and environmental degradation.

The analyses in this paper, based on the main indicators monitoring progress towards the SDG12 show that, in the case of Romania, the lagging behind in the Resource productivity (signalled in previous own research on this topic) still holds although there is some convergence in the energy productivity.

As a reaction to many natural capital challenges, the EU has enforced strong environmental legislative approaches and also other policies especially designed to promote sustainable production and consumption.

Progress towards SDG 12 needs an adoption of good practices such as: sustainability reporting by the companies; promotion of sustainable procurement; environmentally friendly lifestyles of the people; further research & development in technologies and production and consumption methods.

Increasing resource productivity, on a feasible target agreed by the EU Member States would draw more political attention and unleash the currently still understated potential of a greener, circular economy to create sustainable growth and jobs.

For Romania there is progress especially in the field of reducing the total waste generation (excluding mineral wastes), but the recycling rate of waste and particularly the circular material use rate are still too low, indicating a quite unsustainable pattern of production and consumption.

Therefore, new efforts, policies and initiatives of eco-innovation are needed and welcome in Romania, especially those promoting the circular and green economy.

In this respect, in view of a sustainable economic development and in difficult times of economic crisis there is a strong recommendation for implementing business models of industrial symbiosis, able to save all kind of natural, human and financial resources, in the middle and long run.

This may be achieved by setting up symbiotic partnerships between companies from various industries, through which wastes/by-products resulted from the activity of one unit become resources for another activity, thus reducing raw material consumption, the amount of waste generated and the associated negative impact on the environment while promoting economic growth, hence fostering the regional and national sustainable development.

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ECONOMIC RESULTS FROM THE APPLICATION OF FOLIAR TREATMENTS FOLUR, AMALGEROL AND LITHOVIT ON RICE PRODUCTION

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Abstract

One of the economically significant issues that accompany rice production is the increase of productivity through foliar treatments. The aim of the study is to evaluate the economic results from the application of foliar treatment in the production of 6 cultivars of rice - Bulgarian and introduced ones. The level of cost of rice production for 96 commonly tested variants has been established, including for 72 variants to which Folur, Amalgerol and Lithovit leaf treatments were applied. Performance indicators, cost-effectiveness thresholds and the factors that determine them are analyzed. All variants of paddy rice production, using foliar treatments have been found to provide positive economic benefits. Sufficient profit per unit area and profitability in the range of 10 to 18.40% was realized. The critical yield of production for them is 40-55% of the actual production per unit area.

Key words**:** *productivity, economic results, foliar treatment, rice*

INTRODUCTION

One of the key prerequisites for obtaining high and durable rice yields is the achievement of a balanced nutrition, appropriate irrigation regime and plant protection while implementing the technology used for its cultivation [2, 3, 7, 9, 10, 12]. In this regard, one of the economically significant problems which accompanies rice production is the possibility of enhancing the productive capacity of the plant through foliar treatment, which could replace some of the high expenses involved in growing and producing this crucial food crop [5, 6, 8]. The selection of the most appropriate foliar preparations, according to the conditions and technology of cultivation, leads to stable yields and, consequently, to high economic efficiency of produce [1, 4, 5].

Apart from high yields of supreme quality, the choice of rice cultivation technology should also take into account the level of production costs [3, 4]. Currently, one of the major problems in the production of this crop is the low yields during less favourable, in terms of climate, years and also labor productivity against the background of rising costs which are clearly technological by nature. They affect, on the one hand, the impact of factors such as irrigation, fertilization, weed control, mechanization, etc., and on the other, the economy and the management of the production processes.

The purpose of this research is to provide a summary assessment of the economic results of the application of the foliar treatment preparations Folur, Amalgerol and Lithovit and to establish their relationship with the yield in all experimental variants.

The accomplishment of the so-defined target will pass through the following four interrelated **tasks**:

1.Building of a set of economic tools for developing and evaluating the technological and economic calculations.

2.Accurate accounting of the production costs by constituents and by technological units.

3.Division of costs into fixed and variable ones on the basis of carefully selected evaluation criteria.

4.Determination of the critical level of average yield and cost-effectiveness of the rice production.

MATERIALS AND METHODS

Methodical lay-out of the experiment

During the period 2013-2015, in the land area of the town of Saedinenie, in a permanent rice cell was carried a two-factor field experiment on the method of fractional plots in four repetitions. The large plots accommodate the grades of factor A (variants) and the small ones - the grades of factor B (foliar preparations). When combining the two factors, 24 variations are derived. Each variant has a total area of 14.85 m^2 and a harvest area of 10 m^2. The agrotechnical activities have been carried out in accordance with the conventional technologies for rice cultivation.

Methodological and methodical issues and peculiarities in determining the amount of production costs for the cultivation of rice (paddy).

In the present study, ***the technological map*** was adopted as the fundamental, primary document in which the whole technology of the crop cultivation was developed and recorded, from the preparation of the areas for its sowing through the care during the growing season to the harvesting of the finished products. It reflects the main normative factors which influence the amount of production costs. The technological map sets out all those production and economic parameters which reflect the maximum manifestation of the biological potential of the rice crop and the potential opportunities of the technology applied for its cultivation [2, 3].

The economic part of the technological map reflects the physical and the value volume of all the necessary material and labor expenses for the cultivation and harvesting of rice. In essence, these are the direct variable costs which depend on production volume and can be managed and "dosed".

The expenses for raw and other materials (seeds, fertilizers, preparations, irrigation water, fuels and lubricants, electricity, etc.) are calculated on the basis of their amount and unit cost, on average for the period 2013-2019. The raw and other materials from own production, which are involved in the domestic turnover, are valued on the principle of *alternative costs*, ie. at the current market prices for them.

Labor costs are established on the basis of the required number of norms and normshifts, for the implementation of the agro-technical activities and the tariff rate for the respective type of work. In the case of the mechanized works, the relevant vocational class-qualification of the sub-contractor, mechanic, was also taken into account.

The expenses of the mechanized activities (plowing, cultivating, harrowing, transporting, fertilizing, spraying, harvesting, etc.) incurred by rented machines, are calculated in the total cost of the value of the service actually paid. In the present study, in view of the current economic conditions, a new manner of reflecting machinery and transport works is adopted - as services.

Costs of manual labor, surcharges, mechanical, tractor and transportation costs are calculated on the basis of the estimates for them valid for the Agricultural University - Plovdiv and are equal to the actual labor remuneration.

The methodological notes outlined above concern the direct production costs which are fundamental to the production of rice.

The full cost per unit area is obtained by adding other additional costs, such as: insurance, interest on loans, security, management, unforeseen costs, land rent, taxes, fees, property maintenance costs, to the direct production costs.

In practice, the insurance per decare generally widely varies. This research uses averaged rice insurance of 3.40 BGN/da.

Interest, management and contingency costs are calculated as a percentage of the direct production costs, at 8%, 7% and 2%, respectively.

The finished production - rice (paddy), is valued at the average market price for the period 2013-2019.

Separation of costs into fixed and variable

The plan for the estimation of the production costs and their differentiation into Fixed (FC) and Variable (VC) includes the following more important **criteria**: management options, relation to changes in the production volume, relation to the ownership of the basic assets, duration of use, timing of performance, behavior in unit production, correlation possibilities.

Methodological toolkit for establishing the critical yield levels and the economic performance thresholds of efficiency within the variants of the experiment

The determination of the critical yield levels and the efficiency thresholds for rice production is made using a system of indicators [2, 3] as follows: Value of production costs - total, BGN/da; Value of fixed costs - total, BGN/da; Variable costs value - total, BGN/da; Average yield - by technology, kg/da; Cost of marketing, BGN/kg; Variable costs per unit of output, BGN/kg; Critical average yield level, kg/da; Value of total production, BGN/da; Net income of 1 da, BGN/da; Cost of production, BGN/kg; Rate of profitability, %.

The total production is valued at the market prices of the paddy rice for the period 2013 – 2019.

In the system of indicators for the economic efficiency of rice production, the Rate of profitability based on production costs is adopted as the main summary indicator. We believe that when measuring the effectiveness of a particular crop, such as rice, this indicator is sufficiently accurate and reliable.

The other indicators such as average yield, total production, cost and net income per unit area, are used as additional analytical indicators for measuring and 249nalysing the efficiency of rice production.

The efficiency thresholds, expressed by the critical level of average yield, for the individual variants, are calculated as the ratio of the total fixed cost per unit area to the difference between the average selling price and the variable production unit cost by the formula:

$$Q_{BEP} = \frac{FC}{p - VC_1},$$

where:

Q_{BEP} – critical level of average yield;

FC – total fixed cost;

p – average cost of marketing

VC_1 – variable cost per unit of output.

The critical level of average yield (BEP-break-even-point) determines at what volume of yield the rice production ends without profit and without loss (i.e. at "zero"), after which each kilogram of production, above the critical yield, begins to make a profit.

RESULTS AND DISCUSSIONS

The productive capacity of the rice is largely determined by the meteorological conditions of the year, with the flowering period being of particular importance to the crop. The lack of rainfall during this period, which is August (2013), creates favourable conditions for achieving good yields that same year. Subsequent years are defined as unfavourable and this accordingly reflects on the average yields obtained during the experiment period.

Table 1. Effect of the year, cultivars and foliar treatment on paddy yield, kg/ da

Factor (A) Year	Analysis of variance of the effect of the factor on the paddy yield		
	kg/da	Evidence	%
2013	1,112.6	A	100
2014	819	B	73.6
2015	750	C	67.4

Factor (B) Cultivars	Analysis of variance of the effect of the factor on the paddy yield		
	kg/da	Evidence	%
Osmanchik97	879.2	a	100
Gala	878.9	a	99.9
Linche	862.1	a	98.1
Kameo	954.5	a	108.6
Puma	839.5	a	95.5
Brio	949.1	a	108

Factor © Preparation	Analysis of variance of the effect of the factor on the paddy yield		
	kg/da	Evidence	%
Control	846	b	100
Folur	887	ab	101.3
Amalgerol	942	a	111.3
Lithovit	898.9	ab	102.5

Source: [11].

There were no proven differences in yield between the variants tested. In the three years of the study, they achieved productivity between 839.5 kg/ da of the Puma and 949 kg of the Brio one (Table 1).

However, proven differences were noted in the treatment with different preparations.

The main results of the economic evaluation of the foliar treatments tested for the cultivation of rice (paddy) are summarized in Tables 2, 3 and 4.

Table 2. Operating production costs for the cultivation of Rice (paddy) according to variants, in BGN/da

Types of expenses	**Controls**	**Variant 1 Folur**	**Variant 2 Amalgerol**	**Variant 3 Lithovit**
Labor costs - total	**12.51**	**12.51**	**12.51**	**12.51**
Incl. 1. Permanently employed	11.45	11.45	11.45	11.45
2. Temporarily hired	0.55	0.55	0.55	0.55
Material costs - total	**331.99**	**353.39**	**345.39**	**341.89**
Incl. 1. Seeds	37.05	37.05	37.05	37.05
2. Fertilizers	37.05	37.05	37.05	37.05
3. Plant protection products	34.71	34.71	34.71	34.71
4. Leaf treatment preparations	-	21.4	13.20	9.9
- Folur 2 liters/ da	-	21.4	-	-
- Amalgerol 1.2 l/ da	-	-	13.2	-
- Lithovit 0.300 kg/ da	-	-	-	9,90
5. Water	62.50	62.50	62.50	62.50
6. Mechanized services	126.01	126.01	126.01	126.01
- basic urea fertilization	4.27	4.27	4.27	4.27
- plowing	18.51	18.51	18.51	18.51
- discing	7.19	7.19	7.19	7.19
- current leveling	4.61	4.61	4.61	4.61
- pre-sowing fertilization with carbamide	4.27	4.27	4.27	4.27
- chiseling with harrowing	7.40	7.40	7.40	7.40
- transportation of seeds	0.10	0.10	0.10	0.10
- sowing	6.95	6.95	6.95	6.95
- spraying with herbicides	2.24	2.24	2.24	2.24
- water transportation and solution	2.51	2.51	2.51	2.51
- nourishment	4.64	4.64	4.64	4.64
- corrective spraying with herbicides	4.64	4.64	4.64	4.64
- dehulling sector 20%	23.11	23.11	23.11	23.11
- harvest with a combine harvester	27.76	27.76	27.76	27.76
- loading a vehicle with a crane loader	0.38	0.38	0.38	0.38
- transportation of arpa	1.31	1.31	1.31	1.31
- transportation to a purchase center	1.48	1.48	1.48	1.48
- drying in a grain dryer	4.64	4.64	4.64	4.64
Costs Total	**344.50**	**365.90**	**357.90**	**354.40**

Source: The economic indicators are calculated on the basis of current market prices for Bulgaria on average for the period 2013-2019.

The size and structure of production costs by items vary within a relatively narrow range for all variants of the experiment (Table 2). A minor exception are the Controls and Variant 3, which differ from the others in terms of both total production costs and cost per item. At the Controls foliar treatments are not applied, and in Variant 3, the cost of the Lithovit and the amount of its application are the lowest. This is what influences the amount of material costs as well as the value of the direct production costs. The data in Table 2 show that the amount of these costs is, respectively, by 4 to 7% lower than that of Variants 1 and 2.

The main factors which influence the amount of the costs are: the chosen technological option and the volume of the finished production. The larger the latter, the greater the machinery and transport costs associated with the harvest. The technological and economic calculations made in Table 2 reveal that the highest production cost is accounted in the variants in which the Folur and Amalgerol preparations are used. They have total material costs of 353.39 BGN/da and 345.39 BGN/da, respectively, and the value of the total maintenance amounts to 365.90 BGN/da and 357.90 BGN/da respectively.

Table 3. Amount and structure of fixed and variable costs of Rice cultivation (paddy) in BGN/da

Types of expenses	**Controls**	**Variant 1 Folur**	**Variant 2 Amalgerol**	**Variant 3 Lithovit**
Fixed costs – Total	**46.16**	**46.16**	**46.16**	**46.16**
1. Salaries of permanent employees	11.45	**12.51**	**12.51**	**12.51**
2. Land rent	34.71	11.45	11.45	11.45
Variable cost – Total	**298.34**	**319.74**	**311.74**	**308.24**
1. Temporarily hired	0.55	0.55	0.55	0.55
2. Seeds	37.05	37.05	37.05	37.05
3. Fertilizers	37.05	37.05	37.05	37.05
4. Plant protection products	34.71	34.71	34.71	34.71
5. Leaf treatment preparations	-	21.4	13.20	9.9
- Folur 2 liters/ da	-	21.4	-	-
- Amalgerol 1.2 l/ da	-	-	13.2	-
- Lithovit 0.300 kg/ da	-	-	-	9.9
6. Water	62.50	62.50	62.50	62.50
7. Other expenses	126.01	126.01	126.01	126.01
- basic fertilization with phosphorus	4.27	4.27	4.27	4.27
- plowing 23-25	18.51	18.51	18.51	18.51
- discing	7.19	7.19	7.19	7.19
- current leveling	4.61	4.61	4.61	4.61
- pre-sowing fertilization with carbamide	4.27	4.27	4.27	4.27
- chiseling with harrowing	7.40	7.40	7.40	7.40
- transportation of seeds	0.10	0.10	0.10	0.10
- sowing	6.95	6.95	6.95	6.95
- spraying with herbicides	2.24	2.24	2.24	2.24
- water transportation and solution	2.51	2.51	2.51	2.51
- nourishment	4.64	4.64	4.64	4.64
- corrective spraying with herbicides	4.64	4.64	4.64	4.64
- dehulling sector 20%	23.11	23.11	23.11	23.11
- harvest with a combine harvester	27.76	27.76	27.76	27.76
- loading a vehicle with a crane loader	0.38	0.38	0.38	0.38
- transportation of paddy yields	1.31	1.31	1.31	1.31
- transportation to a purchase center	1.48	1.48	1.48	1.48
- drying in a grain dryer	4.64	4.64	4.64	4.64
Costs Total	**344.50**	**365.90**	**357.90**	**354.40**

Source: The economic indicators are calculated on the basis of current market prices for Bulgaria on average for the period 2013-2019.

In Table 3, the production costs of rice cultivation are grouped into two other large groups - Fixed and Variable. The aim is that they can be used to calculate the key economic indicators and performance thresholds for the developed experiment. In this connection, the average rice yields by variants are also indicated. The structure of total production costs is dominated by the variable costs. In the individual variants, they range from 298.34 BGN/da at the Controls to 319.74 BGN/da at the use of the preparation Folur. The fixed costs amount to 46.16 BGN/da for all variants. This cost structure is typical of crops with a high degree of mechanization of production processes, such as rice. At the expenses thus incurred, the highest average yields are provided by the variants with the application of the foliar treatment preparations - Amalgerol - 941.83 kg/ da and Lithovit - 897.66 kg/da, followed by Folur - 893.50 kg/da. The lowest average yield is provided by the Controls variant - 842.83 kg/da, which does not use foliar treatment.

It is noteworthy that the largest increase in the total production costs - 6.21%, which is between the Controls and Variant 1 (with the application of Folur), caused almost the same increase in the average yield between them. For the other variants, this increase is more significant, and for the variant with the application of Amalgerol, it is almost two times greater. In other words, the rate of increase of additional production per unit area exceeds twice the rate of the investments made. This positive trend, though less so, is also noticeable in the other variations. In absolute value, their yields increased by 50-55 kg/ da compared to the control.

The amount of the production costs and the level of average yields are the main factors which influence the economic efficiency of rice production (paddy) in the different variants of the experiment hereby developed (Table 4).

Table 4. Economic parameters for determining the critical level of average yield and the efficiency of Rice production (paddy)

	Indicators	**Measure**	**Controls**	**Variant 1 Folur**	**Variant 2 Amalgerol**	**Variant 3 Lithovit**
1.	Production costs - total	BGN/da	344.5	365.9	357.9	354.4
2.	Fixed costs per 1 decare	BGN/da	46.16	46.16	46.16	46.16
3.	Variable cost per 1 decare	BGN/da	298.34	319.74	311.74	308.24
4.	Average yield by technology	kg/da	842.83	893.5	941.83	897.66
5.	Cost of marketing	BGN/kg	0.45	0.45	0.45	0.45
6.	Variable costs in unit of output	BGN/kg	0.35	0.36	0.33	0.34
7.	Critical level of average yield	kg/da	461.6	512.89	384.67	419.63
8.	Value of total output	BGN/da	379.27	402.08	423.82	403.95
9.	Net income per 1 decare	BGN/da	34.77	36.18	65.92	49.55
10.	Cost of production	BGN/kg	0,41	0.41	0.38	0.39
11.	Rate of profitability	%	10.09	9.89	18.4	13.98

Source: The economic indicators are calculated on the basis of current market prices for Bulgaria on average for the period 2013-2019.

The information in Table 4 show that, in accordance with the size of production costs and the level of average yield, the lowest cost efficiency is at Variant 1 followed by the Controls. The low level of yield at the Controls, and the relatively high cost of production, are the reason for the unsatisfactory value of the total production of BGN 379.27 BGN/decare. For Variant 1, the high impact on production costs reflected negatively on the efficiency, which increased the level of variable costs per unit of output and the cost of production. The latter is the highest at Variant 1 and at the Controls, which is why these variations show
the lowest levels of profit margin per unit area and a rate of return of 9.89% - 10.09%.

Although with relatively high production costs, Variant 3 provides a sufficient level of average yield (897.66 kg/da), so that the resulting production has a sufficiently low cost (0.39 BGN/kg), compared to the cost of marketing of the paddy (0.45 BGN/kg). This provides a profit margin of BGN 49.55 BGN/da, and the profitability rate of 13.98% is sufficient for its extended reproduction.

Variant 2 is distinguished with the highest economic efficiency, in which the cost of production is the lowest - 0.38 BGN/kg, the rate of profitability is 18.40%, and the net income per unit area is 65.92 BGN/da.

CONCLUSIONS

The results of the study give rise to the following important conclusions:

The use of foliar treatment preparations for rice production is only economically feasible when it leads to outstripping rate of revenue increment, resulting in a total revenue which is higher or, at least equal, to the variable costs.

All variants at which foliar treatment is applied provide positive economic results from the production of rice (paddy), a sufficient profit margin per unit area and a profitability of between 10 and 18.40%. The critical level of

yield for them is 40-55% of the actual production per unit area.

The efficiency thresholds indicated, in all variants using foliar treatments, ensure good competitiveness of the rice, sufficient profitability per unit area and a rate of return allowing for reinvestment in the production.

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THE COMPETITIVENESS OF RABBIT MEAT PRODUCED IN REPUBLIC OF MOLDOVA

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Abstract

The notion of competitiveness is very complex and there is no a unique notion regarding competitiveness. This notion is very discussed in both in the business environment and in the scientific environment. It is the foundation of the economic power of the enterprise, which need to be capable to identify the changes of the business environment, in order to adapt more quickly to the changes, thus elaborating the competitiveness strategy of the company. The producers of rabbit meat from the Republic of Moldova are facing many problems which negatively influence the competitiveness of the production of rabbit meat, which is considered a delicacy, becoming more and more popular, because it doesn't contain cholesterol, has a high digestibility and is rich in essential amino acids. The purpose of this scientific research is to analyse the competitiveness of rabbit meat produced in Republic of Moldova, to determine the strong and weak points the producers of rabbit meat are facing, to analyse the food safety of rabbit meat which is traded, to determine the main markets of rabbit meat and to propose solutions for increasing competitiveness of rabbit meat from the Republic of Moldova.

Key words**:** *competitiveness, rabbit meat, food safety, markets*

INTRODUCTION

In our daily life is very important what we eat. Food has a vital importance in our lives. It is necessary for growth, working, including our maintenance and reproduction. On average, a person consumes 30 tons of food during his lifetime, under different diet versions that vary locally, nationally and internationally. Generally speaking, they are a mixture of chemicals, which can be divided into four broad categories: nutrients, natural toxins, contaminants and additives. A food is safe when its consumption does not alter or affect the health of the consumer [1] .

Rabbit meat is considered a delicacy, becoming more and more desired, being considered a delicacy because it does not contain cholesterol has a high degree of digestibility and is rich in essential amino acids[4]. It has no fat and in addition it has healing properties for cancer patients. In addition, rabbit meat is a light meat, tasty and distinguished from other types of meat. It has a lower fat percentage than chicken, turkey, beef or pork. It is dietary and healthy, because it has very low cholesterol content and is recommended by many nutritionists [3, 14].

In Republic of Moldova, rabbits are grown mostly in domestic conditions, by small farmers.

The local farmers does not cover the local demand of rabbit meat because they grow hard, get sick quickly and the subsidies granted for their growth is the lowest compared to other domains.

A special attention must be directed to the quality of the rabbit meat in order to ensure the food safety. The concept of food safety does not have a universally accepted definition. Food safety can be defined as all activities that ensure that food does not cause any health problems for the consumer. This simple definition covers a wide variety of activities ranging from basic ones such as personnel hygiene to the most complex technical procedures for removing contaminants from the technological process or from ready-to-eat foods and ingredients [15]. It is considered that food safety is the main aspect when it comes to the production and marketing of food. Those

involved in the food chain but mainly the producers are responsible for ensuring it.
Thus for increasing the competitiveness of rabbit meat produced in Republic of Moldova, it is necessary to create conditions for growing rabbits not only domestically, under house conditions, but also at the level of enterprises, to support the farmers by organizing different round tables, meetings with experts which will share their experience regarding growing of rabbits, to review the subsidy regulations in order to increase the attractiveness of this domain for the young generation.
The purpose of this scientific investigation is to analyze the problems of the producers of the rabbit meat produced in Moldova and to identify solutions; to analyze the competitiveness of the rabbit meat produced in the Republic of Moldova and the factors which influence this indicator; to analyze the main markets and the quality of rabbit meat sold at these markets in order to ensure the food safety.

MATERIALS AND METHODS

The scientific research was performed based on the data from:
-The Food and Agriculture Organization of the United Nations;
-The National Bureau of Statistics of the Republic of Moldova;
-Other economic sources concerning the competitiveness of agricultural production.
As research methods were used: analysis, deduction, comparative method, graphical method.
In the same time, the researches were performed in the microbiology and immunology laboratory of the Faculty of Veterinary Medicine, Department - Clinic 2.
As a research material was used rabbit meat commercialized in the Chisinau at the Central Square, at the supermarket and house rabbit meat.
For this purpose, the superficial and in-depth microflora of these 3 categories of rabbit meat and liver portions were studied. The classical microbiological methods of the laboratory conduct were used for the investigation of the microflora of the food products: bacterioscopic method and bacteriological method.

RESULTS AND DISCUSSIONS

Growing rabbits is a very efficient business, because it has the following advantages:
-The period of growth is very short and gives possibility to obtain dietary quality meat and other sub products;
-Low expenses for starting the business and reduced spaces for maintenance;
-Furs which can be used in light industry;
-Obtaining of manure which can be used as organic fertilizer to increase the soil fertility;
-The business can be started in low sizes and to be extended after a period of time;
-The business can be managed by the members of a family.
Although exists a lot of advantages of growing rabbits, the local farmers from the Republic of Moldova say that rabbits grow very slowly, the subsidies for growing rabbits are the smallest one, rabbits are very sensible and get sick very quickly and the medicines for their treatment are expensive. The local producers of rabbit meat affirm that in Republic of Moldova, doesn't exist a culture of consumption rabbit meat. Moldovans consume rabbit meat especially at weddings, christenings and Easter Holidays.

Table 1.The Global production trend of rabbit meat during 2015-2017, thousand tons

Years / Country	2015	2016	2017
China	815.17	855.31	931.83
North Korea	160.51	172.68	154
Spain	54.08	59.59	57.26
Egypt	64.95	61.65	56.13
Italy	55	51.18	46.53
France	52.13	48.4	44.02
Germany	39.82	41.02	42.35
…	…	…	…
Russia	17.37	18.19	18.88
Ukraine	13.30	12.20	12.20
…	…	…	…
Moldova	**1.28**	**1.14**	**0.872**

Source: elaborated by the authors based on the data from:www.tridge.com/markets/rabbit-meat-MD; www.fao.org.

Analyzing the data from Table 1 we can reveal that the leader in producing rabbit meat in the

World is China, which produced in 2017, 931.38 Ktons (62.9% from Global production of rabbit meat), being followed by North Korea with 154 Ktons of rabbit meat (10.4% from Global production of rabbit meat) and on the third place is Spain which produced 56.13 Ktons of rabbit meat (3.9% from Global production of rabbit meat) [2].

As we can see from the Table 1, Republic of Moldova produced in 2017, according to FAO, 872 tons of rabbit meat which decreased compared to 2016, by 268 tons.

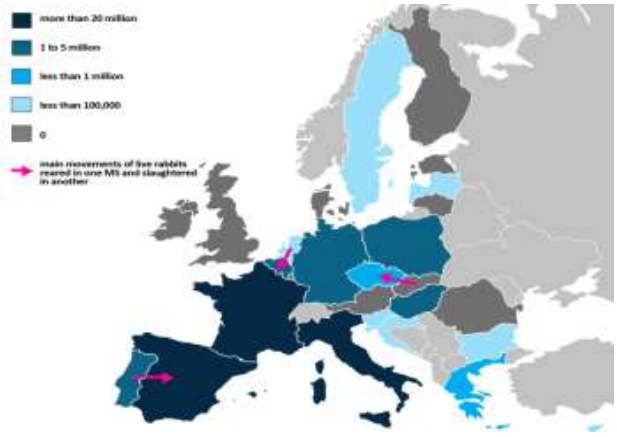

Fig. 1.Number of rabbits slaughtered at approved rabbit slaughterhouses in EU Member States
Source: [1].

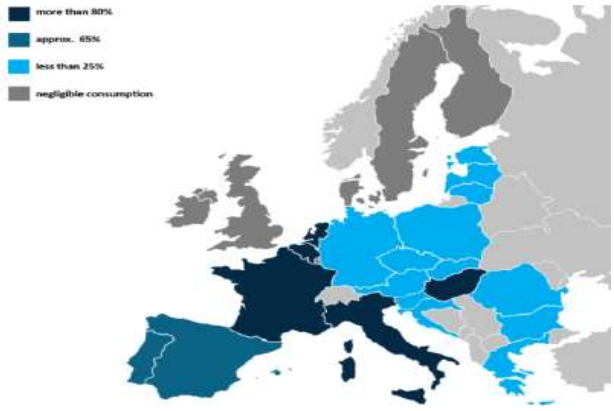

Fig. 2. Percentage of rabbit meat consumption in EU Member States
Source: [1].

Analyzing Fig.1 we can reveal that rabbit growing in EU Member States is located mostly in 3 countries (83% of total EU production): Spain, Italy and France [1].

Analyzing the consumption of rabbit meat in EU Member States (Fig. 2) we can reveal that mostly rabbit meat is consumed per person/per year in the following countries: Malta>3 kg, Spain, Portugal - from 1 kg to 1.5 kg, France, Italy – from 0.5 kg to 1 kg, Belgium, Germany – from 0.1 kg to 0.5 kg.

Most of the rabbits grown in Moldova are grown mainly in domestic conditions. It doesn't exist a culture of growing rabbits in big enterprises [9]. In Moldova, the rabbit meat is sold on the following markets [13]:

-Local agricultural markets and municipal agricultural markets, being sold personally by the farmer at the price of 110-140 MDL or by an employed salesman

-Specialized supermarkets – which receive the rabbit meat packed properly in compliance with the established standards;

-Restaurants – which sign contracts with rabbit meat producers, according to which the producers will ensure constant quantities of rabbit meat.

We have performed the analysis of the quality of the rabbit meat sold in the central square of Chisinau, the rabbit meat sold in the supermarket and the house rabbit meat sold in open air markets. The detailed analysis of Figures 3, 4, 5 shows that in the rabbit meat obtained from the central square the superficial microflora constituted 70 bacteria, compared to the meat from supermarket - 30 bacteria and house rabbit meat - 30 bacteria. The number of bacteria in the depth of the meat determined the smallest number of bacteria in the rabbit meat from the supermarkets - 10 bacteria, followed by the house rabbit meat with 23 bacteria and the rabbit meat from the central square - 50 bacteria. Therefore, these quantitative aspects of the microorganisms in the rabbit meat, denote that the rabbit meat from the supermarket is fresh, compared to other categories of meat (the central square and house rabbit meat sold directly in open air markets), where the quality of meat is doubtful. It is very important to produce high quality products which will find very quickly the customers [5, 6, 7, 8, 11].

How was mentioned above, in Republic of Moldova, doesn't exist a tradition of consumption rabbit meat: it is consumed only at weddings, on Easter Holidays, etc. and there is no production at high scale.

In this sense Republic of Moldova doesn't export rabbit meat, being only as consumer of rabit meat and also imports rabbit meat from

other countries such as Hungary, from where in Moldova were imported in 2018 approximately 15.09 K tons of rabbit meat [10,12].

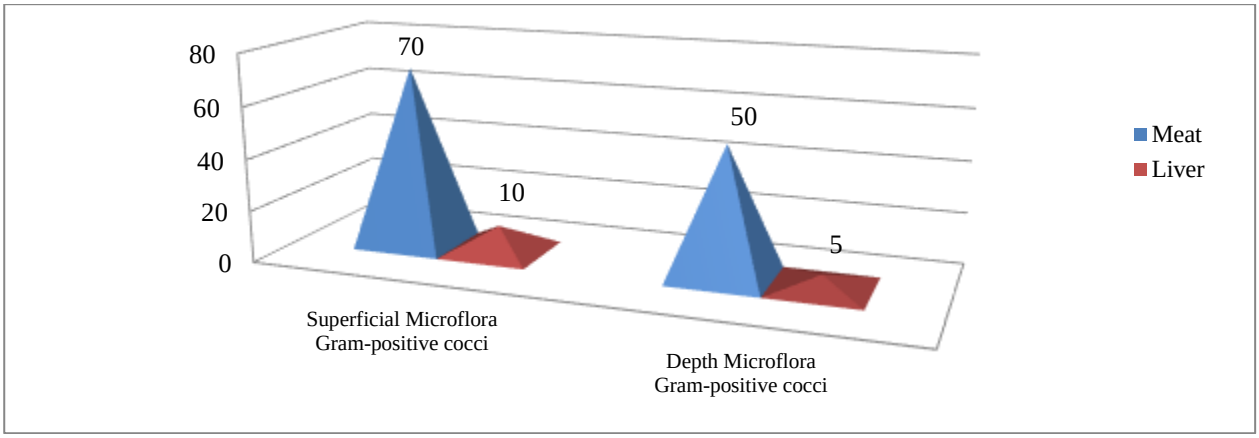

Fig.3.Quantitative aspects of the bacterial microflora on smear of rabbit meat sold in the central square of Chișinău
Source: elaborated by the authors.

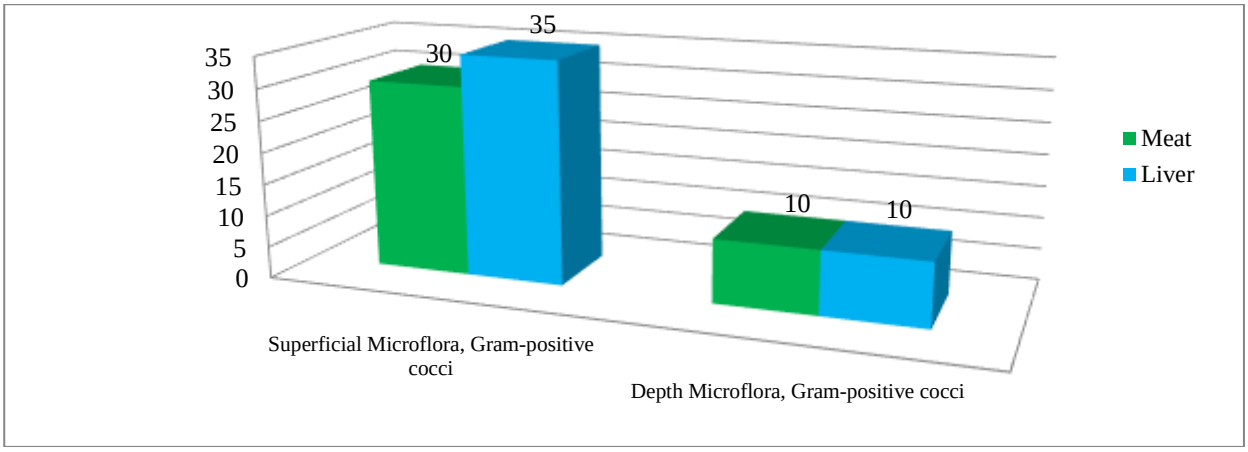

Fig.4.Quantitative aspects of the bacterial microflora on smear of rabbit meat sold in the supermarket
Source: elaborated by the authors.

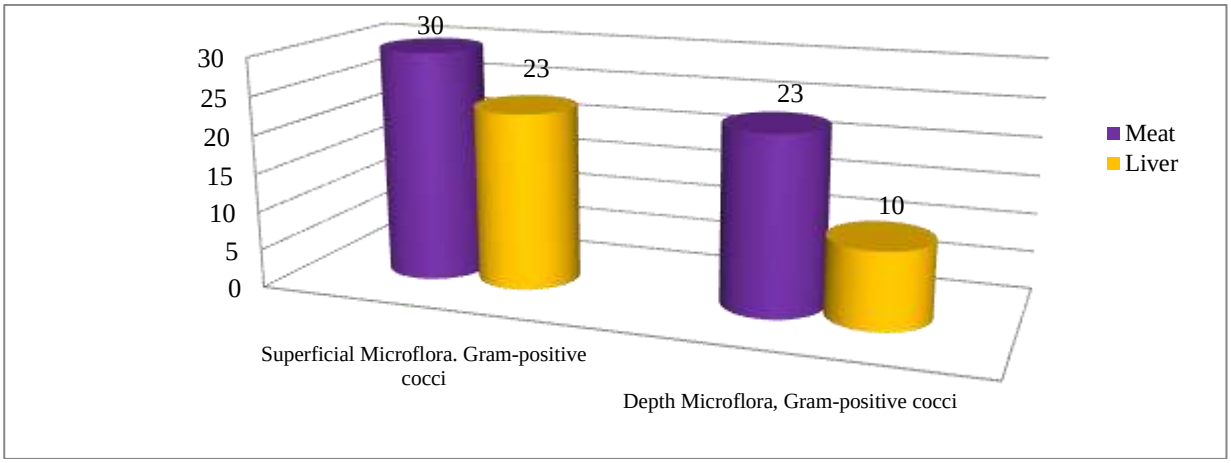

Fig.5.Quantitative aspects of the bacterial microflora on smear of rabbit meat sold in open air markets
Source: elaborated by the authors.

In order to increase the competitiveness of rabbit meat, to achieve new levels of development in this domain it is necessary to pass from growing rabbits in domestic conditions to grow rabbits in enterprises (economy of scale), well organized and well equipped. At the state level must be elaborated programs of financing business activities in the

rural areas at special conditions, which will attract the young people to begin an activity in the rural area.

CONCLUSIONS

The rabbits in Moldova are grown mostly in domestic conditions, the rabbit meat, being consumed totally locally. In Moldova doesn't exist a culture of consumption rabbit meat, being consumed mostly at weddings, christenings, Easter Holidays, etc. The rabbit meat is sold in local agricultural markets and municipal agricultural markets; specialized supermarkets and restaurants. The quality of rabbit meat is different depending on the point of sale, but according to the performed investigations the most qualitative rabbit meat is sold in supermarkets.

Food safety needs to be the main aspect in the production and marketing of rabbit meat, being responsible for the food chain.

In order to increase the competitiveness of rabbit meat it is necessary the involvement of the state authorities which need to elaborate laws for creating development conditions of growing rabbits not only domestically but also at high scale: in enterprises very well organized and well equipped, being financed at low interest

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THE SOCIO-ECONOMIC IMPACT OF GRANTING HOLIDAY VOUCHERS IN THE ROMANIAN PUBLIC SYSTEM

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Abstract

The measure applicable in the tourism sector in Romania, referring to granting the holiday vouchers to employees of the budgetary sector, it had positive effects in the tourism sector, but also on the Romanian economy in general, firstly by registering record incomes and increasing the tourist flows, but also by removing from the underground economy a significant number of tourist reception structures, considering that the number of applications for their authorization increased in 2018 by 10% compared to 2017. Continuing to apply the measure will bring benefits to tourism in Romania, and increasing their value will respond to tourists' request to use complex tourism packages included in the offers of tourism operators.

Key words**:** *tourism, holiday vouchers, economy, Romania*

INTRODUCTION

Tourism is the economic sector with high development potential.

For the programming period 2014-2020, National Plan for Agriculture and Rural Development (NPARD), provides that a main source of income and development for the eight regions will be tourism [3].

However, studies on economic efficiency in tourism show a significant development in terms of number of tourists, but tourism contribution to Gross Domestic Product (GDP) is just 0.9 %, very low compared to other European Union countries [6]. The best years were registered in Romania in 2007, 2008 when tourism receipts accounted for 1.22% and 1.28% of GDP, the global rise in tourism receipts also recorded peak of 1.87% and 1.88% of GDP worldwide [2].

The North-West Development Region is a very high tourism potential for developing competitive touristic products, but unfortunately this potential is extremely poorly capitalized [1].

Related to habits studies show a preference of the arrivals especially in the 3rd quarter of each year, in macro-regions M3 and M1, for foreigners and in the macro-regions M1 and M2 for the Romanian tourists [10].

The paper analyzes the impact of holiday vouchers granted to employees from the budgetary system has over the economy of Romania. Were used data available by the National Institute of Statistics and the Ministry of Public Finance, data that were analyzed based on evolution or variation on relevant indicators for tourism sector within our country's economy.

MATERIALS AND METHODS

Introduced on the Romanian market in 2009 through Emergency Ordinance no. 8/2009 regarding the granting of holiday vouchers published in the Official Monitor. No. 110 of February 24, 2009, with the subsequent amendments and completions by Law no**.** 94/2014, the holiday vouchers were not granted in the public system immediately, but after a year, the reason being the economic crisis that led to of incomes made by the state budget in Romania, and restricted year by year by the legislation elaborated [7].

Since 2017 the granting of these vouchers has been resumed in the public system through Emergency Ordinance no. 46/2017 concerning the modification and completion of Emergency Ordinance no. 8/2009 regarding the granting of holiday vouchers, which specifies that next to

the employees of the private system who had benefited since the adoption of the measure, and the employees of the budgetary system to receive these vouchers annually [8, 9]. The holiday vouchers granted in budgetary system for every employee, values 1,450 lei and they are available since the release date and can be used only in some intern destinations. The nominal value allowed for holiday vouchers on paper are multiple from 50 lei to 100 lei which represents the maximum nominal value per voucher. The maximum level of the amounts that can be granted to employees in the form of holiday vouchers by employers other than those paid from public funds, represents the maximum of six minimum gross basic salaries in the country, guaranteed in payment, (established according to the law) for an employee, during a fiscal year. The taxation of these vouchers is applied only in those regarding the level of income tax (10%) being exempted from withholding social contributions.

RESULTS AND DISCUSSIONS

Holiday vouchers are valuable tickets that are given to the employees to cover expenses incurred in making the holiday leave in domestic tourism. Thus, holiday vouchers are intended to cover the expenses of tourist services, accommodation, meals and/or recovery of work capacity. Holiday vouchers can also be used to cover travel and/or entertainment expenses if they are included in a tour package. The services related to the rest leave can be purchased as packages of services or separately.

Table 1. The evolution of the tourist accommodation capacity existing in Romania in the period 2017-2019 (number)

Places in tourist reception structures - total	Years				
	1990	2008	2017	2018	2019
	Number of seats				
	353,236	294,210	343,720	353,835	356,562

Own design based on the data from [5].

At the level of Romania there are 14,941 economic operators with accommodation functions classified between 2009-2019, 8,434 economic operators with public catering functions and 2,708 licensed organizing and intermediary tourism agencies, according to the Ministry of Tourism. Regarding the tourist accommodation capacity, the situation is presented in Table 1.

It is found that the accommodation capacity had an oscillating evolution during the analysis period as follows: in 2008 compared to the period before 1990 there was a decrease with 16.71% so that by 2017 a growth of 16.82 will be noticed % compared to 2008, an evolution that continues to increase until 2019 but in small percentages between 0.77% and 3.73% (Table 2).

Table 2. The evolution of the tourist accommodation capacity existing in Romania in the period 2017-2019 compared to previous years of granting the holiday vouchers (%)

Places in tourist reception structures - total	Evolution of accommodation capacity				
	2008/ 1990	2017/ 2008	2018/ 2017	2019/ 2018	2019/ 2017
		%			
	83.29	116.82	102.94	100.77	103.73

Source: Own design based on the data from [5].

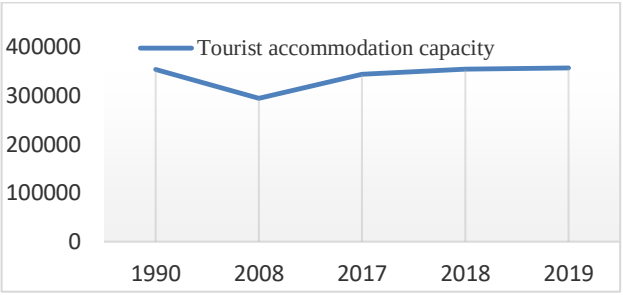

Fig. 1. The evolution of the tourist accommodation capacity existing in Romania in the period 2017-2019
Source: Own design based on the data from [5].

Holiday vouchers can be established for the use of the services of the economic operators regarding the tourism in Romania, the authorization according to the law, the care of the classified primary tourist structures but also of the licensed travel agencies and the accepted care or such payment method (Affiliation units) .The issuing units will pay the value of the holiday vouchers to the affiliated units which they have concluded contracts for their settlement, after the provision of the tourism services (Table 3).

Table 3. Evolution of the number of overnight stays in tourist accommodation structures

	Years			
Overnight stays in tourist reception structures	2008	2016	2017	2018
	Number			
	20,725,981	25,440,957	27,092,523	28,644,742

Source: Own design based on the data from [5].

Regarding the number of overnight stays in tourist accommodation structures, its constant growth is noted with 22.75% in 2016 compared to 2008 and 12.59% in 2018 compared to 2016 and 38.21% in 2018 compared to 2008 (Table 4).

Table 4. Evolution of overnight stays in tourist accommodation structures (%)

Overnight stays in tourist reception structures	2016/ 2008	2017/ 2016	2018/ 2017	2018/ 2016	2018/ 2008
	%				
	122.75	106.49	105.73	112.59	138.21

Source: Own design based on the data from [5].

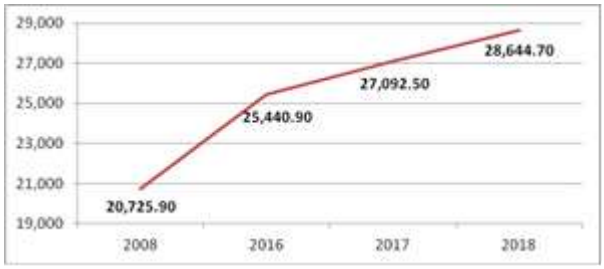

Fig. 2. Evolution of the number of overnight stays in tourist reception structures
Source: Own design based on the data from [5].

Table 5. Variation in the number of tourists participating in the tourism activities organized by the travel agencies in the years in which the holiday vouchers were granted compared to the previous period

Types of tourist activities	Travel agencies	Years		
		2008	2017	2018
		Number of people		
The activity of intern tourism	Tour Operators	416,541	670,428	959,030
	Agencies with sale activity	21,103	93,791	187,187
	Total	437,644	764,219	1,146,217

Source: Own design based on the data from [5].

It is found that compared to the period preceding the granting of holiday vouchers, the number of people participating in different types of tourist activities organized by tourism agencies or only with sales activities, had a significant increase, according to the data in Table 5, data provided by the National Institute of Statistics.

The number of travel agencies selling packages of domestic tourism settled with holiday vouchers has increased in recent years, and these facilitate the access of tourists to different forms of accommodation that do not accept the payment with these tickets.

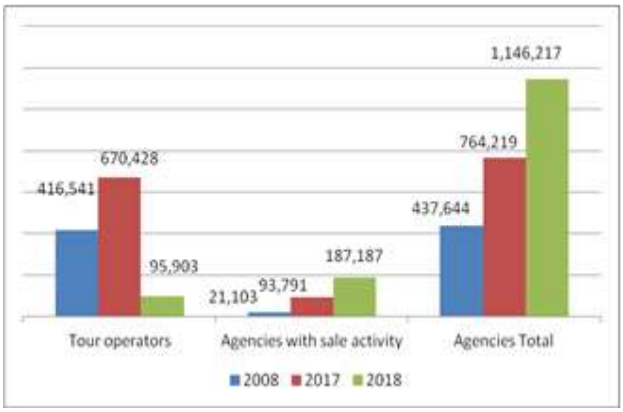

Fig. 3. The number of tourists participating in actions organized by travel agencies
Source: Own design based on the data from [5].

Thus, the situation of the number of tourists who have purchased packages of tourist services sold by travel agencies and only with sales activity is as follows: compared to 2008, in 2017 this number increased by 326,575 tourists, which represents an increase of 74.62%, and in 2018 compared to 2008 with 708,644 tourists, which represents 161.90% growth, which is maintained in 2018 compared to 2017 with 49.98% as a result of granting holiday vouchers in the budget system and involvement to the large number of travel agencies in the sale of these packages of domestic tourism with payment based on them (Fig. 3 and Table 6).

The companies that issued holiday vouchers in 2017, 2018 and 2019 are: S.C. UP România S.R.L., S.C. Edenred România S.R.L., S.C. Sodexo Pass Romania S.R.L. Between 2017-2019, the number and value of holiday vouchers settled by the Ministry of Public Finance both on paper and in the form of cards (electronic support) is presented in Table 7.

Table 6. Variation of tourists participating in the tourism activities organized by the travel agencies in the years in which the holiday vouchers were granted compared to the previous period (%)

Types of tourist activities	**Travel agencies**	**Absolute and relative variation**					
		2017/2008		2018/2008		2018/2017	
		Abs	%	Abs	%	Abs	%
The activity of intern tourism	Tour Operators	+253.887	160.95	+542.489	230.23	+288.602	143.04
	Agencies with sale activity	+72.688	444.44	+166.084	887.01	+93.396	199.57
	Total	+326.575	174.62	+708.644	261.90	+381.998	149.98

Source: Own design based on the data from [5].

Table 7. The value of holiday vouchers on paper

	2017		**2018**		**Jan. - Nov. 2019**	
	Quantity -nr-	Value -lei-	Quantity -nr-	Value -lei-	Quantity -nr-	Value -lei-
S.C. UP România S.R.L.	13,303,713	128,300,120	20,730,861	1,054,052,700	22,615,273	1,147,154,400
S.C. Edenred România S.R.L.						
S.C. Sodexo Pass România S.R.L.						

Source: Ministry of Public Finance [4].

Table 8. The value of holiday vouchers on electronic support

	2017		**2018**		**Jan. - Nov. 2019**	
	Quantity -nr-	Value -lei-	Quantity -nr-	Value -lei-	Quantity -nr-	Value -lei-
S.C. UP România S.R.L.	77,525	5,924,715	2,149,345	108,177,905	6,485,513	294,558, 759
S.C. Edenred România S.R.L.						
S.C. Sodexo Pass România S.R.L.						

Source: Ministry of Public Finance [4].

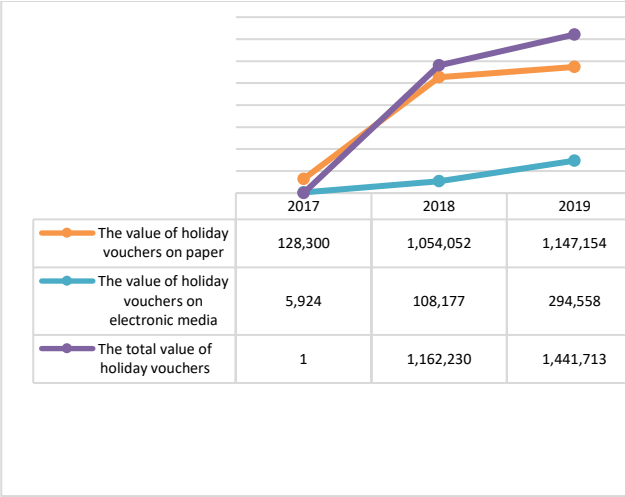

Fig. 4. The evolution of the budget location in what concerns the holiday vouchers for the period 2017-2019
Source: Own design based on the data from Ministry of Finance [4].

The measure of granting holiday vouchers in the budget system had a positive impact which led to the issuing of proposals for granting holiday vouchers exclusively for the off-season. Holiday vouchers can be granted either in print or electronically, according to the legislation in force, and can only be used in tourist establishments within the country (Table 8).

There is a constant increase in the total value of holiday vouchers granted to employees in the budgetary sector, according to data provided by the Ministry of Public Finance, which shows an increase of the beneficiaries of this measure: 92,569 beneficiaries in 2017, 801,539 beneficiaries in 2018 and 994285 in the year 2019 until November. For 2020, the value of holiday vouchers will be maintained at the level of 1,450 lei for each beneficiary of the budget system.

CONCLUSIONS

The measure of granting holiday vouchers in the budget sector aimed at increasing the number of jobs in tourism and thus at preserving the domestic workforce in Romania, intending to stop the exodus of the labor force from the tourism field to other states in the relative vicinity of Romania. On the other hand, the benefits to the employees of the budgetary sector are real, by increasing the

incomes realized, through which they can spend a holiday in the country, with the role of recovering the capacity of work but also of increasing the productivity of the work of the employee and their motivation.

The companies that issued holiday vouchers for the period 2017-2019 are: S.C. UP România S.R.L., S.C. Edenred România S.R.L., S.C. Sodexo Pass Romania SRL, both on paper and in the form of cards (electronic support) and a constant increase in the total value of holiday vouchers granted to employees in the budget sector, according to data provided by the Ministry of Public Finance but also to the beneficiaries of this measure.

The increase of the tourist accommodation capacity was evident during the period 2017-2019, against the background of increased demands in the field of internal tourism but also by the approval of some accommodation and catering units, removing the gray area of the economy.

The number of overnight stays in tourist accommodation structures from domestic tourism registered a constant increase in the period 2017-2019.

The number of tourists who have purchased packages of tourist services sold by tour operators or only with activity of sale has increased as a result of granting holiday vouchers in the budget system and the involvement of the tourism agencies in large number in the sale of these packages of tourism. internally with payment based on them.

For the coming years, it is intended to introduce on the market holiday vouchers that will be granted only for the off-season period (April - May and October - November) to increase the level of tourist occupancy evenly throughout the year and increase their value at the level of 2,080 law.

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THE ROLE OF POPULATION TRAVEL BEHAVIOUR IN ENSURING SUSTAINABLE URBAN MOBILITY. CASE STUDY

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Abstract

The sustainable development of towns is the most important driver of economic and social development and the continuous increase in the number of vehicles has more and more powerful influences on the environment and on the health status of inhabitants in the urban area, due to the polluting matters emissions, noise and road accidents. The lack of integrated planning of transport systems can lead to disruptions in the urban structure of the communities and to strengthening of social exclusion. Starting from these considerations, we initiated the present study in Călărași municipality by which we surveyed the population's opinion on the general problems related to mobility, using the survey - interview and a questionnaire with a number of 15 items, to which a number of 314 persons answered, obtaining information on the number of travels, the problems perceived by the citizens regarding mobility, optimal solutions for improving the situation, the preferred means of transport, if this option would have a sufficient quality, appreciations on public transport, etc., the conclusion being the preference of the citizens for a transport model in which travel behaviour, travel patterns and demands react in time to all socio-economic changes.

Key words**:** *sustainable development, urban mobility, transport model, public opinion, strategy*

INTRODUCTION

In Romania, as a member of the European Union, it is necessary to comply with the norms required by the Union and the application of the characteristics of the systems considered viable within the EU and the quality of the public service is an important problem in the process of modernizing and reforming the administration [5]. Te sustainable development of towns is the most important motor of economic and social development and can be achieved by an integrated approach which aims all dimensions of the urban sustainability, as well as new trends in the area [10].

Due to the continuous trend of increasing the number of vehicles, both globally and in Romania, the transport sector has increasing strong influences on the environment and the health status of the inhabitants of the urban area, due to the polluting matters emissions, noise and road accidents [3]. The lack of integrated planning of transport systems can lead to disruptions in the urban structure of the communities and to strengthen the social exclusion [6].

Urban mobility defines all the travels of persons for daily activities related to work, activities and/or social needs (health, education, etc.), shopping and leisure activities registered in an urban or metropolitan area [7]. In order to ensure sustainable urban mobility, a territorial strategic planning is necessary in order to correlate the territorial development of the localities in the peri-urban/metropolitan area with the needs of mobility and transport of persons, goods and commodities [9].

At present, the public sector must borrow private practice, thus leading to a result-oriented administration - measuring the achievement of the proposed objectives - and the citizen whose needs and requirements should be considered as priorities when ensuring the sustainable development of the town area [8]. In this context, starting from the general objective of the strategy at the level of Calarasi county, respectively: "Sustainable development of the local economy and society, by capitalizing and preserving the natural resources, reducing disparities (between urban and rural areas), creating an attractive environment for investors and tourism,

supported by modern infrastructure, human resources training and social inclusion promotion provided in "Călărași County Development Plan for the period 2014 – 2020", [1] in which the strategic directions for Călărași county are established, of which the first is: Călărași - an easily accessible county, with a modern infrastructure, we initiated the present study to contribute with the obtained results, in establishing the directions of action of the Plan of Sustainable Urban Mobility of Călărași Municipality for the period 2020-2030 [12].

MATERIALS AND METHODS

To survey the population's opinion on the general problems related to mobility, the survey – interview was used and a questionnaire with a number of 15 items, to which a number of 314 persons responded. The questionnaire was applied in gas stations, supermarkets and the two major agri-food markets of the municipality, between November and December 2019. By the methodology used, the citizens were asked to provide information on the travels made the previous day, for a period of 24 hours. By using the questionnaire, information was obtained on the number of travels, the problems perceived by the citizens regarding mobility, optimal solutions for improving the situation, the preferred transport means, if this option would have a sufficient quality, appreciation on public transport and other. This information was used to complete the data obtained from the survey, during the data collecting process. The questions addressed by the questionnaire and the survey-interview also pursued information regarding the main parameters of the mobility of persons and goods, regarding: the structure of the persons movements according to the purpose of the travel; the means of transport frequently used for travel; the main problem occurred during travels in town; the average duration of the travels made by the citizens of Călărași municipality; the average distances travelled by pedestrians and cyclists; the main types of infrastructure and facilities that should be created/upgraded/developed; preferred travel mode; the main problems related to the traffic of vehicles, at the town level; the main problems related to mobility; evaluation of the public transport system; are the citizens of Călărași municipality willing to give up their personal car? If yes, under what conditions and in favour of which alternative means of transport? [11]. From the information obtained by processing the completed forms, data were obtained to ensure the necessary connection between the socio-economic characteristics of the population in the study area and the citizens' travel behaviour [4].

RESULTS AND DISCUSSIONS

Călărași municipality is the capital of Călărași county, part of South Muntenia Region, representing the largest town in the county and one of the largest municipalities in the region [2]. The strategy of urban development of Călărași municipality has the role, through the proposed vision, through the assumed strategic objectives and the portfolio of projects, to continue the development process, the final result being the increase of the life quality for all inhabitants [1].
The main socio-economic indicators at the level of Călărași municipality, for 2018 are shown in Table 1.

Table 1. Main socio-economic indicators, Călărași municipality 2018

Population (no of inhabitants)	Total surface (km^2)	Population density (inhabitants/km^2)
76,483	133.22	574.11

Source: Călărași County Department of Statistics, 2019 [2].

According to the National Institute of Statistics Tempo online database (data from July 2019), the demographic evolution of Călărași municipality registered a continuous decrease between 2007 and 2018, these demographic trends corresponding to the county and regional context of the number of inhabitants [2]. The population of Călărași municipality presents the general trend of the negative natural increase, leading to a predominantly adult population, growing especially in the segment over 65 years old [2].The

characteristics of the group of respondents are presented below (Figs. 1, 2 and 3).

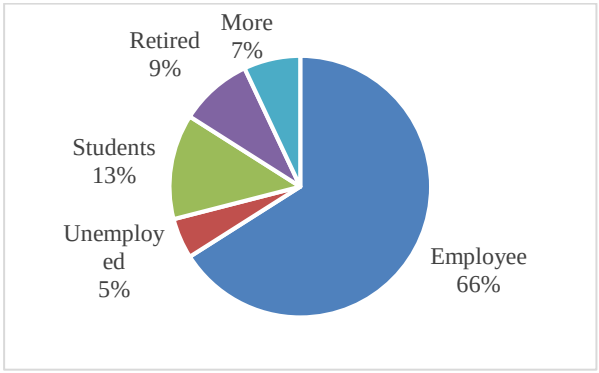

Fig. 1. Structure of the group of respondents, according to occupation
Source: Own calculation and design.

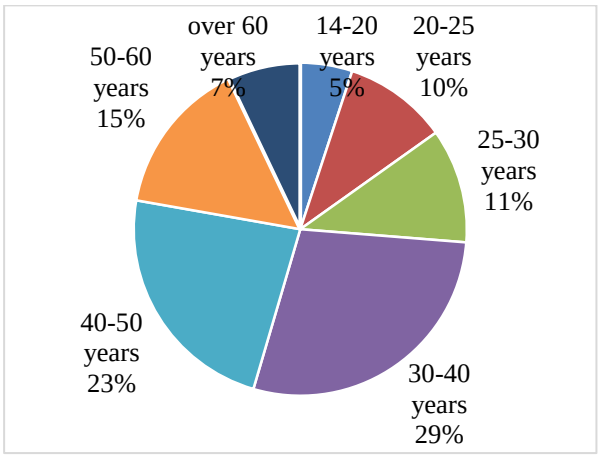

Fig. 2. Structure of the group of respondents, on categories of age
Source: Own calculation and design.

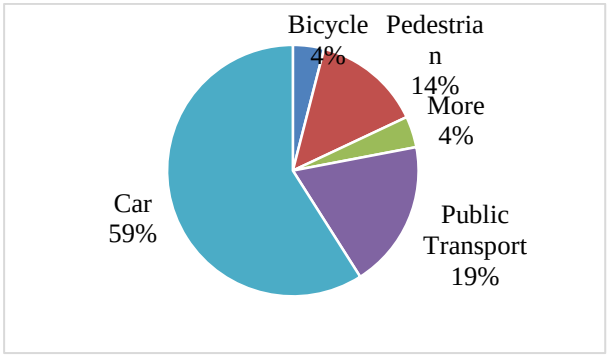

Fig. 3. Structure of the group, according to the main means of travel
Source: Own calculation and design.

The answers to the questions addressed in the questionnaire are following:

(1). How many travels do you do on an average, on a travelling day (a travel is considered a travel from the starting point to the point of arrival - not return)?

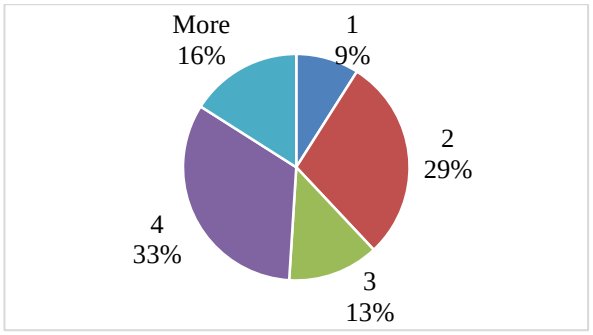

Fig. 4. Distribution according to the number of travels/day
Source: Own calculation and design.

(2).If the infrastructure and facilities would allow, which means of travel would you prefer?

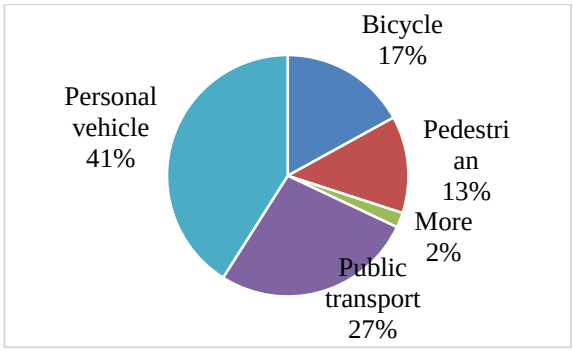

Fig. 5. Preferred means of travel
Source: Own calculation and design.

(3) How do you appreciate the road traffic in Călărași municipality?

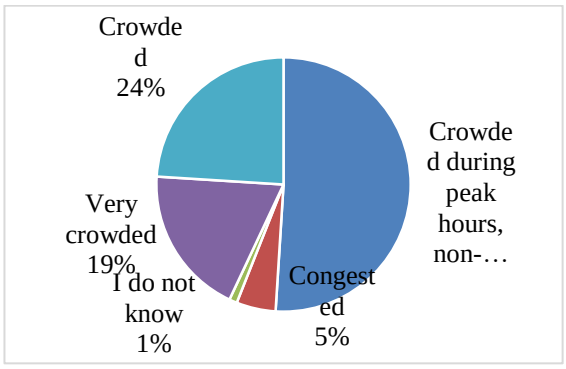

Fig. 6. Citizens' appreciation on the traffic density
Source: Own calculation and design.

(4). According to your opinion, in the mobility field, what types of infrastructure/facilities should be created/upgraded/developed? (you can check maximum 2 options). The answers are shown in Fig. 7.

(5). What do you consider to be the main traffic problems in Călărași municipality? (*You can check maximum 3 options)* The answers are shown in Fig. 8.

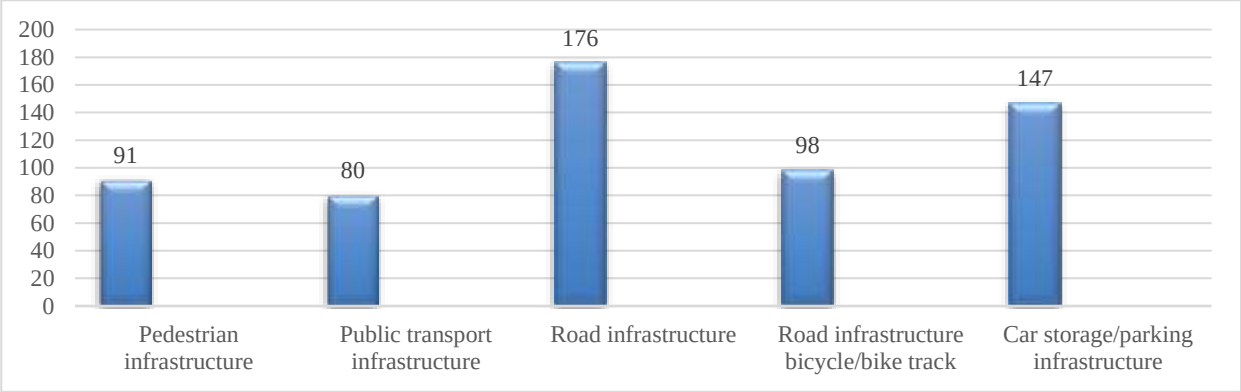

Fig. 7. Type of infrastructure that must be developed – number of respondents
Source: Own calculation and design.

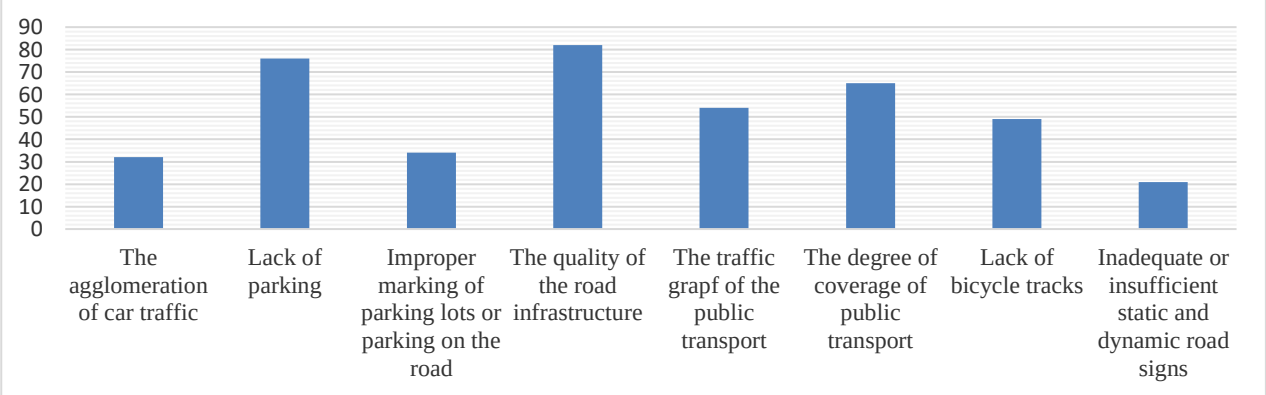

Fig. 8. Main problems of traffic in Călărași municipality -% respondents
Source: Own calculation and design.

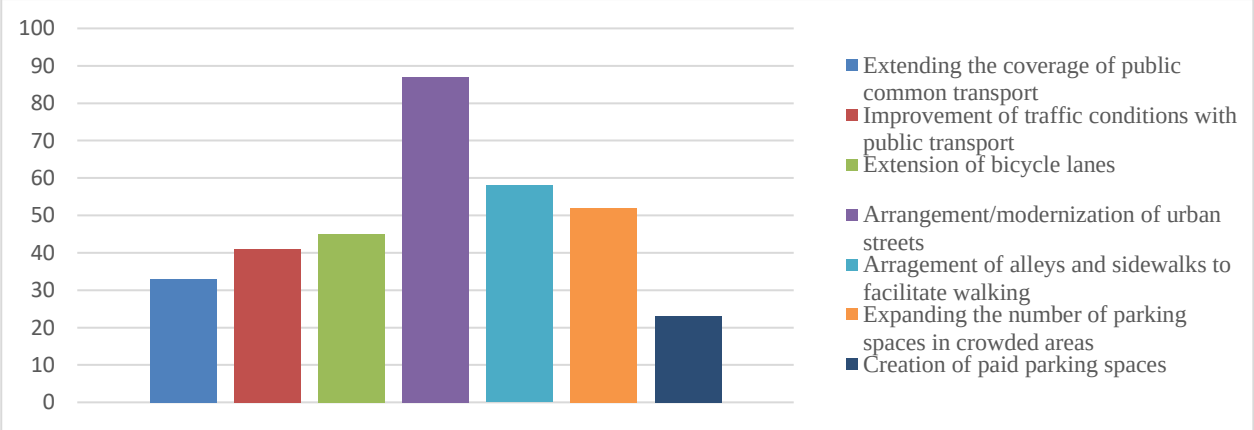

Fig. 9. Solutions for improving the travels inside Călărași municipality -% respondents
Source: Own calculation and design.

(6).In your opinion, which are the most adequate solutions for improving the travels inside Călărași municipality? (you can check maximum 3 options). The answers are shown in Fig. 9.

For items 7-17, the interviewed persons were asked to answer yes or no to the question asked by the operator. These questions referred to the preference for own vehicle travel, bicycle travel/public transportation; citizens' appreciation of the problem of traffic congestion in the central area; on the problem of noise associated with the road traffic; the problem of pollution associated with the road traffic; the possibility to change the means of transport; on the problem of heavy traffic; on the frequency of public transport; on public transport stations; on access to information on public transport; on the cost of public transport.

From the analysis of the answers, the following main aspects result: the sample is representative for the population of Călărași municipality; as expected, the questionnaire was answered by persons who are very interested in mobility issues, namely: people with a large number of daily travels (33% make 4 travels/day) and persons who use the personal vehicle as the main means of traveling (58%).

The main types of infrastructure identified as requiring expansion/modernization are: road infrastructure (82% of respondents); pedestrian infrastructure (38% of respondents); car storage /parking infrastructure (29% of respondents).

Preferred means of travel, if conditions were improved: personal vehicle (42%); public transport (26%); bicycle (17%); pedestrian (13%).

It should be noted that of the 58% respondents who currently use their personal vehicle as their primary means of travel, 16% would prefer to give up this means of transport.

The main problems of traffic: the quality of the road infrastructure; lack of parking; lack of bicycle tracks and rakes; car traffic jam.

Appreciations on the character of traffic: crowded, during rush hours: 51%. The most suitable solutions for improved travel: urban streets arrangement/modernization; the arrangement of alleys and sidewalks to facilitate walking; expanding the number of parking areas. And from these answers it results the preference for walking. 43% of the citizens who completed the questionnaire would prefer to travel by bicycle/public transport. A very large proportion of citizens would prefer less polluting and cheaper means of transport instead of using their personal vehicle. Only 43% of the citizens who completed the questionnaire consider the car jam in the town center as one of the main problems. Noise associated with the road traffic is not considered to be one of the significant problems of the city (52% of respondents). In contrast, more than half of the citizens who completed the questionnaire (59%) consider pollution due to the road traffic to be a significant problem of the city. 79% of the citizens who completed the questionnaire consider that heavy traffic is not a problem, which reflects the usefulness of ring roads; 44% of the citizens who completed the questionnaire are willing to change the means of transport used at present.

The problems related to urban public transport are clear from the opinions expressed by the respondents to the questionnaire: 69% of the citizens who completed the questionnaire are not satisfied with the frequency of public transport; 76% of the citizens who completed the questionnaire consider that the bus stations destined for public transport are not sufficient and do not allow a comfortable waiting; 87% of the citizens who completed the questionnaire consider insufficient access to information on public transport. 73% of the citizens who completed the questionnaire consider that the price of public transport is not appropriate to the quality of the service.

CONCLUSIONS

The main conclusions on the existing dysfunctions, according to the citizens, are the following: the quality of the road infrastructure is not high enough; insufficient parking areas; traffic congestion, especially during rush hours and in the central area; pollution due to road traffic; the quality of the public transport service; frequency, bus station status, access to information and price.

It is worth noting the preference of the respondents for the bicycle transport, and the achievement of an appropriate infrastructure for this means of transport, the creation of the safety conditions and the provision of additional services for the users of this means of travel will lead to a significant increase in the weight of the bicycle in the modal distribution of travels.

We should mention that the dimensions of the town and the relief, which do not have deep slopes on the territory of the town, favor the outline of a network of bicycle tracks, which will ensure the connections between the main areas of attraction/generation of trips (Center, parks, commercial areas, schools etc.). One problem, however, is the low road profiles. In this regard, for the creation of bicycle tracks solutions must be found that will lead to the

least possible damage of the space allocated to the traffic of the road vehicles, as well as the correlation with the parking policies on the side of the road. In the secondary streets, the arrangement of bicycle tracks can be achieved, in most cases, only by creating unique sides.

Also, another way to increase the proportion of using this healthy and unpolluted means of transport is to create a bike-sharing system, which will increase the population's access to cycling. Bicycle pick-up and drop-off stations must cover the entire area of the town and be accessible to all categories of citizens. The alternative mobility system must be integrated with the public transport system, so that you can find a bicycle station near a main bus station, in the proximity of pedestrian areas, in public park-and-ride parks, in intermodal terminals, in parks and areas of maximum interest to citizens. Providing citizens with a system of urban mobility - bike-sharing - will generate real benefits, both for the life of the community and for the environment.

In conclusion, it is considered necessary to carry out studies of reorganization of the traffic, by introducing methods to increase the safety and fluency of the traffic on the road network of Călărași municipality, such as: strengthening the horizontal and vertical static road signaling, to regulate the traffic, heavy vehicles; extending the dynamic road signaling system and including traffic light locations in a dynamic traffic management system; introducing roundabouts, one-way directions and other measures that will lead to increased fluency and reduce the number of conflicts at crossroads; establishing optimal positions for pedestrian crossings so that no crossings jam occur.

From the results of this survey, the citizens' preference is obvious for a transport model in which the travel behaviour, the travel models and the requests will react in time to changes in transport policies, infrastructure or services, to changes in population level or to changes in its spatial distributions, to socio-economic changes.

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AGRICULTURAL BIOMASS POTENTIAL IN BULGARIA

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Abstract

Fuel dependency and uncertainty about their prices, coupled with increasing concerns about climate change and other environmental issues, are among the major global challenges on the agenda. They are key drivers for the development of biomass production, considered as the core of the bioeconomy and a main alternative for energy production. The aim of the study is to analyse the contribution of Bulgarian agriculture to the bioeconomy development and the potential of the sector for biomass production. The research is based on the definition and classification of the bioeconomy proposed by the European Commission. The results show a tendency of diminishing importance of Bulgarian agriculture in the national economy after accession to the EU. On the other hand, the sector remains a major source of employment in rural areas. In terms of the potential of Bulgarian agriculture for biomass production, crops of wheat, sunflower and maize play an important role. Based on the data, the other crops analysed cannot be considered as a key source of biomass. Among the major challenges facing Bulgaria are the attitudes in society about the benefits of using biomass, including economic, social and environmental. Therefore, the entrepreneurial activity should be stimulated in order to guarantee sustainable production and efficient use of biomass in the conditions of imbalance between North and South Bulgaria.

Key words**:** *bioeconomy, agricultural biomass, sustainability*

INTRODUCTION

The agricultural sector faces a number of challenges -a growing global population, demand for food and biomass, as well as environmental issues such as climate change and resource scarcity. As an emerging concept, the bioeconomy si an opportunity to takle multidimensional problems and to ensure sustainability [12].

A number of countries are developing bioeconomy strategies orientated to the economic and environmental benefits, while ensuring food security and supply of biomass [12, 32, 5].

There are high expectations that bioeconomy can enhance sustainable development [21, 22, 5].

Although some aspects and elements of the bioeconomy have been long established, the concept has attracted attention in recent decades based on the new technological innovations, changes in consumers' perception and the necessity of oil and fossil fuels dependency reduction.

The European Union's Europe 2020 Strategy considers a bioeconomy as a key element for green growth, maintaining competitiveness and creating jobs, which presents opportunities for the agriculture [8, 28, 33].

Changes in the biomass demand and supply, as well as the entire value chain, place the agricultural sector in the centre of bioeconomy. The aim of the study is to analyse the contribution of Bulgarian agriculture to the bioeconomy development and the potential of the sector for biomass production.

The paper is structured as follows: First, the materials and methods are presented. Second, an analysis of the potential of agriculture in terms of gross value added and employment levels has been carried out. Third, the agricultural production potential of key crops for the bioeconomy is revealed. The potential of biomass is calculated and analysed. On this basis, conclusions and recommendations are formulated.

MATERIALS AND METHODS

There are many definitions of bioeconomy. It should be noted that the term is evolving and

nowadays is shifting toward sustainability. The "greening" of bioeconomy is linked to the concepts of green and circular economics [2, 27]. As there is no uniform definition of the term, national strategies emphasise different sectors [22]. Therefore, it is important how countries determine bioeconomy in their strategies, in order to understand policy implications and the role of the agricultural sector.

Different surveys and reports [20, 19, 4, 16] analysed bioeconomy sectors and their contribution. However, these studies are not fully comparable due the variation of sectors among them.

According to the European Bioeconomy Strategy 2018 "…bioeconomy includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services (biomedicines and health biotechnology are excluded)"[18].

Based on the EU definition, a study conducted by the European Commission divides the bioeconomy sectors as core bioeconomy, partial and indirect sectors [17].

This paper is based on the definition and classification of the European Commission.

The monitoring and survey of bioeconomy potential and contribution for fostering sustainable development is an object of a global discussion [13].

There are different approaches for measuring the bioeconomy potential and contribution to a country's economy. Based on [13] classification, they could be defined as: the value added/GDP approach; Input-Output (I-O) and Social Accounting Matrix (SAM) analysis; Computable General Equilibrium (CGE) Model; Partial Equilibrium (PE).

Some countries measure the potential and contribution of bioeconomy by disaggregated indicators. Based on [26] methodology, the main indicators are: 1) Turnover of the bioeconomy; 2) GDP/Value added of the total bioeconomy and its sectors, and the contribution of the bioeconomy to total country/region GDP; 3) Employment in the bioeconomy and its sectors and the contribution of the bioeconomy to total employment; 4) Resource use of the bioeconomy; 5) Primary production of biomass in the country.

The document focuses on gross value added and employment indicators to determine the agricultural potential for biomass production.

The methodology is based on approaches applied by [24, 25] and adapted to agricultural sector.

The first part of the study focuses on the analysis of the regional potential of Bulgarian agriculture in terms of gross value added and employment levels. The survey is based on [23] of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS). The study covers NUTS 2 regions in Bulgaria.

The second part compares the potential of Bulgarian agriculture for the production of crops important for the bioeconomy with several other countries at EU-28 level. The biomass production potential in these countries is calculated on the basis of crop residues.

According to [15] the concepts for biomass potential evaluation do not follow the necessary consistency. A number of authors provide information on the calculation of biomass potential [3, 30, 31].

[31, 30] distinguish three levels of biomass potential: theoretical, technical and bioeconomic.

The theoretical potential of residues is calculated by the residue-to-crop ratio (R: C ratio) based on the literature study of [29]. According to the authors, the R: C ratio is inflenced by a number of factors and this causes difficulties in the assessment. It is also mentioned that the harvesting index (HI), defined as a share of primary product in relation to total biomass above ground, is linked to the residue-to-crop ratio as follows:

$$\text{R: C ratio} = \frac{residue\ (\frac{t}{ha})}{yield\ (\frac{t}{ha})} = \frac{1}{HI} - 1 \quad (1)$$

This study is based on data provided by National Statistical Institute, Eurostat, FAO

and Ministry of Agriculture, Food and Forestry.

RESULTS AND DISCUSSIONS

The share of agriculture in Gross Value Added (GVA) shows the potential for bioeconomy development and biomass production. Agriculture is considered as core sector of bioeconomy [8]. Therefore, the data of this part of the study is based on National agricultural economic accounts. The regional variation in the indicator can define the potential and contribution of each planning region to the bioeconomy (Fig. 1).

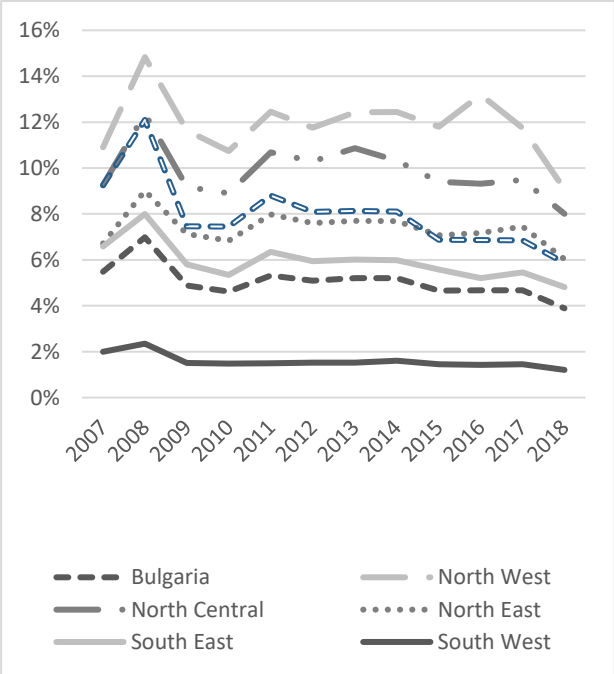

Fig. 1. Share of agriculture in the GVA (%) – regional level NUTS 2, 2007-2018
Source: Own calculation based on National Statistical Institute [17].

A number of significant structural changes have taken place during the Bulgarian transition period [1]. At the beginning of the transition period the relative share of agriculture in the GVA is increased. Deindustrialization and high unemployment in the industrial sectors can be cited as the main reason. The transition in the agricultural sector, however led to various challenges. The land reform, privatization and other policy instruments applied by the government haven't helped the sector to overcome the main issues. The problems during the transition period predetermine the difficult recovery of the agriculture. All this affects the share of agriculture in the in GVA. The data show downward trends in the agricultural potential and contribution to the bioeconomy. In the last few years of the research period, the sector's share of the national economy has been below 5%. The observed negative trends are related to substantial structural and sectoral challenges in Bulgarian agriculture. These issues can hinder the potential for biomass production in the country.

Regional dimensions of the indicator lead to several conclusions. After the accession to the EU, there has been a significant change in the role and importance of agriculture, with a serious decline in the relative share of the agricultural sector in total generated GVA in all planning regions. Nonetheless, there is no major variation for the analyzed period.

The agricultural sector has the highest relative share in the economy of North-West region. However, it is characterized by depopulation and lower economic development. In this area the agriculture is considered as a main source of income and employment.

By contrast, South-West region has the lowest potential and contribution. The agricultural sector does not play an important role in these territories. The negligible share is impressive and is associated to the higher level of urbanization.

Based on the data, the country can be divided into two: Northern and Southern Bulgaria. The leading role of Northern Bulgaria is related to the specialization in cereals and industrial crops production [1]. The larger arable land and the natural characteristics of the northern parts of the country determine their greater potential for biomass production. Based on NSI data it can be concluded that the southern parts of Bulgaria are specialized in vegetable and fruit production. Their potential for biomass is lower and hindered by the negative trends in these subsectors.

Another important indicator related to agriculture's potential for bioeconomic development is the share of agriculture in total employment (Fig. 2).

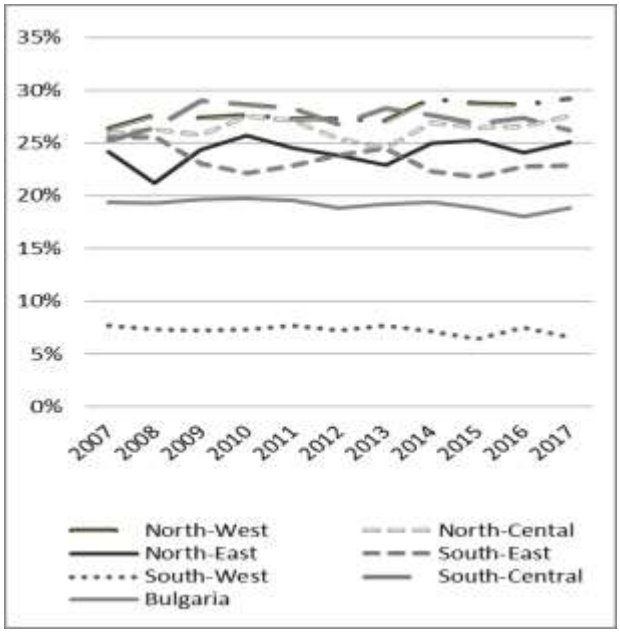

Fig. 2. Share of agricultural employment in total employment (%), regional level NUTS 2, 2007-2017
Source: National Statistical Institute [18].

Based on [10], agriculture provides 4.2 % of total employment in the EU (to 9.7 million). The highest values were recorded in Romania (23%), as well as in Bulgaria (18%), Greece (10.7%) and Poland (10.1%). On the other hand, in Luxemburg (0.8%), Belgium (1.2%) and Malta (1.2%) were registered the lowest shares of agriculture in employment [10].

It should be emphasized that many people can help in the farming activities without being employed. This EU's regular agricultural labor force is much higher, at 20.5 million people in 2016 [11]. However, farming is just an additional source of income for many people in the EU.

Based on the data, it can be concluded that agriculture plays an important role in generating income and employment in the rural areas of Bulgaria.

On regional level, there are not many changes and variation. The highest share of agricultural employment in registered in North-West, North-Central and South-Central planning regions. South West region is lagging behind. The trends are in parallel with the potential and contribution of the areas in generated GVA.

The role and importance of the northern regions determine their higher potential for biomass production and bioeconomic development.

Despite these regional differences, natural characteristics, traditions and knowledge are a prerequisite for the widespread cultivation of crops, which are a major source of biomass, including wheat, rye, barley, oats, triticale, rapeseed and sunflower seed, as well as grain maize.

The assessment of biomass production potential of the main crops is based on data for a 5-year period (2014-2018). The analysis includes comparisons with the neighbouring countries Greece and Serbia, which have similar agriculture structure based on UAA, Romania and Poland, as former central planned economies, and Germany and France, as leaders in agricultural production in Europe.

Wheat is one of the main agricultural crops, both for the agriculture of Bulgaria and for the production of biomass. Its areas cover nearly 1/4 of the UAA in the country, which is almost two times more compared to those in Greece and Serbia. Wheat and spelt areas in Bulgaria occupy 4.5% of the cultivated area with these crops in the EU-28. However, compared to the relative share of Romania (8%), Poland (9%), Germany (12%) and France (20.5%), the country is rather in the group of small producers. In terms of production, Bulgaria accounts for 4.2% of wheat and spelt production in the EU-28. It should be noted that the share of spelt is negligible.

Regarding average yield, it can be stated that Bulgaria is characterized by relatively good levels of this indicator. The average yield during the period under consideration is about 4.87 t/ha. This value is higher than the average values of Serbia, Romania and Poland, and compared to Greece the excess is about 75% in favour of Bulgaria. It should be noted that in terms of leaders France and Germany, the country is lagging behind. The average production of Bulgaria during the period is about 75% of the average French production and 63% of the achieved results in Germany. Bulgaria reports lower average yields compared to the European Union aggregated data - about 93% of the EU-28 average.

The role of other cereals in Bulgarian agriculture is much more limited. The latter also concerns the potential for biomass production.

Compared to wheat, barley is a relatively under-represented crop in Bulgarian agriculture, although the natural and climatic conditions are favourable for its cultivation.

During the 2014-2018 period, barley accounts for about 3.13% of UAA in Bulgaria and only 1.28% of the area with this crop at EU-28 level. The country provides 1.13% of the annual production of barley in the EU-28.

In terms of average yield, the trends in Bulgaria are similar to the findings about the wheat, namely: for the 2014-2018 period only two of the countries included in the analysis - France and Germany - reported a higher average yield, 6.3 t/ha and 6.78 t/ ha respectively, versus 4.37 t/ha for Bulgaria. In Greece, Poland, Romania and Serbia, the registered average yield is ranging from 2.68 t/ ha for Greece to 3.83 t/ ha for Romania. However, the values of the indicator for Bulgaria are below the EU-28 average. Bulgarian yield per hectare is about 90% of that of EU-28.

Triticale is not a widespread crop in Bulgarian agriculture. The areas with triticale are 0.33% of the UAA in the country. During the period, the country reported fewer areas from all analysed countries - an average of 16,310 ha per year. The indicator in the other countries is ranging from 18,450 ha in Greece to 1,367,140 ha in Poland.

The triticale yield for Bulgaria varies from 2.66 t/ha in 2018 to 3.19 t/ha in 2014. The average yield per hectare for the 2014-2018 period is 3.02 t/ha, and the highest values are recorded in Germany (6.20 t/ha).

In the 2014-2018 period, oats account for 0.27% of UAA in the country and 0.37% of areas with oats in the EU-28. Bulgaria provides 0.26% of the EU-28 average annual production of oats.

The lower relative share of production compared to the relative share of the area is due the negative trends in the average yield per ha. The indicator ranges from 1.88 t/ ha in 2014 to 2.54 t/ha in 2017, with the average for the period - 2.15 t/ha. Of the countries concerned, only Greece has lower average yield (1.08 t/ha). In all other countries the values of the indicator are higher, and in France and Germany they reach 4.21 t/ ha and 4.53 t/ha, respectively. The average yield at EU-28 level is also higher and varies around 2.94 t / ha.

For the analysed period the rye occupied only 0.18% of the UAA in Bulgaria and about 0.42% of the area with rye in the EU-28. The country provides 0.22% of rye production in the EU-28. The latter, given the size of the cultivated area, is a prerequisite for a relatively low level of average yield.

Indeed, the data show an average yield of 1.97 t/ha for Bulgaria. Only Greece is characterized by lower values of the indicator (1.77 t/ha). The other five countries included in the analysis report higher averages, with Germany and France reaching 5.33 t/ha and 4.47 t/ha, respectively. Regarding the aggregate data, it can be noted that the average rye yield in Bulgaria is 52.81% of the yield per 1 ha in EU-28.

Rapeseed is a relatively new crop in the agricultural production structure of Bulgaria. Areas occupied by this crop have varied significantly over the years, but a slight upward trend has been observed.

During the period under consideration, rapeseed annually covers 3.5% of the UAA in Bulgaria. The relative share of rapeseed areas at EU-28 level is 2.61% lower, while the average annual production is 481,860 tons.

In terms of average yield, Bulgaria is characterized with lower yield, as only in Romania from all analysed countries is registered lower results. The data show that the value of the indicator for Bulgaria is 2.76 t/ha compared to 2.66 t/ha for Romania. Greece has the highest yield, ranging from 3.33 t/ha in 2017 to 4.85 t/ha in 2018.

As opposite to rapeseed, sunflower is an agricultural crop in the production of which Bulgaria has competitive advantages. Based on average data, sunflower area is 16.6% of UAA, however, Bulgaria provides over 20% of the sunflower fields in the EU-28. The average annual production of sunflower seeds during the study period is 1,913,520 tons. Only Romania of all the countries included in the analysis has a higher volume of production - 2,396,570 tons, cultivating almost 24.5% of the area with sunflower in the EU-28 (Fig. 3).

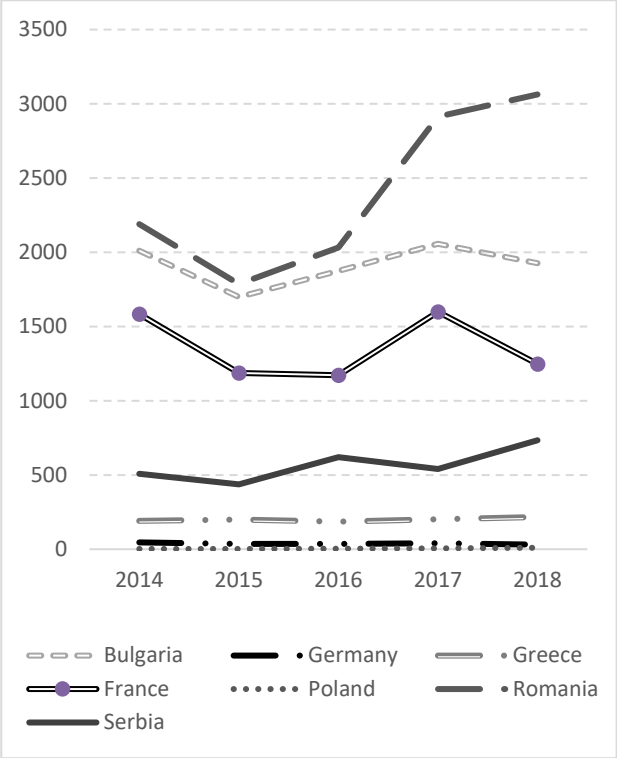

Fig. 3. Sunflower seed - harvested production in EU standard humidity (1,000 t)
Source: FAO stat [14].

In terms of average yields, Bulgaria reports competitive levels of 2.3 t/ha, which corresponds to an average annual yield in France, while Serbia and Romania have better results of 2.83 t/ha and 2.37 t/ha respectively.

Grain maize is the third most widely distributed crop in Bulgaria and accounts for nearly 9% of UAA in the country. Compared to Member States' average values, Bulgaria cultivates 4.9% of the EU-28 grain maize areas and produces over 4.3% of the total EU-28. It is also important to note that of the countries included in the analysis, only Greece has a smaller absolute production volume and a smaller size of the cultivated area with this crop than Bulgaria.

In terms of average yield, Bulgaria has higher results than Poland, Romania and Serbia. The average annual yield for the period is 6.64 t/ ha. In this respect Bulgaria is significantly lagging behind France (9.02 t/ha), Germany (9.54 t/ ha) and the leader of Greece (10.77 t/ha).

The crops that are sources of biomass have not only a different relative share in the agricultural structure, but also have different productivity in terms of the biomass produced. According to Thorenz et al. (2018), the coefficients for determining the theoretical level of residual biomass (R:C ratio) for the crops under consideration are: wheat - 1.00, rye - 1.10, barley - 0.93, oats - 1.13, triticale - 0.95, rape - 1.70 and sunflower seed - 2.70 and grain maize - 1.13.

The coefficients applied cannot change the ranking of a country vis-à-vis other countries with respect to the biomass of a particular crop, as well as in relation to the aggregated EU-28 data. As a result, Bulgaria has competitive positions in the production of wheat, barley, sunflower and corn biomass, taking into account the limited areas of barley. A lower potential for biomass production based on average yields per hectare is reported for rye, oats, triticale and rapeseed.

However, this finding should not be interpreted as a recommendation to limit or ignore the production of rye, oats, triticale and rapeseed.

Therefore there are two directions of analysis. On the one hand, the cultivation of these crops is linked to the autonomy, food security and food safety of Bulgaria, with rapeseed being used primarily as biomass and less for food production. On the other hand, the application of the different crop coefficients changes the ratio between them regarding the production per unit area.

Comparison of the data in absolute terms shows that the largest aggregate production is generated by the wheat crop, with an average annual amount of 5,762,900 tons during the study period. The second is grain maize with a production of 2,852,240 tons, and the production of sunflower is in third place with a result of 1,913,520 tons. The fourth place of production is taken by barley, whose production is 676,460 tons, rapeseed is in the fifth place with an amount of 481,860 tons.

After applying the coefficients for calculating the theoretical level of biomass, while maintaining the same size of the crop areas, there is a significant shift in the ranking of the crops producing the highest total production - biomass. Wheat, with a theoretical level of biomass production of 5,762,900 tons, remains first. Sunflower with biomass production of 5,166,500 tons, however, ranks second. The third is grain maize, which would generate biomass of 3,223,030 tons, and rapeseed is in

the fourth place with a potential biomass volume of 819,150 tons.

The potential for biomass production of individual crops can be most clearly estimated by comparing the average theoretical yield measured in tons per 1 ha (Fig. 4).

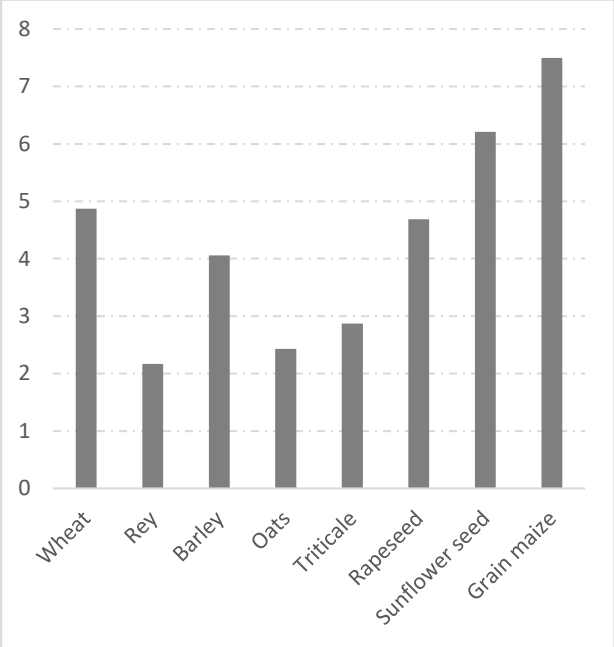

Fig. 4. Average biomass yield, t/ha
Source: Own calculation based on data from [9, 12, 29].

The highest average yield is reported for grain maize - 7.5 t/ha. In terms of average yield, the second in the ranking is sunflower with values of 6.21 t/ha. Wheat is ranked third with an average yield of 4.87 t/ha, followed by rapeseed and barley - with 4.69 t/ha and 4.06 t/ha respectively.

The presented data show, primarily, that the most widely used crops in the production structure of Bulgarian agriculture have the highest theoretical values for biomass production. The latter reveals the significant potential for biomass production in the country.

Second, some policy recommendations can be formulated on the basis of analysed data, including which crops should be targeted by government policy measures and policies to stimulate biomass production, as well as to support entrepreneurs seeking to invest in the production and processing of biomass.

CONCLUSIONS

Based on the analysis some conclusions and recommendation could be highlighted:

The data show that agricultural crops, which are the main source of biomass, occupy over 57% of Bulgaria's UAA. This, combined with the competitive levels of biomass production per ha, gives reason to claim that Bulgaria, by its scale, has good potential for biomass production.

Generalizing the conclusions of the analyses, it can be noted that wheat, sunflower and maize crops have significant potential for biomass production in Bulgaria. Other crops also have their place, both in the production structure of agriculture and as sources of biomass, but due to their limited area and constraints in climatic and economic conditions, there are no prerequisites for becoming a key source of biomass.

One of the main challenges facing Bulgaria is to change attitudes in society about the benefits of using biomass, including economic, social and environmental. The latter will stimulate entrepreneurial activity and guarantee sustainable production and efficient use of biomass in the conditions of imbalance between North and South Bulgaria.

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SOCIAL AND ECONOMIC ASPECTS REGARDING THE DEVELOPMENT OF AGRICULTURE IN ROMANIA

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Abstract

Agriculture plays a major role in the economic context of emerging countries. Important factors influencing the agricultural sector include sustainable development, climate change, food security, population and expenditure in the field. Within the paper, social and economic indicators were analyzed regarding the evolution of the agricultural sector in Romania during 2013-2017. Thus, the following indicators were analyzed: agricultural surface, agricultural workers, rural and urban population, value added per worker in agriculture, GDP/capita, and government expenditure. It is found that during this period the GDP/capita in Romania had an ascending evolution and government expenditure in agriculture had a downward trend during the analyzed period.

Key words**:** *agriculture, expenditure, GDP, employment*

INTRODUCTION

Romania has considerable potential for development. The country has a total area of 238,000 km^2, being the 8th member state of the European Union regarding the surface and a population of approximately 20 million inhabitants.

Agriculture is among the oldest human and economic activities that address the basic needs of food, and its productivity has controlled the social development for centuries [17].

Agriculture is a vital activity with major consequences on the food security of the population and on the regional and local ecosystems, becoming an important geostrategic tool for the economic development of any country [9]. Also, agriculture is an important economic sector that provides food for the population, raw materials for the processing industry and agri-food products for export [8]. The macroeconomic context in which agriculture and rural communities developed in Romania was the result of short-term political and strategic measures [4, 5].

Some authors [16] affirmed that Romanian agriculture can be viewed both at the macroeconomic level because the revenues from this activity contribute to the GDP, but also at the microeconomic level, agriculture being a positive factor for the rural development.

Rural development at the national level plays an important role. This is done mainly through agriculture and hence the need for adaptation to European Union policies, but also for integration into the European rural economy. The arable area of Romania makes the country one with a clear agricultural profile, and with importance at European level and also a competitive one among other countries, as it owns almost 1/3 of the total agricultural land in the EU [3].

The study carried out by [2], revealed the need for further agricultural structural concentration, so that modern agrotechnics can be used. Romania has a huge agricultural fund that is not exploited or inefficiently exploited.

The economic context in Romania can face difficulties, as the agricultural sector faces some problems such as competition, high production costs, climate change, etc. Considering this, the objective of the paper was to analyze the situation in Romania of the agricultural sector, evaluating some indicators relevant for this sector.

MATERIALS AND METHODS

In order to attain the purpose of the study concerning the situation in Romania of agricultural sector during the period 2013-2017, statistical data available from the National Institute of Statistics, FAOSTAT, The World Bank were used. The analysis of the Romanian agriculture is important to ascertain the current state of the situation of this branch in the national economy. For the analysis, the method of comparison, relative change (%), was used and the indices with a fixed basis were used to highlight the difference between the level recorded in 2017 compared to 2013. The indicators analyzed were the evolution of GDP, the share of agriculture in GDP, the rural and urban population, the agricultural surface, the workers in the agricultural field, the exports of imports, the trade balance and the expenditures of agriculture.

RESULTS AND DISCUSSIONS

This article has pursued to evaluate the economic context in Romania regarding the activity carried out in the agricultural sector. For this, there were examined some indicators that emphasize the case of the agricultural sector. Within the study, it was investigated the position of agriculture in the national economy regarding the investments in agriculture, GDP and other indicators. The agricultural sector includes crops, livestock production, forestry, hunting and fishing. The significance of the Romanian agricultural sector within the national economy can be evaluated as share the of added value in agriculture in GDP. The evolution of the national GDP and the share of agriculture in GDP can be observed in Table 1. During the period analyzed, it can be hightlighted that although the value of GDP in Romania decreased by 9.8%, the share of agriculture increased by 24.83%. GDP per capita during the period 2013-2017, it has increased by 12.81%.

Table 1. The value of the GDP in Romania and the share of agriculture in GDP

Year	GDP (billions of U.S. dollars)	GDP per capita	GDP share of agriculture (%)
2017	190.95	10,813.72	5.38
2016	199.63	9,532.17	4.72
2015	177.89	8,978.39	4.19
2014	188.49	10,020.28	4.06
2013	211.7	9,585.27	4.31
Relative change in the last five years (%)	-9.80	12.81	24.83

Source: The World bank.com [18].

As stated by other authors the larger size of farms, new technologies, better training and managerial skills of farmers, high quality extension services to improve labor productivity contribute to GDP growth [15].
Table 2 shows the number of inhabitants in rural areas compared to those in urban areas. In both cases, their number decreased, due to the migration of the population to other European countries to work, but also due to aging.

Table 2. Urban and rural population in Romania (million persons)

Year	Urban	Rural
2013	10.82	9.24
2014	10.76	9.20
2015	10.71	9.16
2016	10.66	9.11
2017	10.61	9.06
Relative change (%)	-1.94	-1.94

Source: FAO [7].

During the studied period, almost 54% of the population lives in the urban area and 46% lives in the rural area (Fig. 1).
This high share of rural residents shows the need for their development and support. Also, the inhabitants of the rural area mainly deal with agricultural activities, but the transport, marketing, etc. infrastructure is deficient.

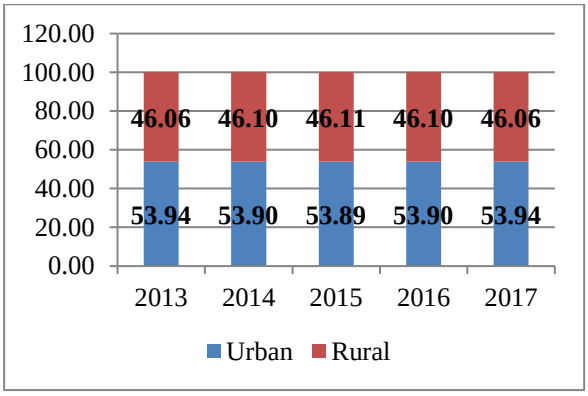

Fig. 1. Share of population from urban and rural area
Source: own calculation based on data available on FAO [7].

There is a need to revitalize agriculture, which includes food production and the development of rural communities because mainly the agricultural activities in Romania are carried out in the rural area [9].

The existing land structure in Romania is in accordance with the quantitative and qualitative requirements of the development of plants and animals, in order to respond to food consumption and to ensure the availability for export [12].

The agricultural area used is about 13 million hectares, divided into arable land, pastures and grasslands, vineyards and nurseries and orchards. This emphasizes the predominantly agricultural character of the country and its potential. The agricultural area of Romania decreased by 3.79% during 2013-2017 (Table 3).

Table 3. Agricultural land area in Romania (1,000 ha)

Year	Agricultural land area
2013	13,905
2014	13,830
2015	13,858
2016	13,521
2017	13,378
Relative change (%)	-3.79%

Source: FAO [7].

Romania is one of the European countries that enjoys good land, water and human resources. Its used agricultural area (13.3 million ha), places Romania in the European Union on the first places in terms of agricultural land per capita (about 0.7 hectares). However, the influence of these advantages was diminished regarding the development and restructuring of agriculture and in rural areas [5].

In figure 2 it is illustrated the proportion of the agricultural area in Romania. From the total area of Romania of 23.84 million ha, the agricultural area has gradually decreased, reaching in 2017 to 56.12%.

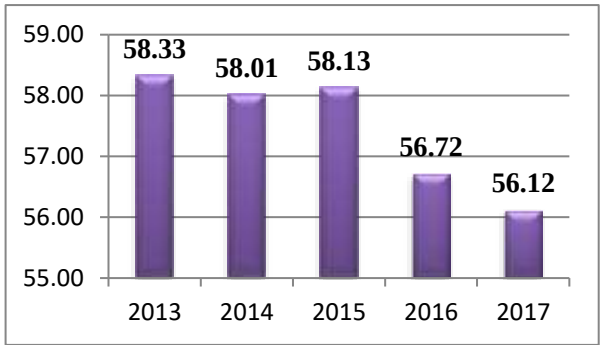

Fig. 2. The share of the agricultural surface from the total area of Romania
Source: own calculation based on data available on FAO [7].

Romania needs agricultural innovations to support the resource base, the communities, the cooperation and the solidarity of the farmers. Cooperation between research and farmers is vital, especially for improving their knowledge of natural resources for sustainable production methods and for improving their production [6].

The social function of agriculture is that it is the main supplier of labor force for this sector, [9].

The improvement of the agricultural sector relies upon the employees in this field. Table 4 presents the change in the number of total workers and the ones in the agicultural sector in Romania. With regard to the national workforce in the period 2013-2017 we can see that the total population employed registered a slight decreasing tendency of 1.92%, whereas in the case of people involved in agricultural activities, the decline was considerable of 26.82%. Therefore, it is necessary to encourage and qualify the labor force in order to have economically efficient productions and to be competitive on international markets. Regarding the share of the population involved in agricultural activities it can be observed that in 2013 it was 27.9%, and decreased until 2017, reaching 20.82%. This is because the people involved in agricultural activities are not stimulated.

Table 4. Total employed population and employed in agriculture (thousands persons)

Year	Total employed population	Population employed in agriculture	Share of population employed in agricuture from total
2013	8,530.6	2,380.1	27.90
2014	8,431.7	2,304.1	27.33
2015	8,340.6	2,003.1	24.02
2016	8,317.6	1,726.8	20.76
2017	8,366.8	1,741.7	20.82
Relative change (%)	-1.92	-26.82	

Source: own calculation based on data provided by NIS [14].

As other authors have predicted [11], the number of employed people is decreasing and it is directly proportional to the reduced number of resident population in Romania.
The main ways to enhance the number of people working in agriculture would be to offer further specialized courses in order to be prepared in this field, financial incentives for opening new businesses in the agricultural field and providing facilities to those in rural areas.
The value of the total agricultural production in Romania varied during the analyzed period. The lowest value was recorded in 2015 of 68.74 million lei, but in 2017 it increased by 10 million lei. Also, for the year 2017 it can be observed that although the number of people employed in agriculture has decreased, the value of agricultural production increased, which indicates that the economy in this sector is more efficient (Fig. 3.).

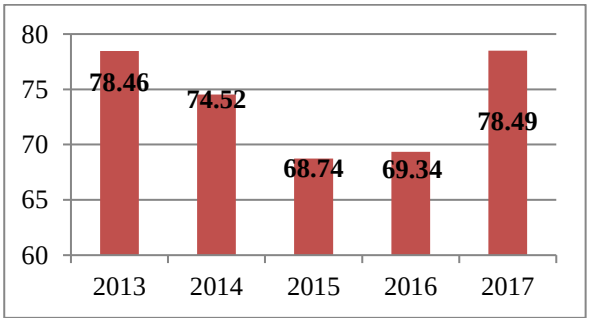

Fig. 3. Value of agricultural production (millions)
Source: NIS [14].

Agricultural productivity can be improved by adopting new technologies and innovation. Also, young farmers, but also workers, should be encouraged. Promoting education among those involved in agricultural activities ensures food security, reduces poverty and social exclusion and revitalizes rural areas [9].
International trade is an important branch of any economy. In Romania, trade in agricultural products generally involves raw materials and less processed products.Table 5 presents the value of the Romanian exports divided by categories of animals and vegetable products. Regarding live animals and animal products during the analyzed period, a decrease is observed until 2016, and in 2017 there was an increase, the relative change being 7.74%.For vegetal products the highest value was recorded in 2014 of $ 4.06 million, and in 2017 the growth was only 0.16% compared to 2013. The total value of exports in 2017 was 5.05 million of dollars, increasing by 1.67% compared to 2013 (Table 5).

Table 5. The value of exports of agricultural products (thousands of dollars)

Year	Animals and animal products	Vegetable products
2013	990,244	3,982,947
2014	993,517	4,067,711
2015	865,438	3,417,042
2016	903,167	3,804,635
2017	1,066,932	3,989,517
Relative change (%)	7.74	0.16

Source: NIS [14].

Smart and modern agriculture could contribute to a wide variety of economic, social and environmental objectives. Innovative technologies, products and practices can help to make the most efficient and sustainable use of natural resources and, therefore, to improve the agricultural process [6].
As shown in Table 6, the import of agricultural products is an increasing one for both live animals and animal products as well as for vegetable products. The value of live animals improts increased during the analyzed period, relative change being 29.32%. Also, in the case of vegetable products, there were significant increases, the relative change in the period 2013-2017 being 39.04%.
The total value of imports in 2017 was $ 4.6 million. On the romanian market there are

demands for agricultural products for which the romanian farmers and producers do not face or do not have the market. In order to balance supply and demand, there are many imported products on the domestic market, which affect Romanian producers.

Table 6. The value of exports of agricultural products (thousands of dollars)

Year	Animals and animal products	Vegetable products
2013	1,481,220	1,931,531
2014	1,628,070	2,014,475
2015	1,390,561	2,255,354
2016	1,594,186	2,578,619
2017	1,915,536	2,685,546
Relative change (%)	29.32	39.04

Source: NIS [14].

The total volume of trade in agri-food and agricultural products is an indicator that helps establish the role of agriculture in the national economy.

The total trade balance regarding the trade with agricultural products, in the period 2013-2017 is a favorable one (Fig. 4), since the value of the imports is lower than the value of the exports, although the trend is a decreasing one.

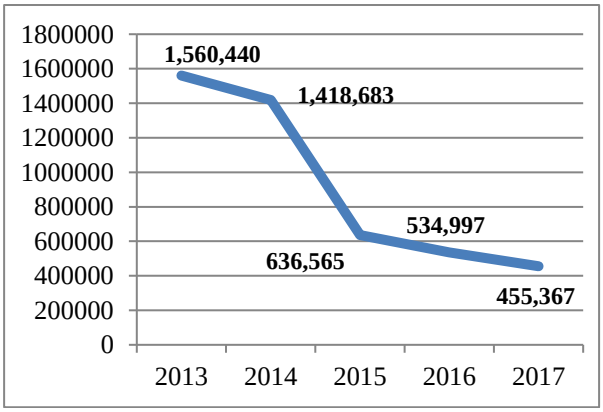

Fig. 4. Trade balance with agricultural products in Romania in the period 2013-2017(thousands of dollars)
Source: own calculation based on data available at NIS [14].

The difference between exports and imports gradually decreased, registering a 29% decrease in 2017 compared to 2013. Although during the analyzed period there were slight increases in exports, the value of imports increased more in the case of live animals and products. animals, but also for vegetable products.

The Romanian agriculture and the rural area continue to have a substantial growth potential, however underused; agricultural restructuring and revitalization of the rural economy are important levers of economic development in Romania [5].

Regarding government expenditure on agriculture in Romania, they are presented in Fig. 5. The values recorded between 2013 and 2017 were between $ 16.1 million and $ 9.5 million, the lowest amount being allocated in 2016. Although the trend was a downward trend, in 2017 there was an increase compared to previous years. However, the relative change during the period analyzed was -10.65%.

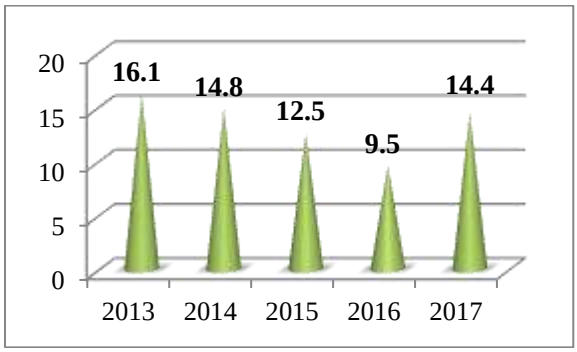

Fig. 5. Government expenditure on agriculture in Romania
Source: FAO [7].

Reducing these costs can cause problems not only for farmers and agricultural producers, but have long-term implications as well as for the entire national economy. In the agricultural field, it is necessary to take measures and propose new solutions for stimulating agriculture.

Investments in the agricultural sector have significant effects on the economy of a country, because it contributes to the improvement of the entire sector, starting from the increase of the incomes of producers and farmers, access to food, products available on the national market, lower prices for food. Some studies have analyzed the importance of public investments in agricultural research and development, irrigation and expansion in increasing production, and have stated that the

contributions of different types of agricultural investments varies greatly [13].
Some authors believe that stimulating investments in agriculture and non-agricultural activities contributes to the development of the economy [1].
Also, as other authors have stated, the Romanian agricultural potential is not sufficiently exploited, which means that it is necessary to increase the competitiveness of agricultural products in international markets [10].

CONCLUSIONS

The development of the Romanian agricultural sector must be done in accordance with the requirements of sustainable development and the alignment with the policies of the European Union. Although, agriculture is a sector of primary importance in Romania, both through its contribution to the national economy and to its social role, the analysis revealed that this sector records oscillations. The agricultural sector has further development potential. Also, the country could beneffit from the advantages offered by the European Union in order to become competitive in other markets as agricultural potential exists and should be used more efficiently.
In conclusion, between 2013-2017 the analyzed indicators recorded oscillating values. Regarding the GDP of Romania, it is decreasing by almost 10%, but the share of agriculture in GDP has increased by 24%, meaning that the agricultural sector has potential and leads to the improvement of the economy.Although both the agricultural area and the number of people engaged in agriculture decreased by 3,79% respectively 26.82%, the value of agricultural production registered an upward trend.This means that productivity in the agricultural sector has increased.The trade balance is surplus, but the trend is declining, and this should lead to taking measures to stimulate domestic producers and exports.The decrease in exports may be due to the reduction of government expenditure on agriculture during the period analyzed.
The development of the Romanian agriculture is necessary because it is a large branch for the Romanian economy. Among the measures that should be taken are the improvement of the employment, the stimulation of the efficiency in the agricultural field, but also the development of the infrastructure, the improvement of the system of irrigation, research and innovation.Also, the measures to be adopted should not only focus on agricultural production, technology, but also consider the whole rural area, by providing support, consultancy and assistance regarding the development of agricultural activities.
The need for restructuring in agriculture derives from the fact that this branch remains an important activity in the rural area and has a significant contribution to the national economy. This is why there is a need for increased investments in agriculture to support generations of farmers, small producers and to provide more development opportunities.

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INNOVATIVE METHODOLOGY FOR APPLICATION FOR INDUSTRY 4.0 IN TOURISM SECTOR

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Abstract

In the age of the new computer world, the topic related to individual tourist trips is quite relevant. However, the question arises with the language barrier when considering tourist sites, getting timely information about the site using intelligible (native) language. This methodology examines the possibility of applying the modern achievements of technology in the tourism industry. The essence is to use an individual self-propelled robot that moves along a given route chosen by the tourist. The verification methodology is based on two fundamentally different recognition methods embedded in a robot developed by us. The robot's movement can also be controlled in automatic or manual mode. By applying Industry 4.0, it stops at every object and senses it using sensors. The robot, in turn, introduces the tourist to the features of the object in a language understandable to him. The present development aims to demonstrate the offering of an innovative tourism service which bypasses the linguistic peculiarities of the different languages, obtains better tourist services and achieves greater satisfaction with the tourist.

Key words**:** *tourism, industry 4.0, robot, tourists, innovation*

INTRODUCTION

The use of robots is not a new idea. There are developments in different spheres without human intervention, but they don't can take on the complex real world with all modern technology. Therefore, these machines have not been very successful. The current understanding is to create intelligent machines that are capable of making independent decisions and operating in the natural environment without taking over the human control functions. At the same time, these machines must be capable of operating for a long time without supervision [1].

On the other hand, there are no working hours and days off for the robots. At the same time, they may perform functions in inclement weather.

Robots are small, smart, interconnected, lightweight machines that aim to release the person from basic everyday pursuits.

One advantage of modern robots is their ability to be built using cheap, lightweight and intelligent components. Due to their spread in consumer electronics such as mobile phones, gaming consoles and mobile computers (laptops, tablets, etc.), high quality cameras and embedded processors can be built into many platforms at a very low cost. In most cases, they are made of new materials and modern composites, using modern and technological production processes that are much cheaper than the basic production processes for the production and manufacture of its details and for the production and implementation of robotic platforms [6].

The symbiotic use of new and differently based platforms will synchronize the work of robots to further enable the distribution of tasks across this multitude of platforms and thus provide an opportunity to increase the tourist service offered. The most robotic fleets can also take advantage of a wealth of data from various sources to calibrate tasks and minimize environmental impacts [9, 6].

The wide range of technologies embedded in these robots enables the rapid transition of the fourth industrial revolution to enter the tourism sector through robotics. Some technologies will need to be developed specifically for this sector, while other technologies have already been developed for other activities and can be adapted to the tourism domain, such as autonomous vehicles, artificial intelligence and machine vision [9, 3, 6].

In recent years, there has been a greater uptake of artificial intelligence-based technologies in tourism globally. Tourism innovations should and would be useful if they are aimed at improving the competitiveness of Bulgarian tourism companies on the domestic and global markets [5].

This can be achieved by improving the organization of the production and sale of tourist goods and services.

Recent advances in telecommunications, networking, databases, data processing and electronic marketing provide many new opportunities for tourism-business. These are significantly impacting traditional tourism business models. The long-term growth of any economy is determined by its ability to renew itself, ie. to turn knowledge into an economic result. "Upgrade or Die" - with this article title in the magazine. "Economist" Peter Drucker gives the shortest definition of the importance of the "renewal" problem for contemporary economic development [2].

This is evidenced by the fact that in developed countries, half of GDP growth is a result of innovation and this share increases as the intensity of new knowledge creation and use in the economy increases. In the tourism sector, a large number of operations are carried out by people, the employment of human resources is over 75%. Significant progress has already been made in implementing AI solutions in the tourism industry. This trend will not only continue, but will intensify in the coming years. The ability of artificial intelligence-based technologies to improve customer service while saving human resources makes AI extremely relevant to the tourism sector. This is a prerequisite for the implementation of this type of solutions at an even faster pace in 2020 [8].

The purpose of this development is to demonstrate the application of Industry 4.0. in the tourism sector, and in particular in the amusement parks, by offering an innovative tourism service that circumvents the linguistic features of different languages.

MATERIALS AND METHODS

To illustrate the areas of activity related to the fourth industrial revolution in the tourism sector, an attempt was made to create the tree structure shown in Fig. 1.

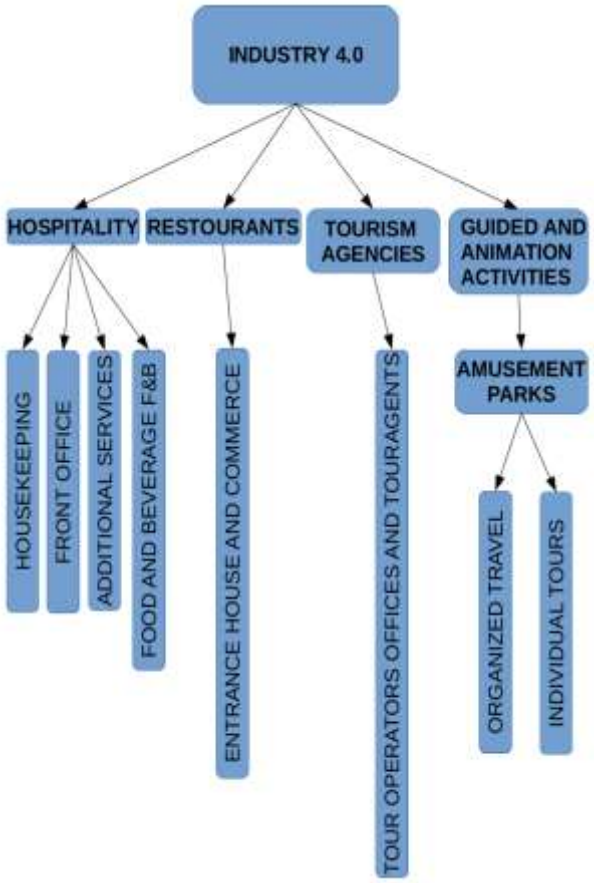

Fig. 1. Industry 4.0 in the tourism sector
Source: Author's development.

Fig. 1 shows the areas of activity of the robots in the tourism sector. In Bulgaria, the application of Industry 4.0 is poorly developed and implemented. all the above mentioned tourism sectors.

Specifically for the purpose of our development, we will look more closely at the implementation of Industry 4.0. in the amusement parks.

As mentioned in Amusement parks it is possible to do organized trips and individual tours.

Fig. 2 shows the interrelations between the different elements of the methodology for using robots in Amusement parks. The purpose of this development is precisely amusement parks (AP). They have a significant number of

attractions and sights to go around. In many cases, they work part-time.

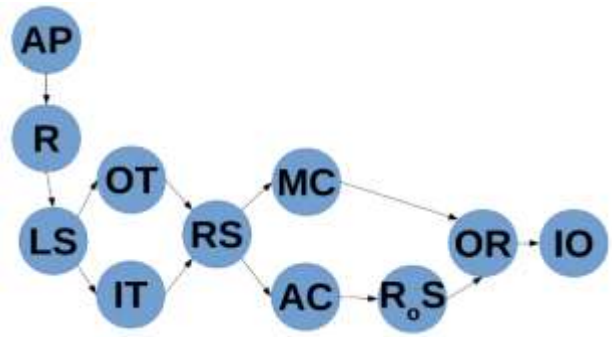

Fig. 2. Relationship between the different elements of the methodology for using Industry 4.0 in the tourism sector:
Legend: AP-amusement park; R-robot; LS-language selection; OT-organized travel; IT-individual tour; RS-regime selection; MC-manual control; AC-automatic control; RoS-route selection; OR-object recognition; IO-information of object
Source: Author's development.

This requires shift guides and more staff to be employed. In the absence of a skilled guide or employment, using Industry 4.0 is quite attractive.

RESULTS AND DISCUSSIONS

Artificial intelligence will improve customer service and save resources in the tourism business. The general technological scheme of hotel services includes activities and operations in: Front office (Front office); Hotel household; Units for additional activities and services; Food & Beverage Sector.
In the near future, hotels will impress their guests with modern IT developments. According to the forecasts of specialists in the hotel sector (Professor of Information Technology at the École Hôtelière de Lausanne in Switzerland and Richard Lewis of Best Western Hotels GB), hotels will soon surprise their guests with directional sound, virtual reality, 3D printing technology, a wireless Internet that works with LEDs and other innovations [8].
In Bulgaria, innovations in the hospitality industry related to Industry 4.0. (robotics and automation software products), modern AI developments, high-tech developments that facilitate and replace human-made work operations and lead to consistent quality of service have not been implemented. The human factor is still large. The quality of service in the hotel complexes would be greatly improved if a new, innovative model were introduced [4].
Food and entertainment establishments combine production and commercial activity. For each of these activities, appropriate premises should be provided include activities and operations closely related to their intended use.
- Commercial premises to the front of the establishment;
- Production premises close to commercial and direct connections;
- Warehouses are the most frequently chosen northern part;
- Administrative-residential premises one floor below or above.
For the purposes of our development, we will focus on Commercial Premises. They include all the rooms where visitors are welcomed, accommodated and served. This includes the entrance hall and commercial halls (dining, banquets, etc.).
In the face of increased competition in the restaurant business, stylish interiors and quality and delicious food are no longer sufficient to retain regular visitors and attract new customers, which requires owners and managers of restaurant establishments to bring in new technologies without increasing technology. the complexity of managing them. The introduction of Industry 4.0 in the restaurant business will enable effective communication and synchronization in the restaurant service and will give greater added value and a better quality restaurant product.
Only the activities, directly or indirectly related to the provision of basic and additional tourist services, may be performed at the sites for the implementation of tour operator and tourist agency activity. The office of the travel agent must have a showcase and signboards and information boards, and near the entrance information on the company of the travel agent and on the place and the name and surname of the person in charge of the site as well as working hours should be placed. In the office a commercial area with separate workplaces and a place for reception of clients should be

formed. The travel agent's office must be open full-time, at least five days a week. If the tour operator also carries out travel agency activity, the premises in which he operates must meet the above requirements. The requirements for the staff are specified in the Regulation on the requirements for the staff of tour operators and travel agents [7].

They are introduced in this regulation and relate to education, language qualification and internship of the staff. Implementation of Industry 4.0. it will facilitate a large part of the work operations in the sector and lead to their uniformity and better quality. Trends show that consumers are increasingly preferring self-service solutions and avoiding intermediaries. The introduction of technologies that eliminate the need for the client to interact with a consultant or tour operator to complete the booking or purchase of a tourism product will save time and provide convenience that will be useful to both consumers and tourism companies. Further improvements in this direction will reduce problems with self-service systems to ensure reliability and security.

Like any additional tourist service, amusement parks have a great added value for the tourism sector and for those who offer it. This methodology makes it possible to apply the modern achievements of the technique in the excursion and animation activities.

Specifically, we will look at the amusement parks in the case of individual and organized tours. The essence is to use an individual self-propelled robot that moves along a given route chosen by the tourist. The verification methodology is based on two fundamentally different recognition methods embedded in a robot developed by us. The robot's movement can also be controlled in automatic or manual mode.

By applying Industry 4.0, it stops at every object and senses it using sensors. The robot, in turn, introduces the tourist to the features of the object in a language understandable to him. This innovative tourist service allows you to bypass the linguistic features of different languages, to obtain better tourist services and to achieve a more complete satisfaction of the tourist.

As mentioned in the first section of the methodology (illustrated in Figure 2) are Amusement parks (AP).

The second unit is the use of robots (R). They are subject to a number of requirements for different fields of use, but in this case, in particular, the robots must meet a few more specific ones:

-Adequate clearance - necessary for the robot to overcome obstacles in its path. Such can be stairs, slopes of ascent and descent, stones, soil, etc.;

-Great autonomy of travel - the requirement must be tailored to the length of the routes. The need arises from the requirement for the robot to circumnavigate these landmarks and return to the entry position;

-Ability to quickly restore the energy source;

-Ability to use RES energy;

-Use quiet mode of movement;

-Possibility for automatic and manual mode of movement;

-Database connection;

-QR reader;

-Ability to work in different languages;

-Convenient user interface.

Once the robot has been selected as a way of touring the attraction, it is necessary to be able to choose the language of communication (LS). This is done using a suitable user interface in a web-based platform. The platform gives you the choice of mode of travel.

One is the group tour (OT). It is suitable for organized visits to the attraction. Usually these are tourists, students, businesses or organizations. They move in a group, usually with a leader who is responsible for the persons in the group and serves as a contact. He must have a minimum of knowledge of computer science in order for communication to take place properly. If the group is large it is possible to split it by interests to satisfy the requirements and wishes of all visitors. It is also possible to divide by number, limiting the maximum number of tourists in one group for the sake of group unity.

One group needs one robot, otherwise it starts with individual tours (IT). They require a robot for each tourist to follow, after programming for certain visits.

The next element in the methodology is mode selection (RS). It selects the way the robot moves in the attraction. There is a choice between automatic mode and manual mode. Specifying the choice of guidance mode aims to specify the length of visit to the park.

By choosing the manual mode of travel (MC), tourists are given a joystick to control or choose the sequence of visits to the attractions. By choosing a joystick control, they have the ability to direct the robot's movement themselves and stop at specific attractions for maximum satisfaction. With it, the robot stops where the tourist takes him, while choosing the attractions to be visited by tourists determine in advance the sequence of visits to the individual attractions. This mode does not require a pre-selection of the attractions to visit.

With automatic guided tour (AC), tourists do not have this option. The specially developed software here instructs the robot on its movements. Communication is required between the robot and the navigation system through a GSM operator or satellite system.

The Road Selection (RoS) element specifies the sequence of visits to the selected attractions. After choosing the attractions to visit, specialized software develops several routes for the robot to travel. Allows you to choose which of the routes the robot moves. This allows the tourists to have a controlling effect on the machines, and it enables them to make a logical decision depending on certain criteria. After specifying the previous elements, a visit to the attractions begins.

Stopping in front of the attraction, the robot must recognize it (OR). This is done with the help of a QR reader, the standard equipment for the robot. To be able to properly approach the code plate, the robot is equipped with an additional 3 VGA cameras on Cognex on both sides. They serve to determine the position through specialized software that takes into account the distance and position of the code. The QR reader may be integrated into the aperture chamber. The cameras also allow the number of tourists in the group to be monitored through the specialized software attached to it. By reading the code, the robot receives information about the attraction in front of it and connects to a database to retrieve information about the particular attraction. The last step in this methodology is to output object information (IO). Through the appropriate user interface, the robot informs tourists about the object in front of them.

Audio-visual display of the information on a special screen on the robot is possible. There is also an option for holographic display of object information in 3D.

When visiting two attractions with sufficient proximity, headphones are used or information is displayed on the screen of tourists' smartphones by a special application that communicates with the robot via the bluetooth interface.

When using specialized software on the smartphone, it is possible to control the camera of the robot to take pictures or selfies.

CONCLUSIONS

Based on the research we can summarize and synthesize the following conclusions:

The artificial intelligence-based technologies are conduct to improve customer service while saving human resources. This making Industry 4.0. extremely suitable for the tourism sector.

An attempt has been made to create a tree structure aiming to outline the areas of activities related to the fourth industrial revolution in the tourism sector.

A brief feature of industry 4.0 activity areas has been made. and the various sectors of the tourism industry (hotels, restaurants, tour operators and travel agencies, guides and animation).

An innovative methodology has been developed for using robots in excursion and animation activities, specifically at Amusement parks, for organized tourist groups and individual tourists.

The essence of methodology are consist to use an individual self-propelled robot that moves along a given route chosen by the tourist.

The requirements for the use of the robot in the tourism sector are specified.

Methodology for application of Industry 4.0 developed. in the tourism sector, it is an innovative tourism service that circumvents the linguistic features of different languages,

aiming at achieving better tourist services and more complete tourist satisfaction.

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EVOLUTION OF THE COMMON AGRICULTURAL POLICY IN ROMANIA BETWEEN 2014-2020

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Abstract

This study follows the evolution of the implementation of the Common Agricultural Policy (CAP) in Romania between 2014-2020, wishing to highlight the characteristics and the results obtained so far. Official documents and reports of the organizations of the European Union, the Ministry of Agriculture and other authorized institutions are analyzed that reveal a series of inconsistencies between what was expected and what is happening in the economic reality of rural areas. Between 2014-March 2018, Romania managed to absorb only 16.1% of the allocated funds, the data from September 2019 show an absorption rate of 32%. The payments made to the beneficiaries of the European Agricultural Fund for Rural Development registered in the first part of 2019 an increase of the absorption of European funds up to 36.2% compared to the first part of 2016. The structural problems of the Romanian agriculture, numerous small farms, labor in this sector, inadequate and bureaucratic internal administration of funds, the structure of the CAP, made it difficult to better absorb the funds available through CAP.

Key words**:** *evolution, PAC, investment, absorption rate*

INTRODUCTION

Agriculture is not only a means of food production and is not one of the important contributors to the GDP of the European Union. It means much more: it develops rural communities, protects natural resources, preserves the specific lifestyle. Many of the jobs are in this sector, and a large part of the population lives in the rural area.

A main objective of the EU has been to increase agricultural productivity to ensure sufficient supply of food. In this algorithm, farmers are the first to provide the basis of the whole system. A coherent policy to support farmers is desirable.

A common policy at European level imposes common rules on a single market, protects progress, facilitates a common commercial policy and contributes to the economic development of rural areas [13].

The study was conducted to observe the current situation of absorption of funds that are made available to Romania through the CAP. These funds represent an important development factor for the entire economy.

Direct payments for farmers provide a certain stability to their incomes which are experiencing significant price and production volatility, and financial support can provide them with a decent minimum income that will contribute to the development of the rural communities in which they live.

The implementation of the CAP requires joint decisions at European level supported by those at national or regional level. The objectives envisaged for Romania such as increasing the productivity of agriculture by promoting technical progress, ensuring the rational development of agricultural production, optimal use of production factors especially of the labor force, ensuring a fair standard of living for the agricultural population, stabilizing markets, guaranteeing security of supply, ensuring reasonable prices for products delivered to consumers are those that can be achieved through the proper functioning of the mechanisms, instruments and institutions made available through the CAP.

MATERIALS AND METHODS

This paper analyzes the evolution of PAC in Romania between 2014-2020. The information base of the research was statistical and analytical materials of national and

international databases based on Eurostat, the European Union through cohesion reports, Eurostat, the Ministry of European Funds, the Ministry of Agriculture. Difficulties were due to data lagging behind too many indicators and sub-indicators. Some of them are sent late, others are missing, and some are poorly correlated, the correct centralization of data is difficult.

The researches and conclusions of the specialists in the specialized work on this topic were also taken into account. The main methods of research was comparison, factor analysis, grouping of data regarding the evolution of the CAP in Romania. Taking into account the evolution of the European Agricultural Fund for Rural Development (EAFRD), the European Agricultural Guarantee Fund (EAGF), the absorption of the European Structural and Investment Funds (ESIF)

RESULTS AND DISCUSSIONS

European Union (EU) statistics show that agriculture and forestry occupy 84% of EU territory. As one of the major importers of goods and an exporter of agricultural and food products the EU has a say in global food systems.

The single European market has evolved due to the Common Agricultural Policy (CAP). Through the CAP the agricultural field makes an important contribution to the satisfaction of the citizens in terms of food safety, security, quality and sustainability. The other side are problems related to low profitability, high production standards, high costs with production factors. This sector is an important competitor in the world market in terms of prices, has a high quality and diversity of products and exports the largest volume of agri-food products.

The CAP was created since 1962, and has tried to establish a partnership between agriculture and society. The CAP is one of the common European policies with an important impact, both from the budgetary point of view, in 2014-2020, 39% of the total EU budget was allocated, but also from the social point of view with a strong role in the EU cohesion.

After cohesion policy, the CAP is the second important common policy. The mechanisms by which the CAP is structured, are summarized in two important pillars: pillar 1 refers to the granting of revenues and involves measures to help the market, and pillar 2 deals with rural development. Market development strategies and income support received funding only from the European Union budget. Concerning rural development, it is considering to be co-financed by the Member States.

Steps have been taken with visible progress, but there are still many problems to be solved. Direct payments have contributed to the survival of 7 million farms, covering about 90% of the agricultural land. These farms represent 46% of the revenues of the EU agricultural community, their percentage being much higher in many regions and sectors [6].

Based on the experience of the CAP from 2007-2013, a common monitoring and evaluation framework (CMEF) is established [7]. The objectives to achieve the CAP performance are:

- viable food production, taking into account agricultural incomes, agricultural productivity and price stability;
- sustainable management of resources and actions to combat climate change, paying special attention to greenhouse gas emissions, biodiversity, soil and water;
- balanced territorial development, paying special attention to employment in rural areas, economic growth and poverty in rural areas. as shown in EU Regulation no 1303/2013, and "Technical handbook on the monitoring and evaluation framework of the CAP 2014-2020" from 2015 [14].

The World Bank highlights the fact that the CAP really helps to reduce the differences between the incomes obtained in the agricultural sector and those obtained in other sectors.

Based on previous experience, the multiannual financial framework (MFF) on agriculture sets the final financial value within the CAP as follows: OCP market measures hold 4.3%, i.e. 17,453 billion euros from the total budget 2014-2020, direct payments have 71.3% , ie

291,273 billion euros, and the rural development measures are 99,587 billion euros, so 24.2%, the total 2014-2020 CAP is 408,313 billion euros. Regarding the EAFRD, Romania is one of the main beneficiaries receiving, for example 14.1% of the actual payments in 2017 [12].

Over the years there has been a decrease in CAP allocations from the EU budget [2]. The decrease is 28.2% if you take into account the percentage from 2020 compared to 1980. A decrease is also visible in agricultural expenditure compared to the EU's gross national income, which is 0.20% in 2020 compared to 1990.

During 2014-2020, the CAP support is over 20 billion euros, of which 11,35 billion in Pillar 1 (EAGF) and 8,12 billion in Pillar 2 (EAFRD). The effects of using these funds to change the quality of life and well-being of farmers and the rural population are a matter of debate, and some conclusions are based on the proposals for better repatriation of subsidies under the CAP, for the period 2021-2027. At European level, in terms of Implementation Progress (total cost) for European Agricultural Fund for Rural Development, at present the situation is this according to Fig. 1.

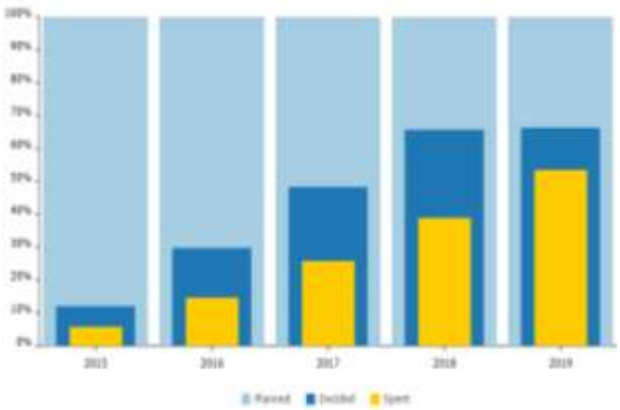

Fig. 1. Implementation Progress (total cost) for European Agricultural Fund for Rural Development
Source: EAFRD, European Structural and Investments Funds, Europa EU, https://cohesiondata.ec.europa.eu/funds/eafrd#top, Accessed on Feb. 20, 2020 [5].

Evolution is positive, in 2015 - 6% of the planned funds were spent in 2016 - 14%, in 2017 - 26%, in 2018 - 39%, and in 2019 - 53%.

In Romania, agriculture is an important factor of the Romanian economy, coming with 7% of the gross domestic product. But Romanian agriculture faces a number of structural problems, among which we list:

-a polarized structure of the farms, 7% of the medium-sized farms manage 70% of the agricultural area. One third of EU farms are in Romania, and half of them are small and very small. This is also explained by Romania's opposition to cap proposals that would leave many farms out:

-the preponderance of vegetable production over animal production

-low level of integration on the value chain

-little organization and representation of farmers (small and very small farms are poorly organized and represented, the bargaining power and the position of farmers requires consolidation, including through accessible consulting services)

-sustainable use of natural resources

-adaptability to climate change and the application of measures to combat them

-depopulation of villages and urgency of generational renewal

-Slavic local governance and administrative culture [4].

For 2018 at European level, 156.1 billion EURO commitment loans are foreseen, of which 58.1 billion euros are for the CAP, which means 37.6%. Direct payments were worth 40.1 billion Euros, ie 26%, rural development measures were 14.3 billion Euros, or 9.1%.

In order to implement the CAP, a complete land register and a well-developed payment system are required. In Romania there are small farms, which raise a number of difficulties in their eligibility to access European funds. Only large farms will access these funds [8].

Romania applies a level of CAP decoupled aid per hectare below the European average. The EU allowed the minimum area to access the 0.3 hectare funds, but Romania decided this minimum area to be one hectare which led to almost half of the number of Romanian farms cannot access these funds.

Pillar I of the CAP is aimed at developing market and income and is based on direct payment to farmers. A first step used for five years was the Single Area Payment Scheme

(SPUS). This program involves giving a lump sum per hectare, regardless of the farmers' decision to cultivate the land. The responsibility of implementing this program lies with the Agricultural Payments and Intervention Agency (APIA). Direct payments are made to stabilize farmers' incomes and increase the competitiveness and sustainability of agriculture in the EU.

Regarding Pillar I, there is a particular situation regarding Romania. 92.25% of the Romanian farms have less than 5 hectares. In 2018, the number of those who submitted applications for such farms is 73.5%, according to the data from the Integrated Administration and Control System (IACS), managed by the Agriculture Payments and Intervention Agency.

In this respect, the Scheme for small farmers has been applied, which encourages the possession of larger areas of land through additional payments of 5 euros / hectare for the owners of land between 1 and 5 hectares and 45 euros / hectare for those who own land with an area of between 6 and 30 hectares The simplified scheme for small farmers offers a maximum annual total payment of up to 1,250 euros per farmer and reduces the administrative burden. The need for such a scheme can be seen in the fact that about 80% of the farmers who asked for direct support opted for this scheme, one of the highest rates in the EU [1].

Pillar II of the CAP is aimed at rural development, focusing on support for farmers, environmental measures, developing rural infrastructure. Regarding Pillar II, for the period 2014-2020 there is a decrease of 15% compared to the previous period in respect of all EAFRD actions. 80% confinement for environmental and climate actions, non-productive investments, PEI (European Innovation Partnership), LEADER are maintained. The co-financing is 100% for the activities financed from the funds transferred to the EAFRD from the EAGF [9].

The evolution of the absorption of the funds made available through the CAP is sinuous. It has to be taken into account that in terms of absolute value, the financial allocations for the CAP, especially for the direct payments, have undergone a constant increase considering the enlargement process in 2004, 2007 and 2013. The money allocated to the CAP has a downward trend in the last years, and this trend will be mainly recorded in the future multiannual financial framework, according to expert estimates [3].

For the period 2007-2013, 8 billion euros were spent for rural development, of which we mention: 299 million euros for 12,700 new farmers, modernization of 2,800 farms for which 1.87 billion euros were spent, support for the restructuring of 52,700 farms of semi-subsistence, improving biodiversity on an area of 3,7 million hectares and aid for organic farming on 85.212 hectares [1].

In 2014, 1.2 billion euros of direct payments were made, having as beneficiaries 1,186,290 agricultural farms. For 2015 measures were taken for the wine sector worth 42 million euros. Also this year it was decided that 219 million euros from direct payments will be used for coupled support measures. This type of support refers to aid for sectors in difficulty. 13% of the EAGF through 19 types of measures were used for the agricultural sectors considered in difficulty [4].

Only in 2015, money was paid from the Fund for Rural Development and Fisheries, and in 2016 they are paid from the EAGF. At mid-2017 the amount that is absorbed is almost 6 billion euros [1].

The direct consequence of the cohesion process was the increase of direct payments by about 15%. In 2019-2020 the payment is 195.5 euros/ha and reaches 1,91 billion euros annually.

In 2014-2020, the N + 3 rule functioned, which implies the loss of the right to reimburse from the humanitarian budget the amounts unspent and undeclared to the Community budget in the next 3 years, which resulted in delays in the implementation of programs with negative influences overall on the EU budget. Also during this period, 1.15 billion euros were forecasted for the aid of areas with natural constraints, which increased by approximately 51% compared to the 2007-2013 financial year. an increase of 25% of the single payment for a maximum of 60 hectares. The organic farming for which the PNDR has allocated 200

million euros, as well as agricultural land worth 909 million euros is taken into account [4].

In the first half of 2018, the European Commission adopted a new multiannual financial framework (MFF) for 2021-2027, but also a proposal for the reform of the CAP. The European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD) constitute the CAP budget and comprise 365 billion euros. The 9.1% decrease from the previous budget continues the downward trend and is a consequence of the imminent departure of the United Kingdom, a very important contributor to the Union's net budget.

The difficult absorption in the financial year 2014-2020 had as a cause a number of internal problems such as: the late start of the operational programs, the projects did not have a long-term vision to create new jobs, wrong payment assessments, poor quality of projects, bureaucracy, insufficient information of citizens [1].

For 2019, according to Eurostat statistics, Romania presents the following situation according to Fig. 2.

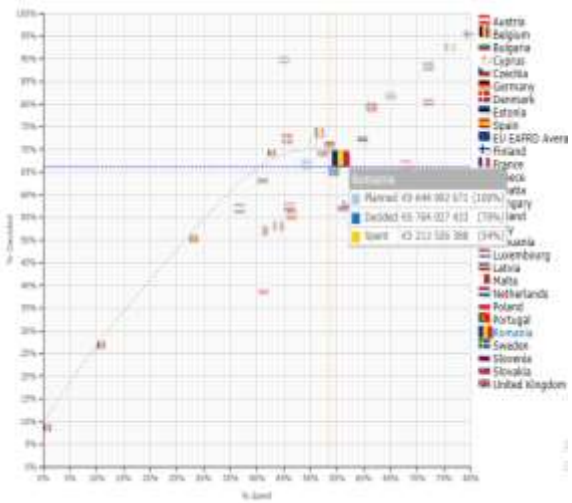

Fig. 2. Implementation by country for European Agricultural Fund for Rural Development – total cost of selection and spending as % of planned

Source: EAFRD, European Structural and Investments Funds, Europa EU, https://cohesiondata.ec.europa.eu/funds/eafrd#top, Accessed on Feb. 20, 2020 [5].

The absorption rate is 16.1% compared to the European average of 18%. Between 2014 and March 2018, our country received 10.2 billion euros from the financial year 2014-2020. Over half of this money is the advances sent ex officio for the beginning of the programming period and direct payments per hectare (EAGF) worth 4.28 billion euros without the need for projects [15].

The data on the absorption of the European refineries, as well as the data on the CAP are constantly updated. The payments made to the beneficiaries of the European Agricultural Fund for Rural Development registered in the first part of 2019 an increase of the absorption of European funds up to 36.2% to the first part of 2016.

In January 2020 the reports made by the Ministry of European funds showed the following situation:

-11.69 billion euros European money entered in Romania through the Cohesion Policy and the Agricultural Policy, to which there is also added 7.92 billion euros direct payments to farmers;

-26.43 billion euros - the total value of the open financing lines;

-46.75 billion euros the value of the projects submitted for these financing lines;

-29.4 billion euros the total value of the financing contracts signed.

In Romania, there were allocated 31 billion euros, of which it received from the EU 11.69 billion euros, which means an absorption rate of 38%, given that the average absorption rate at EU level is 41%. If you subtract from these amounts the pre-financing amount is about 9 billion euros, which means an effective absorption rate of about 30%.

The absorption of the European Structural and Investment Funds (FESI) thus shows in January 2020 a total value of 11,697,050,797 euros. Table 1 explains the main operational programs in Romania and their related amounts, being counted and percentage as it means from the total amount available.

Table 1. The absorption of the European Structural and Investment Funds (euro)

Time schedule	Human Capital Operational Program	Operational Program Technical assistance	Operational Program competitiveness	Operational Program Administrative capacity	The large Infrastructure Operational Program	National Program for Rural Development	Regional Operational Program	Operational Program Fisheries and Maritime Affairs	Direct payments to farmers
Value	1.2 billions euro	151.7 millions euro	397.4 millions euro	154.52 millions euro	2.75 billions euro	4.87 billions euro	1.81 billions euro	53 millions euro	7.92 billions euro
Percent	11.33%	1.30%	3.40%	1.30%	24.56%	41.80%	15.55%	0.45%	25.54 % of the total allocated funds of 31 billion euros

Source: data processed by the author after the Ministry of European Funds in Romania, http://mfe.gov.ro/informatii-de-interes-public/rezultate/, Accessed on Feb.20, 2020 [11].

As it can be seen, the highest absorption rate is that from PNDR, managed by the Ministry of Agriculture, which demonstrates the usefulness and necessity of these funds for the development of rural areas. To these amounts are added direct payments to farmers worth 7.92 billion euro and represents 25.54% of the total allocated funds of 31 billion euros.

In December 2019, the Ministry of Agriculture and Rural Development reported the situation of payments for National Programs for Rural Development (NPRD). In Table 2 we illustrated the implementing stage for some measures and sub-measures related to NPRD. It is noted that most projects and most payments were made to Measure 13 "Payments for areas facing natural or other specific constraints" with 89%, 6.1 "Support for the installation of young farmers" with 85.79%, 6.2 "Support for setting up non-agricultural activities in rural areas "with 77.62%, at the opposite pole there is 4.2" De minimis schemes "with 1.76%.

Table 2. The stage of implementation National Programs for Rural Development (NPRD), December 2019

Submeasure/ Measure	**NPRD financial allocation 2014-2020**	**Value Payments made**	**%**
1.1 "Support for vocational training and skills acquisition"	54,191,021.76	3,657,667.23	6.74
4.1 "Investments in agricultural holdings"	844,672,337.89	452,028,487,31	53,51
4.1a "Investments in orchards"	284,356,108.71	78,927,524.05	27.75
4.2 "Support for investments in the processing/marketing of agricultural products"	359,883,695	73,846,093	20.51
4.2 "GBER State aid scheme"	112,500,000	31,966,183	28.41
4.2 "De minimis scheme"	12,500,000	221,184	1.76
4.3 "Investments for the development, modernization or adaptation of agricultural and forestry infrastructure - irrigation"	433,978,719	97,845,867	22.54
4.3 "Investments for the development, modernization or adaptation of agricultural and forestry infrastructure - agricultural access infrastructure"	130,298,233	46,471,651	35.66
6.1 "Support for the installation of young farmers"	426,744,132	366,121,245	85.79
6.2 "Support for setting up non-agricultural activities in rural areas"	106,569,178	82,722,904	77.62
6.3 "Support for the development of small farms"	246,493,158	141,960,907	57.59
6.4 "Investments in the creation and development of non-agricultural activities"	166,503,969	70,919,499	42.59
7.2 "Investments in the creation and modernization of the basic infrastructure on a small scale - road infrastructure of local interest"	1,109,058,285	305,518,853	27.54
7.6"Investments associated with the protection of cultural heritage"	188,010,999	107,351,983	57.09
Measure 10 "Agri-environment and climate"	1,069,002,274	364,575,062	34.10
Measure 13 "Payments for areas facing natural or other specific constraints"	1,317,643,914	1,172,746,684	89.00
16.4 "Support for horizontal and vertical cooperation between actors in the supply chain"	10,085,582	1,447,780	14.35
19.2 "Support for the implementation of actions within the local development strategy"	495,598,466	165,215,850	33.33
Measure 20 "Technical assistance"	209,099,948	87,415,220	41.80
TOTAL	9,441,583,798	4,360,373,898	46.18

Source: The stage of implementation of PNDR 2014-2020 on 05.12.2019, https://www.madr.ro/pndr-2014-2020/implementare-pndr-2014-2020/situatia-proiectelor-depuse-2014-2020.html?start=10, Accessed on Dec. 09, 2019 [10].

But there are also many measures and sub-measures for which no payment was made such as: Sub-measure 1.2 "Support for demonstration and information activities", Sub-measure 3.2 "Support for information and promotion activities carried out by producer groups within the internal market", Sub-measure 7.4" Support for investments in the creation, improvement or extension of basic local services for the rural population, including recreational and cultural ones, and the related infrastructure", Sub-measure 9. 1a" Establishment of producer groups in the fruit sector".

CONCLUSIONS

Even though official data shows a declining trend for CAP allocations at European level from one financial year to the next, it remains a priority set of measures in the EU budget. Romania is one of the Member States that enjoys generous allocations from the European CAP budget.

For the 2014-2020 financial year, a number of difficulties related to the CAP structure were identified, which created difficulties for Romania, which has a very fragmented agricultural land with many small and very small farms. To this is added an aging population, but with a high percentage of the labor force involved in agriculture and inefficient and bureaucratic administration.

Over time, the CAP has become increasingly complicated and bureaucratised, difficult to understand and implement. In Romania, access to information was difficult at the beginning of the period, and then improved. However, farmers have had to adapt quickly to changes and procedures.

The state of implementation of the National Programs for Rural Development (NPRD) is not a satisfactory one. We are at the end of the financial period 2014-2020, and Romania made payments of only 46.18% for this program. It is necessary to rethink, prioritize, clarify and simplification the measures that will help the absorption of the funds made available by Romania by the EU.

The CAP, especially through the rural development policy, has huge potential for the prosperity of rural communities, but which has not been used to the fullest by the Romanian authorities. According to the analysis, the funds successfully attracted were those of the National Rural Development Program with over 4.87 billion euros. But the country-wide absorption rate remains below the EU average. Through the measures taken to increase the subsidy per hectare depending on how large the farm is, it is trying to reduce the number of farms and the excessive fragmentation of the farms. In our country, the excess of bureaucracy, the cumbersome and little explained procedures, the insufficient involvement of the local administrations led to the mentioned results.

The direct payments to the farmers have an immediate impact with beneficial effects for them thus leading to the raising of the standard of living, ensuring the minimum incomes of the farmers, reducing the risk of poverty in the rural areas.

The post-2020 period is being announced with major changes in view of the Paris Agreement on climate change, the effects of Brexit and the subsequent reform proposals that are still being negotiated.

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ANALYSIS OF THE STATE OF BEEKEEPING IN SERBIA IN LINE SUSTAINABLE DEVELOPMENT IN AGRICULTURE

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Abstract

In Serbia, beekeeping is one of the few agricultural branches with a positive export balance. Honey in Serbia is harvested from environmentally safe areas and certain types of honey are globally recognized and have a geographically protected origin, accordingly better quote on the global honey market and at are a more competitive price. Goal of this paper to analyze the state of beekeeping production in Serbia, to consider the legal frameworks and regulations in this field, investments and incentive measures implemented at the state level in order to improve this production. This paper will present the results of the analysis of parameters related to beekeeping production in the last ten years according to official statistics at the national level. Based on the analysis of the situation, it can be concluded that beekeeping has the potential to become a strategic economic sector. Interest in beekeeping in Serbia is in expansion and an increasing number of farms are officially registering this activity, following the regulations and world trends in this area, placing bee products on the market and earning significant revenues.

Key words**:** *Serbia, beekeeping, honey, incentive measures, additional activity, sustainable development*

INTRODUCTION

Honey is a product of bees with a complex chemical composition that has long been used in human nutrition because of its nutritional and medicinal properties. Free sugars make up 76-79% of the honey content, of which fructose, glucose and sucrose are predominant (maltose and other disaccharides make up 7% of honey). Higher sugars can be about 1.5%; water can be up to a fifth of honey content. The remaining contents of honey are acids (gluconic, formic, acetic, malic, citric, amber and lactic), minerals: iron, copper, manganese, silicon, chlorine, calcium, potassium, sodium, phosphorus, aluminum, magnesium. Honey is not only an energetic but also a nutritious and medicinal substance that contains the amino acids, enzymes and vitamins necessary for normal metabolism. Studies have found that honey has antibiotic, antifungal and antioxidant properties that are related to polyphenols in honey, and honey is an activator of the immune system and can help with anemic and sclerotic disorders [2].
Honey is often used in combination with herbs and other nutrients [10].

Bees are insects of the genus Apis to which nine species belong, of which two species, the eastern bee (*Apis cerana*) and the western bee (*Apis mellifera,* grown for the purpose of obtaining honey for commercial purposes According to some studies, beekeeping is crucial for the whole food chain because every third bite of our food is thought to originate from crops that are pollinated by bees [12]. The bees are endangered and their survival has been called into question due to the insecticides used as part of agrotechnical measures implemented in agriculture. The eventual disappearance of bees would have a catastrophic effect on food production. The pollination of many plant species, especially fruit trees, is directly dependent on the activity of bees. In 2018, the European Commission adopted a decision to completely ban the use of three neonicotinoids (clotianidin, inidacloprid and thiamethoxam), which caused a massive dying worldwide beekeeping community of bees wherever they were applied to crops in the open. New sulphoximine-based insecticides ("sulfoxaflor") have been used as a replacement for neonicotinoids since 2013. It has been established on the basis of research

conducted that this insecticide also has negative effects on bees in terms of reproductive disorders, reduced colony growth rate, and the immune system as well. This insecticide has no effect on the behavior of bees in eating and collecting nectar, but that the bees are smaller than the normal untreated of these insects and there are half as many reproductive males. It is recommended by beekeeping experts to avoid this insecticide as well. It should be noted that residues of these pesticides were detected in certain types of honey [6]. The beekeeping is a world-wide rave as an economic activity. The honey market is being harmonized and legal regulations are being established at the world and national levels. Specific incentive measures have been introduced and implemented at European Union level in this area to improve the production of bee products and to repair the damage caused by the use of insecticides. At the world level, Apimondia is one of the organizations that collects beekeepers for the purpose of promoting production and introducing good beekeeping practices in accordance with food safety standards.

MATERIALS AND METHODS

This paper uses data from the field of beekeeping and honey production related to honey trade at the world level and within the state of Serbia. Official statistics data were used in the analysis of individual parameters [14]. The data collected are analyzed using standard mathematical and statistical methods, which can serve as a basis for predicting the honey production performance that can be expected in the future.

RESULTS AND DISCUSSIONS

World honey production

In terms of the number of beehives globally, India has 13 million, followed by China nearly 10 million, Turkey has 9.5 million, Iran has 8 million and Ethiopia 7 million. Regardless of the number of hives, the largest honey producer in the world is China with 650,000 tons of honey, accounting for 36% of the world's honey production, which is around 1,8 million tons. After China, the largest producers of honey are Turkey, the USA, Russia and Iran, which together account for 58% of world production. The EU produces 230,000 tons of honey, which is 12.7% of world production, in Turkey 115,000 tons of honey, which is 6.4%, while the US produces 100,000 tons of honey, which is 5.5%, and the Russian Federation accounts for 95,000 tons of honey produced, world production with 5.2%. Around 708,000 tons of honey are exported annually worldwide. The countries with the largest share (32%) in world honey exports are China (130,000 tons), Argentina (about 7,000 tons), Ukraine (about 68,000 tons), India (close to 53,000 tons) and Vietnam (about 62,000 tons). At the world level, the United States is the largest importer of honey with 202,000 tons of honey per year, followed by Germany with 81,000 tons, the UK importing 46,000 tons, Japan importing 43,000 tons of honey and France 35,000 tons of honey [15]. Despite the fact that honey production is globally endangered, some countries like Romania have used their natural resources and honey production has increased. Between 2000. and 2011. in Romania, honey production increased from 11,746 tons to 24,700 tons [8]. Based on an analysis and monitoring of the development of beekeeping in Romania, it was concluded that EU accession in 2007 led to an increase in honey production. In 2017, honey was found to represent 30,177 tons of honey, 46 % of which was exported mainly to the EU. The beekeeping industry had a positive export balance in 2016, with exports totaling $ 41.4 million and imports $ 8.9 [11]. Table 1 also lists other countries with a significant share in global sales of natural honey. Compared to 2014, when global honey exports totalized $ 2.4 billion, 2018 data indicates a decline in honey production, which has been happening for several reasons in the past few years.

One of these is the insecticide spraying (already mentioned) and the massive destruction of bee communities, which has threatened the survival of these beneficial insects and the decline in honey and honey production [16].

Table 1. Shows the export balance of honey producers countries and their percentage representation in relation to the global level of honey exports for 2018

Country	Exports of honey USD millions	Market share in global market sales %
China	249.3	11.0
New Zealand	245.5	10.8
Argentina	169.7	7.5
Germany	140.5	6.2
Mexico	120.4	5.3
Spain	107.3	4.7
India	102.4	4.5
Ukraine	98.2	4.3
Brazil	95.4	4.2
Hungary	90.6	4.0
Belgium	77.6	3.4
Vietnam	67.6	3.0
Canada	61.2	2.7
Romania	49.4	2.2

Source: [16].

In addition, the problem of so-called honey counterfeiting and the massive sale of fake honey is growing in the honey market, which has a significantly lower price, which threatens beekeepers worldwide to market their quality products at adequate prices. Apimondia, as the world beekeeping organization officially in 2019, highlighted this problem and proposed new standards that would ensure that the quality of honey is constantly monitored so that only original and safe bee products can be marketed and fed [3].

China is also the largest consumer of honey with about 400,000 tons a year, while the US consumes about 250,000 tons, in Turkey about 100,000 tons, in Iran and Germany less than 100,000 tons are consumed. At EU level, about 360,000 tons of honey are consumed annually. In terms of quality, the best honey is produced in Ukraine, Greece, Scotland, Yemen, and New Zealand. New Zealand produces the highest quality manuka honey in the world, derived from the flowers of a manuka plant that grows like a bush and is the healthiest honey in the world for which it pays € 130 for 500 g [7]. Worldwide sales of natural honey generated $ 2,264 billion in 2018 revenue. China accounted for the largest share of this global honey trade at 11%.

Honey production in Serbia

Serbia collects several types of honey (acacia, meadow, linden, sunflower honey, honey; exotic sage, chestnut and heather) of high quality and with geographical origin. Some of these honeys are protected by the Lisbon Convention on the international honey market on the basis of geographical origin, namely Homolski honey, Fruška Gora linden honey, Kacharski honey, Djerdap honey and Vlasinski honey. Apart from honey, other bee products such as royal jelly, propolis, pollen and bee venom are also present. 9,000 beekeepers are registered in Serbia, organized in 218 local associations within the Association of Beekeeping Organizations of Serbia (SPOS).

There are estimates that more beekeepers are engaged in honey production than what is officially registered and that is around 15,000. According to these estimates, in 2018, there were 1,011,479 hives in Serbia (official data for registered producers is 850,000 hives, while the official statistics presented in Table 2 are 914,000 hives), and about 11,427 tons of honey was produced. Of the said production, 2,774 tons were exported, with revenue from this activity amounting to $ 12.4 million. The same year saw the import of 43 tons of honey, which cost the state 266,000 euros. Thus, at the national level, beekeeping recorded a positive export balance [1].

The incentive measures of the state of Serbia amounted to 3.9 million euros or 470 million dinars and when the hive (only for registered producers with a minimum of 20 hives) the allocation amounts to 720 dinars.

In terms of markets to which Serbia exports honey, EU countries are most interested with 53% of total exports, followed by CEFTA countries with 20%, the US with 1% and other countries with the remaining 26%. 700 tons were exported to Italy, 600 tons to Norway, about 300 tons to Germany, 200 tons to Montenegro and about 180 tons to Bosnia and Herzegovina and Macedonia. Quantities of about 120 tons were exported to Sweden, Bulgaria, Australia and France.

Limiting factors for higher honey exports are relatively low production, strong competition on the world market and low price. Increasing consumer demands on the appearance and

distinctiveness of honey packaging are being put to the fore and marketing needs to be targeted and tailored in this regard. Honey must be health-safe, natural, have a geographical origin, have a modern packaging and label design and a good value for money [7].

Table 2. Production of honey in the Republic of Serbia and number of hives in the period 2009-2018

Year	Annual honey production Thousand tons	Number of beehives Thousands
2009	4,577	302
2010	4,479	320
2011	4,283	306
2012	6,865	654
2013	8554	653
2014	4,387	677
2015	12,263	792
2016	5,761	792
2017	7,014	849
2018	11,427	914

Source: [14].

According to the data in Table 2. One can notice the variation in honey production over a given period of time. The variations that are obvious are related to the already mentioned use of pesticides that led to the destruction of bee communities, but also to the effects of climate change and climate disasters that affected vegetation in Serbia, which also led to a decrease in honey yield, which can be especially observed for 2011 and 2014.

By a comparative analysis of the parameters related to beekeeping in Serbia for the stated decade 2009-2018 compared to the decade 2000-2010, we can see an increase in the number of hives (from a minimum of 164.000 in 2002 to 914.000 as in 2018), honey production is these twenty years also grew (from a minimum of 2.317 tons in 2001 to 11.427 tons in 2018) [9].

In Serbia, there are ecologically preserved habitats in mountainous areas, so extensive meadows and forests are increasingly used for growing bees and producing quality honey.

Honey from the Homolian Mountains is of exceptional quality and adequate measures are being taken by local communities and the state to maintain this quality. Breeding bees in this eco-friendly mountain area is a long tradition. It is a stationary bee-rearing system in cone-shaped beehives knitted with white called bush. The hives are set on the sunny sides of the Homolian Mountains where some fruit trees are planted to collect swarms of bees. The natural conditions, in which meadows and forests are surrounded by homolous mountains, enabled the development of honey meadow and woody plants that serve bees to produce quality honey. Homol honey is thick and varies in color from lighter to dark orange amber hue, produced by mixing meadow and acacia honey in a 1: 1 ratio. The honey has a very pleasant aroma and taste and is of internationally recognized geographical origin, which gives it additional value in the honey market [4].

Honey that stands out for its properties is linden honey from the slopes of Fruška Gora. The linden forests on the slopes of Fruška Gora provide a rich grazing area for bee communities in these regions. This honey has a monofloral and distinctive aroma and taste of lighter orange hues and pronounced antibacterial properties. This honey is recommended to alleviate respiratory and digestive problems [5].

At the level of the Republic of Serbia there is an Association of Beekeeping Organizations of Serbia (SPOS) whose activities are related to the local beekeeping associations, which follow the world trends and developments in beekeeping. Against this background, this Alliance (SPOS) was the organizer and host of the 2012 Apimondium Symposium. The symposium was held under the title "Impact of beekeeping techniques and environmental conditions on the quality of bee products", in addition to the above, the problem of bee diseases was discussed. These developments contribute to drawing attention to Serbia and offering quality honey to the world market. Serbia follows and harmonizes standards of good beekeeping practice with those respected in the EU and in the world. Legislation is also harmonized in the Republic of Serbia and it monitors contemporary beekeeping and needs in this field [13].

Based on the data presented and a comparison of world production that is facing the challenge of how to save bees, there are preserved natural conditions for bee breeding in Serbia, which would also increase honey production. Based on the indicators of honey production and the number of hives listed, it is evident that this activity is in expansion in Serbia. Beekeeping within agricultural holdings is developing as an additional activity and if it is stimulated at the national level and if it has a secure market then in this area sustainable foreign exchange inflow at the level of the Republic of Serbia can be increased.

CONCLUSIONS

Beekeeping and honey production in Serbia are organized economic activities within the legal frameworks and regulations that follow the standards in force at EU and international level. Honey produced in Serbia is of high quality that is recognized worldwide and is an adequately paid export product of Serbia with a positive export balance. Monitored parameters honey production and number of hives for the decade 2009-2018 years have had an increasing trend, also when compared to the previous decade. Serbia is increasingly developing and utilizing its potential for beekeeping development. Indicators of export-import activities in honey production also indicated more significant exports of honey compared to imports, thus generating significant profits in this area. Incentive measures at the state level of Serbia are implemented in order to improve beekeeping and honey production and to introduce good beekeeping practices in accordance with the concept of sustainable development of this agricultural sector.

Investments in this sector are certainly needed in order to meet the requirements for recognition of the geographical origin of certain honey producers and for such bee products to have added value on the market and to be of recognizable quality, such as honey from Homolje and Fruška Gora.

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THE INFLUENCE OF IRRIGATION ON THE STRUCTURE OF CROPS ON ARABLE LAND, UNDER THE CONDITIONS OF ROMANIA'S PLANNED ECONOMY AND FREE MARKET

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Abstract

The paper describes the main criteria that were taken into account during the planned agriculture period, the communist period before 1990, compared to the current period under the conditions of the market economy. During the first period, at the beginning of each year, the Law on the socio-economic development of the country was published, in which the parameters which had to be reached by the end of that year were set. In terms of agriculture, the structure of the crops, livestock, plant and animal production, average yields per hectare and per head of livestock were planned. However, the structure of the crops was compulsory. Both the areas of the different crops and the level of yields were established according to the natural favorability of the land, but especially according to the extension of the areas equipped for irrigation. And during the second period, when the irrigated areas were drastically reduced, they were a major criterion for establishing the structure of the crop.

Key words: *irrigation, arable land, crops*

INTRODUCTION

The structure of the crops on arable land characterizes most faithfully the agriculture of a state during a certain period. The share of certain crops or groups of crops, their presence or absence is defining for the type of agriculture, the degree of intensity, the state policy, investments, profitability. The paper presents two distinct periods: the one prior to 1990, which reflects the period of the planned economy (1945-1989) and the market economy period, from 1990 until the present. During the first period, at the beginning of each year or even before, the *Law of the annual plan for the development of agriculture* was published, which stipulated the areas that had to be sown with each crop, the average yield per hectare, the total yield. If the average and total yields were rather desired and almost never met, the area to be cultivated with each species was mandatory [3]. Plans, or rather programs for the development of a certain economic branch or the whole of the economy existed - they still exist today - but they are indicative, rather than mandatory (laws). Moreover, the plan of crop structure also indicated which of the two categories of agricultural units was to cultivate each one.

The cooperative sector, for example, cultivated species with greater needs for manual labor, less mechanized: vegetables, medicinal plants, while the state agricultural enterprises were mainly allocated cereals, for which by the end of the period the mechanization was complete [3]. According to the plan, the state sector was allocated sugar beet [2] only in 1989, when due to the territorial supply plan the cooperative sector was not sufficient for this product. Also, during the last years of the totalitarian regime there was a plan also for the assisting plots of cooperative members' families, as well as for the non-cooperative private sector (about 10-12% of Romania's arable land) [1].

The situation is completely different under the conditions of market economy, in which the managers of the trading companies or even the peasants with small households decide for themselves what crops they cultivate and on what areas [2].

One of the main criteria for planning the crop structure during the planned economy was the evolution of areas equipped for irrigation. To these areas were allocated crops with higher

water needs, such as maize, sugar beet, potato, some species of vegetables.
The yields obtained from the set up areas were well below the planned ones [4, 8]. However, in the hope that the technologies specific to irrigated agriculture would improve, the crops with higher water needs were to a certain extent located according to the increasing pace of the area equipped for irrigation [8].
In various research studies regarding the yields obtained by various agricultural corps cultivated on irrigated and on non irrigated land proved the difference of production [5, 6]. Also, under various levels of fertilization which requires irrigations, the yields achieved by Romania are below the ones obtained by other countries [7].
During the four chronological reference points studied, the areas equipped for irrigation or irrigated were the following: 1968 - 530 thousand ha (3.5% of arable land); 1989 - 2,908 thousand ha (39.7% of arable land), 2008 - 288 thousand ha (3.1% of arable land) and 2017 - 307 thousand ha (3.2% of arable land) [9].

MATERIAL AND METHODS

The material used is extracted mostly from the statistical yearbooks of Romania, respectively the figures regarding the areas cultivated annually with different plant species and groups of plant species. To these are added the works of the authors on this topic or on topics related to the subject matter.
In order to highlight the tendency of the areas cultivated with different crops that reflects the changes in the crops' structure, the quadratic equation was used, which reflects most accurately the changes that occurred in the crops' structure.

RESULTS AND DISCUSSIONS

Table 1 shows the crop structure of Romania's arable land in 1968, 1989, 2008 and 2017. The first two chronological reference points belong to the planned agricultural system in which the crop structure was established at the highest level, by law.
The main criteria that were taken into account were the technological progress - rather a theoretical one - but especially the evolution of the areas equipped for irrigation (Fig. 1).
The zonal favorability of the land, as well as the social economic, state or cooperative sector were also taken into account.
The county-by-county breakdown was done in the presence of the agricultual directors and, obviously, the chief secretaries of the party.

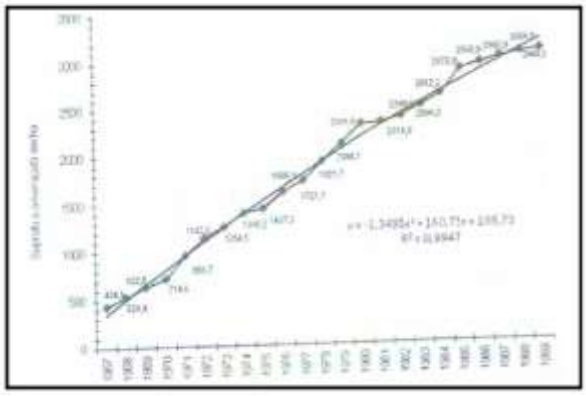

Fig. 1. Areas equipped annually for irrigation in Romania during the 1967-1989 period
Source: [9].

The discussions mainly concentrated on the level of average yields, by counties and sectors (state and cooperative).
The results obtained on the land equipped for irrigation were also taken into account. Some results were well below the planned level, between 3-4 tons/ha compared to 10 tons/ha projected [3]. This explains why the share of maize in the structure of the crops was lower in 1989 than in 1968 (Table 1 and Fig. 3), when the influence of irrigation was insignificant (about 500 thousand ha at country level). Instead, the increase of the share in the structure of crops with higher water needs, such as soybean, sugar beet, potato, rice, for which over 50 thousand hectares were set up, was forced.

The evolution of the areas cultivated with the main crops

Wheat and maize. Romania has always been a cereal producing country, and Romanian wheat, one of the most sought-after export products. Together with maize, it accounts for more than one third of the cultivated area. The two cultures are competitive, but also complementary, the difference being given especially by the need for water. Wheat, with

smaller water needs, is less sensitive to drought and as the areas equipped for irrigation increase, the cultivated - actually planned - areas decrease (Table 1 and Fig. 2), but not below the 2 million ha threshold. However, due to the inadequate exploitation of irrigation, the areas planned and cultivated with wheat increase again (during the 1963-1989 period).

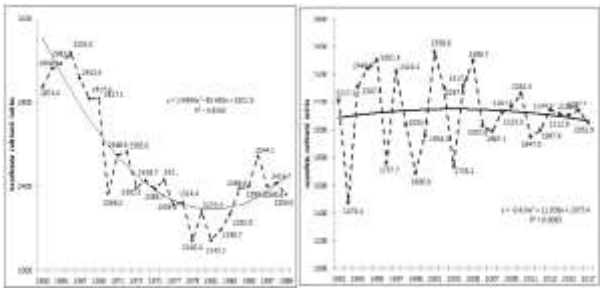

Fig. 2. Wheat cultivated area in Romania
Source: [9].

During the second period, 1991-2017, the area cultivated with wheat remained around 2.5 million hectares. During the socialist agriculture period, the maize cultivated area should have increased due to the extension of irrigation. However, this was not the case as a result of irrigation failure. During the last years the maize obtained was: 1985: 3,846 kg/ha; 1986: 3,811 kg/ha; 1987: 2,699 kg/ha; 1988: 2,781 kg/ha; 1989: 2,472 kg/ha, compared to the projected 8-10 t/ha. Such yields tempered the enthusiasm of the planners for extending the maize production and the cultivated areas were reduced to a necessary minimum (Fig. 3).

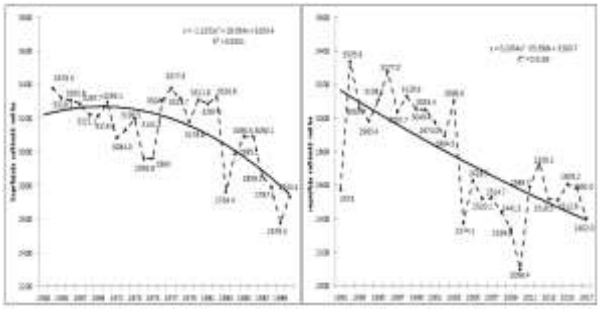

Fig.3. Maize cultivated area in Romania
Source: [9].

After the fall of the planned agricultural regime at the end of 1989, the areas cultivated with most crops did not constitute articles of law, the decision descending to the level of each new owner. But as the irrigation systems were abandoned, with the drastic reduction of irrigation, the maize cultivated areas reduced from one year to another, the curve becoming a downward line (Fig. 3).

Oleaginous crops. A special case is that of the sunflower. Along with wheat and barley, it was one of the few profitable crops during most years and this is precisely because they are satisfied with less irrigation. However, after a significant increase in the area cultivated in the late 1970s, the planning bodies reduced its extension in order to accommodate species with higher water needs: maize, sugar beet, potatoes and even soybean. After 1990, however, with the abandonment of irrigation, the sunflower expanded greatly (Fig. 4), sometimes exceeding even one million hectares. It seems, however, that the choice of new-old managers is also due to a more favorable market.

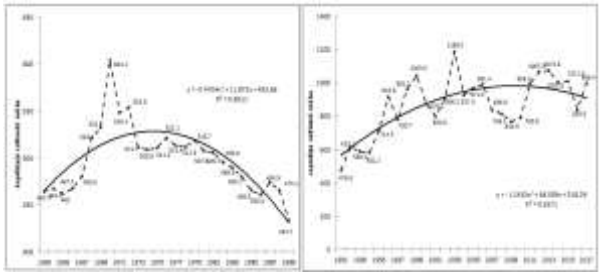

Fig. 4. Sunflower cultivated area in Romania
Source: [9].

Soybean was also a special issue. Considered rather a protein than oleaginous, but dependent on irrigation, it has expanded to an extent alongside irrigation, but also alongside large animal breeding complexes.

Cultivated on insignificant areas before 1970 (it is not even mentioned in the statistical yearbook) it reached over half a million hectares in 1989 (Fig. 5), although the yields per hectare were very small due to unjustifiable technological errors (1,228 kg/ha in 1986 - the highest yield and only 593 kg/ha in 1989, compared to the planned 3,000-3,500 kg/ha).

Table 1. Evolution of areas cultivated with different plant species and their share in Romania's arable land

	1968		1989		2008		2017	
	Area - thousand ha-	Arable share %	Area – thousand ha-	Arable share%	Area- thousand ha-	Arable share %	Area - thousand ha-	Arable share %
CEREAL GRAINS	6,657	67.9	6,027.1	61.2	5210.7	66.2	5,192.3	55.1
- Wheat and rye	2,861	29.2	2,359	23.9	2,123.3	27.3	2,062.7	21.9
- Barley and two-row barley	292	2.9	767.8	7.8	394	5.1	455.5	4.8
- Oat	132	1.3	105.7	1.07	200.4	2.6	165.8	1.8
- Maize	3,344	34.1	2,733.4	27.3	2,441.5	31.3	2,402.1	25.5
- Sorghum	0	0	10.5	***	8	***	14	0.1
- Rice	25	***	49.3	***	9.9	***	9.1	0.1
PULSE + TEXTILES	266	2.7	434.5	4.4	36.7	0.5	119.3	1.3
- Peas	111	1.1	96.9	1	18	0.2	106.6	1.1
- Beans	39	***	197.5	2	18.2	0.2	11.2	0.1
- Flex fibre	34	***	70.1	0.7	0	0	0	0.0
- Hemp	29	***	46.1	0.5	0	0	1.7	0.0
OLEAGINOUS PLANTS	616	6.3	1,070.6	11	1,239.4	15.9	1,766.3	18.7
- Sunflower	520	5.3	433.7	4.4	813.9	10.4	998.4	10.6
- Cole	2	***	19.8	0.2	365	4.7	598	6.3
- Soybean	49	***	512.2	5.2	49.9	0.6	165	1.8
- Flax oil	66	***	78.6	0.8	0	0	2.2	0.0
- Castor-oil plant	22	***	26.3	0.3	0	0	0	0.0
INDUSTRIAL AND MEDICINAL PLANTS	250	2.6	354.1	3.6	37.7	0.4	1,778.3	18.9
- Sugar beet	185	1.9	255.9	2.6	20.4	0.3	28.2	0.3
- Tobacco	36	***	34.4	0.4	1.2	0.02	0.8	0.0
- Chicory	2	***	6.4	0.06	0	0	0	0.0
- Medicinal crops	10	***	41.6	0.4	7.3	0.09	3.2	0.0
POTATOES + VEGETABLES	550	5.6	604.2	6.14	523.9	6.7	392.3	4.2
- Potatoes	316	3.2	351.4	3.6	255.3	3.3	167.4	1.8
- Vegetables	218	2.2	252.8	2.6	268.6	3.4	224.6	2.4
FODDER PLANTS	1,303	13.3	1,149.2	11.7	851.3	10.9	874.7	9.3
- Lucerne	445	4.5	361.4	3.7	321.4	4.1	391.1	4.2
- Clover	195	2.00	126.4	1.3	117.4	1.5	115.9	1.2

Source: [9].

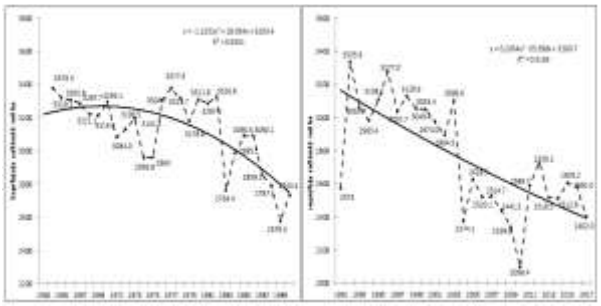

Fig. 5. Soybean cultivated area in Romania
Source: [9].

After 1989, the cultivated areas were drastically reduced (Table 1 and Fig. 5), both due to the reduction of irrigation, but also to the competition of grit imported from countries without GMOs (genetically modified organisms) restrictions.

It seems, however, that the need for the indispensable grit of the animal breeding complexes, as well as the revival of irrigation will be favorable conditions for the expansion of the crop.

Sugar beet. With smaller, but traditional zones of favorability, sugar beet was cultivated even before the '60s, on areas sometimes exceeding 200 thousand ha (Table 1 and Fig. 6).

With high water needs, the trend of cultivated areas has followed that of the extension of irrigation, the cultivated areas reaching over 280 thousand ha.

Introduced in the irrigation systems of the Romanian Plain it did not yield the expected results, but as *the law was the law*, in accordance with the famous *territorial self-supplying program* sugar beet was cultivated in

each county. After 1989, the reduction of irrigation, as well as the preferences of the processors for refining the imported raw sugar, resulted in a tenfold reduction in sugar beet cultivated areas [9].

The future of the crop will be decided by a variety of factors, such as the extension of irrigation, the market and the response of the new managers who will act according to the principles of the market economy, *the profit*.

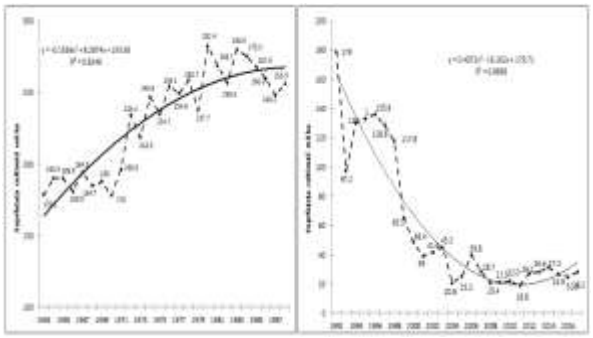

Fig. 6. Sugar beet cultivated area in Romania
Source: [9].

Potato. It is part of the group of perishable but necessary daily food products, which is why self-supply in a country still almost half rural was an unwritten law.

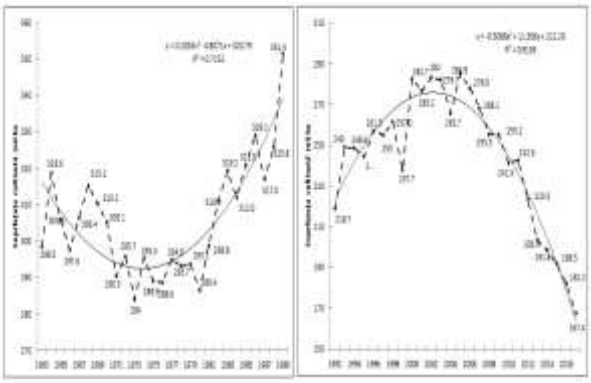

Fig. 7. Potato cultivated area in Romania
Source: [9].

Before 1990 (Fig. 7), with the irrigation, but also with the implementation of the principles of the planned economy, the potato cultivated areas increased even if the yields per hectare were far from the planned parameters and the results of the research in the field, or precisely because of this.

Rice. A somewhat traditional crop in Romania, it came to the attention of specialists especially during the '60s, when rice plantations were arranged on 50,000 ha, of which 42,136 ha in the Danube Floodplain on the occasion of its drainage.

During the last 5 years of the planned agriculture, the rice cultivated areas and the yields per hectare were, as follows:

- 1985 ..... 37,600 ha ..... 3,643 kg/ha
- 1986 ..... 43,200 ha ..... 3,533 kg/ha
- 1987 ..... 44,300 ha ..... 2,586 kg/ha
- 1988 ..... 49,000 ha ..... 2,686 kg/ha
- 1989 ..... 49,300 ha ..... 1,422 kg/ha

In 1992 and 1993, rice was still cultivated on 16,400 ha and, respectively, 12,000 ha in the state's rice plantations in the Danube Floodplain, then the areas cultivated with some variations were reduced to 1,000 ha in 1993 (Fig. 8).

The interest in rice will increase, but the cultivated areas will not exceed 20,000 ha taking into account the average consumption of 4-5 kg / capita.

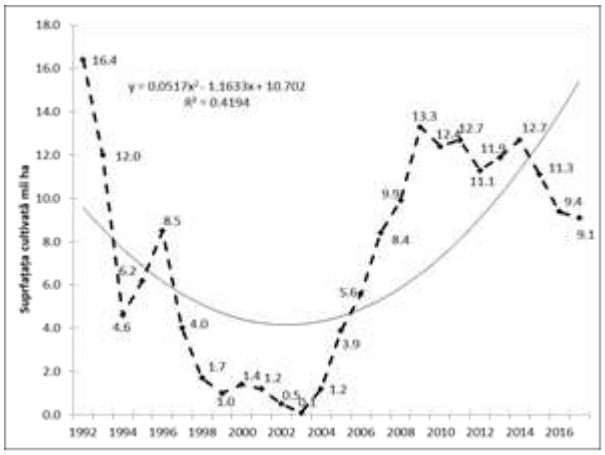

Fig.8. Rice cultivated area in Romania
Source: [9].

CONCLUSIONS

The mutations that occurred in the structure of crops in the arable land was largely influenced by the programs of extension of areas equipped for irrigation, but also by the small yields obtained on the so-called irrigated land.

The dictatorial regime prior to 1990, invested a great deal in irrigation, considering it one of the main factors of agricultural intensification.

The huge investments in projects related to development works, apart from the fact that the simplest solutions were used, and the irrigation systems of immense size remained practically unfinished, were not accompanied by other factors of production, such as fertilizers or pesticides. Moreover, from the research in the

field it turns out that not even watering was done, the energy for pumping water being used for other purposes. This explains why species such as maize have been cultivated in the last decade on smaller areas precisely because of the unsatisfactory results obtained on areas equipped for irrigation, but in an inadequate way.

During the second period, the decision to restrict the areas of some crops is also due to the irrigation practiced on very small surfaces. In the conditions of the market economy, the managers of agricultural enterprises correctly oriented towards crops more resistant to drought, such as sunflower, which in some years exceeded one million cultivated hectares. The biological material created along the way, the favorable market, the orientation towards biofuels were also favorable factors.

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THE EFFECT OF DIRECT PAYMENTS ON FARM PERFORMANCE FOR THE CASE OF CEECs THROUGH STOCHASTIC FRONTIER ANALYSIS APPROACH

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Abstract

Since the 1980s, agriculture in CEECs has been under continues pressure due to the changes in political, economic and institutional circumstances that have been closely linked to the transition process as well as to the process of integration into the European Union and openness to the world markets. The transition process led the agricultural sector to experience substantial reforms at both macroeconomic and at microeconomic levels. These changes were expected to increase the performance indicators of farms in these countries, however, they are still lower compared with the performance indicators of farms in developed countries. The aim of this paper was to calculate the technical efficiency scores of farms in CEECs though Stochastic Frontier Analysis approach and to measure the effect of direct payments on performance indicators. By using the FADN data for 11 CEE countries for the period 2004-2016, the results suggested that the average technical efficiency was 84%. Compared to Kosovo, this average technical efficiency score, as a proxy for farm performance, is very high. However, compared to more developed countries, these efficiency score can still increase by making more targeted agricultural policies. Direct payments are suggested to significantly and negatively affect the technical efficiency scores.

Key words**:** *direct payments, performance, technical efficiency, SFA, CEECs*

INTRODUCTION

The transition process led the agricultural sector to experience substantial reforms. At macroeconomic level, the reforms were concerned on the elimination of central control, price liberalization and the imposition of hard budget constraints, while at microeconomic level they had to do with changing of the structure of the farms -from collective farms to individual farms as well as reducing the number of workers and changing the way of farm management. These changes were expected to increase the incomes of the agricultural sector as the farms would be more efficient, would have increased productivity, and would be more competitive [19]. Although immediately after the reforms, output has dropped uniformly in all Central and Eastern European Countries (now one referred as CEECs), after several years, productivity has increased significantly due the implementation of these reforms. So, the performance of the agricultural sector has begun to increase in the mid-1990s due to improved economic situation as a condition for EU membership and due to improved access to technology, capital and know-how. However, serious improvements still need to be made on performance indicators (e.g. technical efficiency) for the case of CEECs as theirs differ greatly with those of developed countries.

In order to increase the performance of the agricultural sector, every country has developed its own agricultural policies. However, the countries member of the EU are part of one agricultural policy known as Common Agricultural Policy (now on referred as CAP). This is a very important policy in the EU as it occupies 38% of the EU's budget [12]. Also the CEECs that joined the EU, some in 2004 and some in 2007, started to implement CAP and to benefit from it. However, the adaptation of CAP was challenging because in addition to transition and reform policy which needed to take place in these countries, they also needed to adapt the EU's new agricultural strategies.

With the accession of New Member states into EU, the CAP direct payments were extended

also for the farmers of these countries by providing them the perspective for the development of agriculture through the systems of European funds and direct payments. As part of CAP, the amount of direct payments increased together with the number of beneficial farmers. After the accessfion of EU-10 in 2004, the average incomes for farmers increased by 70 %. For example in Estonia the incomes increased by 132%, in Latvia increased by 106%, in Poland by 95% and in Lithuania the average agricultural incomes inceased by 92%, while in the Old Member States the agricultural incomes remined unachanged [11]. Direct payments range from € 2,231 on average per farm (the case of Romania) to € 162,522 on average per farm (the case of Slovakia) [11].

Subsidies/direct payments, grants and other kinds of support are provided in order to increase the incomes of the farms and to increase their competitiveness. This in one of the main reasons why the government of each state supports the agricultural sector though different forms of support policies (e.g. direct payments) even though these supports are a huge burden for the budget of each country [15]. As a result, many research works have been conducted in order to analyse whether these agricultural support policies have achieved the desired goals, more specifically if they improved the performance of the farm.

Different papers consider different indicators for measuring the performance of the agricultural sector, but technical efficiency is the most used indicator for farm performance. In addition, factors affecting the performance of the agricultural sector are numerous, however what is of interest in this paper is to assess the impact of direct support (as proxy for support policies) policies on technical efficiency of farms (as proxy for performance). In the literature is identified the impact that the direct payments have on agricultural production, input allocation and income distribution but not also on technical efficiency [22]. Even though the theoretical results on this direct payment–efficiency link are ambiguous one can expect positive effect of direct payments on efficiency, negative effect, or no effect.

Regarding the positive effect, it is believed that agricultural direct payments help employment and increase capital investments. [13] suggests that this positive relationship is as a result of two conditions: Firstly, if they assist in the improvement of technology of the farm, thus increasing the initiative to innovate or to switch to new technologies, then efficiency will also increase. In this regard, also [24] suggest that with the help of direct payments, the farmers overcame their financial contains and can restructure or modernize their farm by improving their productive capacitates by either replacing their technologies or by investing in more advanced technologies. Secondly, if the support provided to farms helps them to better use economic resources, then efficiency will also increase [13].

[22] emphasizes that support policies alleviate farm lending restrictions and reduce risk aversion which is another factor that supports the positive relationship of direct payments on efficiency.

However, support policies may also be problematic and as a result efficiency might decrease because they can make the farm less productive due to two reasons [5]. First, support policies weaken managers' motivation to produce at lower cost. Second, direct payments can help managers to avoid bankruptcy and as a result the managers postpone the activities to re-organize the farm in order to become more productive and to improve performance. Managers go to fundraising activity rather than production or prefer more leisure with a higher income from direct payments. According to [20], direct aids reduce the work time of farm managers and their efforts and as a result, the farm's effectiveness decreases. Support policies can also influence the change of farmer's orientation because make the farmers invest in sectors that have more support but in which may be less productive [4]. Even when support policies are important, farmers spend more time on other activities that may adversely affect farm performance [17] or just prefer more leisure with a higher income from direct payments [24]. In addition, support farms can change the combination of capital and labour by investing more in capital and thus may

result in allocation inefficiency [12, 21]. For example, when these payments are linked to a special resource like capital, then they are used to increase this resource and not to other factors [16].

Also, one may expect no significant effect (i.e. null effect) of direct payments on technical efficiency, since this is not the primary aim of the subsidization policy. As suggested, the effect of direct payments on performance indicators of farm can be of both directions or no effect but it is also important to recognize that support policies affect restructuring of the farm in general because they effect the decision making of the famers and make them isolated from economic and technical signals and as such the performance indicators of the agricultural sector might decrease.

However, the economic theory does not provide enough guidelines on the direction of relationship between direct payments and technical efficiency and as such there is a small amount of studies conducted in this field [14]. As these studies are little and complex, this relationship and its direction is an open empirical question and is subject to empirical studies [17].

MATERIALS AND METHODS

In many countries of the world, agriculture is one of the most important sector for the development of the national economy and is the oldest sector in the history of the mankind. Because of its importance, it was decided in this paper to measure the technical efficiency rates of the farms in CEECs and to identifying potential sources of inefficiency by being focused on direct payments.

Efficiency is a very important indicator when evaluating the performance of a production units, of an industry, or of the whole economy. In the agricultural sector, efficiency is a key contributor to agricultural productivity growth and distribution of resources in the economy. As a result, there have been developed different techniques to measure the technical efficiency scores of the farms in the sample.

Stochastic Frontier Analysis (now one referred as SFA) is suggested as the most suitable technique to be used in agricultural studies because it is able to consider stochastic noise when measuring the technical efficiency scores [9]. In addition, as agricultural production is characterized with high level of uncertainty, due to factors out of the control of the farmers such as weather, pests, diseases, trade issues, access to material and other factors, then the use of SFA is suggested to be the most adopted methodology in measuring farm efficiency [9]. SFA can handle this stochastic noise because it is able to decompose the error term of the production function into the pure random error *(vi*) which accounts for measurement errors and effects of the factors that are out of the control of the farmer into the technical inefficiency terms (*ui*) which accounts for the deviation from the frontier [2]. As agricultural production is likely to be effected by unpredictable factors, by other variables such as size, organizational type, education and also by policy measures, then the SFA offers a better framework for this kind of analysis compared to other techniques (e.g. Data Envelopment Analysis).

It was the year of 1977 that marked the origination of SFA with the work of [1] and [21]. The model for panel data is the model to be used for the measurement of technical efficiency and sources of inefficiency for farms in CEECs. Panel data models have many potential advantages over cross-section data in frontier estimation. According to [8] panel date increase the degree of freedom for estimation of parameters, provide consistent estimators of form efficiencies, removes the necessity to make specific assumption for the distribution of u_i, do not require inefficiencies to be independent of the regressors. In addition, with panel data is possible to estimate the productivity change as well as the technical progress or regress [10].

This model for panel data is represented as below [7]:

$$\boldsymbol{y_{it}} = \boldsymbol{f}\left(\boldsymbol{x_{it,}}, \boldsymbol{\beta}\right) + \boldsymbol{\varepsilon_{it}}, \quad \text{where:} \quad \boldsymbol{\varepsilon_{it=}\, v_{it} - u_i}$$

$$y_{it} = f\left(x_{it,}, \beta\right) + v_{it} - u_i\,, \quad u_i \geq 0$$

where:

y_{it} represent the output of the *i*-th farm at t-th time;

x_{it} represent the inputs to be used in the production function
$f\ (x_{it,}, \beta\ )$ is functional form of the production function
β is the unknown parameters to be estimated though SFA
v_{it} represents the statistical noise (iid), $N(0, \sigma_v^2)$
u_i represent the component of technical inefficiency $N(\ \mu, \sigma_v^2)$.

On the other hand, technical efficiency of the farm is represented as observed output y_{it} over maximum feasible output [6]. As a result, this rate can be expressed in terms of the errors as [6]:

$$\boldsymbol{TE_{it} = exp - (u_i)}$$

Technical efficiency rates can range between 0 and 1, where the value of 0 means that the farm is technical inefficient while 1 means that the farm is 100% technical efficient. These values are as such because of u_{it} which is a nonnegative random variable. Otherwise $\boldsymbol{TE_{it}} < 1$ provides a measure of the shortfall of observed output from maximum feasible output in an environment characterized by $exp\ (v_{it})$, which allows for variation across producers [6].
In addition to the model for the measurement of technical efficiency score, there is another model which is used to identify the sources of inefficiency (in u_{it}). The inefficient term ($U_{it}\ s$) is supposed to be function of a set of other explanatory variables and can be presented by the equation below:

$$\boldsymbol{U_{it} = z_{it}\delta + W_{it}}$$

where:
z_{it} represent the independent variables;
δ represents the unknown coefficient to be estimated;
W_{it} denotes the truncation of the normal distribution with zero mean and variance σ^2.
For the measurement of the both models in the same time, otherwise known as a one-step or as simultaneous procedure, is used the Maximum Likelihood technique as proposed by [3].

RESULTS AND DISCUSSIONS

The data from the European Community's Farm Accounting Data Network (FADN) are used to measure the technical efficiency scores for 11 countries of CEECs: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and for Slovenia for the period 2004-2016. FADN enables us to create a strongly balances dataset with 143 observations.
For the technical efficiency model are used 5 variables categorized in three groups:
-1. Output variable - Total Agricultural Output (y) in value;
-2. Input variables: Classical inputs (Capital in value ***(x_1)***, Labour in annual working units ***(x_2)*** and Land in ha ***(x_3)***);
-3. Variable Input - Intermediate Consumption in value ***(x_4)***.
The descriptive statistics for these variables are presented in Table 1.

Table 1. Descriptive Statistics for CEECs

Var.	Obs	Mean	Std. Dev	Min	Max
Output (value)	143	100,260	151,858	0	665,263
Labour (AWU)	143	3.37	4.35	0	22.02
Land (UAA)	143	101.59	156.4	0	615.33
Var. Input (value)	143	76,561	120,960	0	497963
Capital (value)	143	262,698	342,458	0	1,682,114

Source: Author's own calculations.

As explained in the section above, in efficiency analysis is not important only to measure the technical efficiency score by using the variables presented in table 1. Of an equal importance in efficiency analysis, also presents the measurement of the effect of exogenous variables (Zs) on inefficiency term. The analysis of the second model can explain why some farms can perform better compared to other farms, in other words, why some farm are nearer the frontier and have higher technical efficiency rates.
The explanatory variables to be used in the inefficiency model are: direct payments to total

output, degree of specialization proxied by the ratio of total livestock ouput to total output and its square, total land to total labout, family labour to total labour, ranted land to total utilized land, financial helath proxied by short term and long term debt to total assests, and also are used two dummies: regional dummies and legal form dummies. Direct payments is the variabl of interest in this paper and is treated as exogenous because a farmer can not increase or decrease the amount of production only by increasing or decresing the amout of direct payments that they receive [25].

Before executing in STATA the MLE estimation of stochastic frontier model, it is preferred to firstly estimate the model with OLS and to investigate the skewness of the OLS residuals. For the case of CEECs, Table 2 presents the coefficient estimated by using OLS.

Table 2. OLS estimation of the model for CEECs

Ln Output	Coeff.	Std. Err.	t	P>|t|
Ln Capital	-0.0078	0.027	-0.29	0.771
Ln Labour***	0.0874	0.024	3.69	0.000
Ln Land	-0.0108	0.028	-0.38	0.704
Ln Variable Input***	0.8824	0.040	21.97	0.000
_cons	1.6705	0.167	9.97	0.000

Note: * significant at 10%, ** significant at 5%, and *** significant at 1% of significance level
Source: Author's own calculations.

The coefficients from this OLS estimation for the variables of lnLabour and lnVariableInput are significant at 1% of the significance level and as such are suggested to be consistent for the production frontier model. On the other hand, lnCapital and lnLand from the OLS estimation are found to not be significant but will continue to be present in the stochastic frontier model. The OLS estimation also suggests that the output elasticity of the classical and the variable input is 95%, which is very close to the constant returns to scale.

In addition, the estimation of the OLS regression helps us to check the validity of SFA specification. With the other words, to see whether the SFA methodology, which is composed from the two error terms, is more appropriate compared to the standard OLS, which is composed from one error term. This is done through the test on OLS residuals proposed by [23]. If there exists a negative skewness on the OLS residuals that the SFA is valid and the MLE techniques can be used to estimate the stochastic frontier model. As such the hypothesis for the Methodology **(γ=0)** to be tested are:

Hypothesis 1: Methodology (γ=0)

H_0: OLS is appropriate for the estimation of the production function (SFA is invalid)

H_1: OLS is not appropriate for the estimation of the production function (SFA is valid)

To show more clearly if the OLS residuals are skewed to the left, is performed the skewness statistics as suggested by [8]. The skewness statistics shows a value equal to -3.260301. This negative number suggests that the OLS residuals are skewed to the left and as a result the null hypothesis of the no skewness on the OLS residuals is rejected. This test suggests that SFA is valid and the MLE technique can be used to estimate the SFA model. In addition, there is needed to make a distribution assumption on $\boldsymbol{u_i}$. In this paper, is assumed half-normal distribution on $\boldsymbol{u_i}$ as the most preferred assumption proposed in the literature. After making the distribution assumption, is needed to choose the function form that best represent the data. The mot two common functional forms are: Cobb-Douglas and Translog functional form. These two functional forms can be represented as:

Cobb-Douglas frontier model:

$$lny_{it} = \beta_0 + \sum_{j=1}^{K} \beta_j \ln x_{j,it} + v_{it} - u_i$$

Translog frontier model:

$$lny_{it} = \beta_0 + \sum_{j=1}^{K} \beta_j \ln x_{j,it} + \frac{1}{2} \sum_{j=1}^{K} \sum_{h=1}^{K} \beta_{jh} \ln x_{j,it} \ln x_{h,it} + v_{it} - u_i$$

The LR statistics, is a test that suggests whether the Cobb-Douglas functional form is preferred over the Translog functional form or vice-versa. The SFA can be used on both functional forms, however it is important to know whether for the dataset is more appropriate the Cobb Douglas functional (known as more restricted model) or the Trans-log functional form (known as less restrictive model). For the functional form, are presented the hypothesis below:

Hypothesis 2: Functional Form (β_{ij} =0)

H_0: Cobb-Douglas is a more suitable functional form for the dataset

H_1: Cobb-Douglas is not a suitable functional form for the data set.

The LR statistics can be calculated by the equation:

$$\boldsymbol{\lambda = -2[LLF_0 - LLF_1)}$$

where:

LLF_o - likelihood value from the Cobb-Douglas functional form

LLF_1 - likelihood value from the Translog functional form

When computing the calculation for the formula above in STATA, we receive a result of -60.3. This value, when compared to the critical value, suggest that we do not have enough statistical evidence to reject the null hypothesis. As the null hypothesis is not rejected, it is suggested that the Cobb-Douglas functional form better fits the data and will be used later in the analysis

In addition, it is important to test for technical inefficiency in our error term though the below mentioned hypothesis testing.

Hypothesis 3: No inefficiency (δ i= 0)

H_0:There is no technical inefficiency **($\sigma_u^2 = 0$).**

H_1: There is technical inefficiency **($\sigma_u^2 \neq 0$)**

As in the above hypothesis testing, also in this hypothesis testing is used the LR value. The same formula will be applied in order to calculate the LR statistics, however, here the **LLF_o** represents the log likelihood values of the restricted OLS model whereas LLF_1 represents the likelihood value of the unrestricted SF model. The implementation of this formula gives us a number of 18.47, when compared with the critical value, suggests that the null hypothesis of no technical inefficiency is rejected.

All the hypothesis test conducted suggest that the SFA is valid, there is technical inefficiency and that in order to conduct the empirical analysis for our data, the Cobb-Douglas functional form is going to be used. In this model, the explained and the explanatory variables are expressed in their natural logarithmic forms as below.

$$\boldsymbol{ln}y_{it} = \beta_0 + \beta' lnx_{it,} + v_{it} - u_i$$

On the other side, the farm-level variables are going to used in order to measure their effect on technical efficiency rates. While the first model measures the technical efficiency rates, the second model measure the effect that some firm-level or exogenous variables might have on the technical efficiency rates by being focus on direct payments, The inefficiency model is presented as below.

$$\boldsymbol{U_{it} = z_{it}\delta + W_{it}}$$

When both of these models are estimated in the STATA software through the one-stage procedure, the results presented in Table 3 are achieved.

The variables of Capital and Land significantly and negatively affected the technical efficiency of the farm where as the Labour and the Variable Inputs effect the technical efficiency significantly and positively. Regarding the inefficiency model, is can be suggested that total direct payments to total output as a proxy for the effect of direct payments have a significant positive sign, meaning that it increases inefficiency, meaning that it has negative effect on technical efficiency score.

The increase of direct payments with 1%, decreases the output by 5.6%. The negative effect on efficiency is also observed in the share of rented land to total land as well as in the debt to asset ratio, meaning that an increase in rented land as well as in the total liabilities, decrease the technical efficiency scores.

Table 3. Maximum likelihood estimation of SFP together with the inefficiency mode for CEECs

Ly	**Coeff.**	**P>|z|**
Frontier		
Ln Capital***	-0.209	0.000
Ln Labour***	0.306	0.000
Ln Land***	-0.118	0.000
Ln Variable Input ***	1.008	0.000
_cons	3.170	.
Usigmas		
Z1- Total Direct payments to Total Output (%) ***	0.056	0.005
Z2- Share of Crop Output to Total Output (%) ***	-0.086	0.000
Z3-Total Land to Total Labour Ratio (%) ***	-0.001	0.000
Z4-Share of Hired Labour to Total Labour (%)	-0.001	0.953
Z5-Share of Rented UAA to Total UAA (%)*	0.029	0.051
Z6- Debt to Asset Ratio (Total Liabilities to Total Assets)***	0.054	0.003
_cons	-0.457	0.678
Vsigmas		
_cons	-35.71	0.898

Note: * significant at 10%, ** significant at 5%, and *** significant at 1% of significance level
Source: Author's own calculations.

On the other side, is found positive effect on technical efficiency score by these variables: the share of crop output to total output, total land to total labour, and the share of hired labour to total labour. However, the last variables in not significant whereas the other two variables are significant at 1% of the significance level. The average technical efficiency rates for all the data is summarized in Table 4. The table suggest that the average technical efficiency scores is 0.84, meaning that on average a farm can achieve up to 84% of the maximum output. The rest of the potential output, 16 %, is lost due to technical inefficiency. On technical efficiency, negatively and significantly have an effect the variables for the total direct payments to total output, share of rented land to total land, and the debt to asset ratio Most of the farms are located above 75% of technical efficiency rate.

Table 4. Summary of technical efficiency scores

Variable	Obs	Mean	Std. Dev.	Min	Max
TE	143	0.86	0.097	0.497	0.99

Source: Author's own calculations.

It was expected capital to have the positive, however the negative sign of capital was found also in the study of [18] in the case of the Polish farm with the explanation as the CEECs have old machinery and as a result are less productive. In addition, also the variable of land is found to be significant and negative with the reason that larger land in more difficult to manage and as a result can negatively affect the efficiency rates.

CONCLUSIONS

The aim of this research was to shed light on the effect of direct payments on technical efficiency of farms for the case of CEECs. Technical efficiency is used as an indicator for farm performance and as such was used also in this paper. As the agricultural sector is characterized with stochastic noise, then the SFA approach was used in order to conduct this research. After some hypothesis testing, it was suggested that the Cobb-Douglas functional forms were more appropriate for the data-set and as a result was used in the empirical analysis. The analysis paid attention to direct payments whish are considered as the most important variable in the inefficiency model as a large part of almost every budget spending's are headed for agricultural supports. Even though, the support for the farms has increased for CEECs, especially after the accession to the EU, in this paper is found to significant and negatively impact the technical efficiency rates. In this regard, it is suggested the agricultural policies to be more targeted in order to have the desired positive effect.

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QUALITY OF SEEDS OBTAINED IN A COMPANY WITH AGRICULTURAL PROFILE IN CALARASI COUNTY. CASE STUDY

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Abstract

In this paper, the quality of the seeds obtained in a company with an agricultural profile, as well as the main factors that can lead to the deterioration of the quality of the seeds, is shown. The company's headquarter is in Ştefan Vodă commune, Călărași county and owns an area of 1494.43 ha. The period analyzed was 2016-2018. From the crops practiced by the company, we analyzed the qualitative parameters of wheat, rapeseed and sunflower, following the quality of the resulting seeds. Most of the qualitative parameters were within the norms stipulated by STAS. There was exceeding in the case of the hectolitre mass parameter in the wheat crop, but this meant a better quality of the wheat analyzed.

Key words**:** *cereals, quality, qualitative indicators, parameters, seeds*

INTRODUCTION

The qualitative indicators of cereals have been, since ancient times, the basic element in establishing their price.The quality of the seeds is a relative notion, due in particular to the fact that the seeds of some species may have different destinations such as seeding, food or feed consumption and industrialization. Even if certain quality indices are common, their appreciation may be different, as the criterion of appreciation of a component is subordinate to its theological or agronomic importance [3].The quality mainly ensures product competitiveness. This is the cumulative fruit of the following objectives of the company, carefully aimed: quality products and services; low cost of the production process; contractual punctuality [11].

The seed is the basic exponent of the qualities, capacities and qualities of the plants of high crop [4]. The determination of the quality of the seeds that are delivered for sowing is established in two distinct stages: one of these would be the establishment of the biological value, which is achieved by the recognition in the field, and the second is the cultural value, established by laboratory analyzes [1]. The qualitative indices that express the physical and germinal properties of the seeds are determined by laboratory analyzes for each lot of seeds [9]. The physical properties of the seeds are brought by the individual characteristics of the seeds and the foreign components (impurities) remaining in the seed mass despite the cleaning operations. Even if they come from the same source, the seeds are differentiated by shape, size, weight, water content, etc. [10]. The presence of certain pests or items of phytosanitary quarantine in the chain or in the seed lot, or the presence of certain diseases leading to the productivity of crops destined for seed production are strictly forbidden [8]. For some varieties, the standards provide for the proper treatment of the seeds before sowing. So, in order to meet the normative requirements and standards regarding the material used for sowing, the cereals have to go through the conditioning process. The conditioning operations are: drying, cleaning, sorting, treating, packaging and storage. These operations aim to increase the purity of the product. Therefore, determining the quality of the seeds helps to obtain a good price when selling, but also to know in which category they fit, or what is their destination [2]. In order to obtain a higher quality, only certified seed from the zoned varieties, with biological and physical purity

and adequate germination capacity are used at the sowing, and the seed treatment is mandatory [7].

MATERIALS AND METHODS

The activity of the company in the present case study is carried out within the area of Ștefan Vodă commune, Călăraşi County, by exploiting an area of agricultural land of 1,494.43 ha, of which a part is in the property, and the rest in the form of rent.
The main field of activity is the production to which CAEN Group 011 corresponds: Growing of non-permanent plants. Main activity 0111 - Growing of cereals (excluding rice), leguminous plants and oilseed plants.
The company is located in the South-East Plain area, predominantly the soil type is the chernozem, a very fertile soil, of a brown to black color, contains 3% - 6% humus, a small percentage compared to other soil types, having a pH with a value of 7-7.8% [6]. The temperatures, specific to the temperate-continental climate conditions, are 10.5-11.5°C without frost days, precipitation of 470-560 mm/year with a hydrothermal index for unirrigated areas of 5.3 [5].
The company has its own analysis laboratory to determine the quality of the obtained seeds. The period studied was 2016-2018, and from the grown crops, quality indices of wheat, rapeseed and sunflower were interpreted. The determination of the quality of seeds for consumption is carried out by the laboratories of the selling units of agricultural products: the analysis at the reception of the products, the analysis during the preservation and conditioning and the analysis regarding the quality of the seeds. State standards regarding the analytical method are: STAS 1069–67, determination of foreign bodies, STAS 2522–66, defect terminology, STAS 6280–66, grain size determination, STAS 6124–66, humidity determination [1].

RESULTS AND DISCUSSIONS

As we know, seeds are the most important and essential step in getting a good crop per hectare. Agronomic practices can only improve the genetic potential of the sown seeds. These are really the foundation of the success or failure of any crop, and in order to obtain harvests with maximum efficiency and quality, it is needed to sow seeds of the highest quality. The structure of the crops practiced by the agricultural company during the analyzed period, respectively 2016-2018 is shown in Table 1.

Table 1. Structure of crops practiced in the company in the period 2016-2018

Crop	Year/Area -ha		
	2016	2017	2018
Wheat	521.81	600.10	685.39
Barley	94.47	61.40	195.56
Maize	332.12	332.35	311.45
Sunflower	-	134.96	163.59
Soybean	-	-	138.44
Rapeseed	352.12	227.52	-
Green peas	189.48	138.10	-
Total	1490	1494.43	1493

Source: Internal documents of the agricultural company

During the analyzed period, the company recorded various crops from cereals such as wheat, barley, maize, to oilseed plants: sunflower, rapeseed, soybean and even vegetables, peas. Regarding the structure of the crops within the agricultural company we can see the oscillations regarding the grown areas from year to year. The crops of rapeseed and peas were in the attention of the farmers in the first two years of activity, and in 2018 they turned to other crops, more qualitatively and at a better price, such as soybean, sunflower, wheat, maize.
For each of the three crops selected in the study (wheat, rapeseed and sunflower), we will analyze the main quality parameters/indices, to find out the causes that led to their final quality.

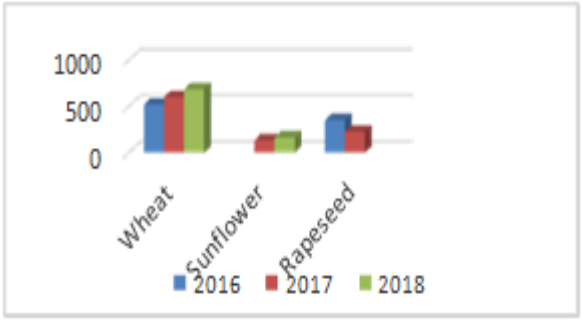

Fig.1.Dynamics of the three crops in the period 2016-2018
Source: Own design.

The wheat crop is in continuous growth, from 521.81 ha as it was in 2016, reaching 685.39 ha in the agricultural year 2018, with a difference of 163.58 ha. The other two analyzed crops were practiced only for 2 years out of the three studied.

The quality parameters for wheat crop in the company over the three years of activity are as follows in Table 2.

Table 2. Analysis of qualitative parameters of wheat crop in the period 2016-2018

Wheat crop								
Year 2016			Year 2017			Year 2018		
Parameters	**Value**	**STAS**	**Parameters**	**Value**	**STAS**	**Parameters**	**Value**	**STAS**
Hectolitre mass	74.8%	Min 73%	**Hectolitre mass**	78.6%	Min 73%	**Hectolitre mass**	74.8%	Min73%
Humidity	12%	14.5%	**Humidity**	12.6%	14.5%	**Humidity**	11.3%	14.5%
Impurities	0.7 %	3%	**Impurities**	0	3%	**Impurities**	0.1%	3%
Broken grains	0.1%	5%	**Broke grains**	0	5%	**Broken grains**	0.1%	5%
Defective grains	0.1%	5%	**Defective grains**	0	5%	**Defective grains**	0.1%	5%
Germinated grains	0.1%	2%	**Germinated grains**	0	2%	**Germinated grains**	0	2%
Damaged grains	0	Max 1%	**Damaged grains**	0	Max 1%	**Damaged grains**	0.1%	Max 1%
Foreign bodies	0	Max 2%	**Foreign bodies**	0	Max 2%	**Foreign grains**	0	Max 2%
Protein	7.5%	10%	**Protein**	9%	10 %	**Protein**	7.5 %	10 %
Wet Gluten	23%	Min 22%	**Wet Gluten**	29.15%	Min 22%	**Wet Gluten**	24%	Min22%

Source: Documents of quality of the agricultural company.

The values corresponding to the three years analyzed regarding the *hectolitre mass*, exceed the value of STAS. In 2016, there was a value of 74.8%, which means an increase from the STAS value of 2.46%. The year 2017, records a value of 78.6%, with 7.67% more than the minimum value allowed, but this aspect is a positive one, because the wheat has a better quality as the hectolitre mass has a higher value, this fact due to the high content of healthy grains, well developed and with the whole shell, which are not attacked by various mites. The hectolitre mass can be influenced by the impurities in the seed table, according to their nature: the sand and dust increase it, while the straw, the hay and the edges reduce it.

Humidity, as can be seen, in the period 2016-2018, was within the optimum values, not exceeding the value of STAS, that of 14.5%. In the years 2016 and 2018, the humidity value is 12%, except for the year 2017, in which the value is 12.6%, which means an increase of 0.3% compared to 2016.

The *impurity* parameter, records the normal values, often seen after the analyzes performed. The value of STAS is 3% admitted impurities, and the company recorded in 2016, 0.7% and in 2018, 0.1% impurities. The year 2017 is a favorable year, as well as 2018, from the point of view of this parameter, because 0.1% impurities were recorded. Thus, the company avoided the selection process, a process that requires time, money, equipment and labor.

In the case of *broken grains, defective grains and germinated grains*, we observe that they do not exceed the STAS value provided by 5% and 2% respectively. These have an equal value in both 2016 and 2018 of only 0.1%, which is due to efficient harvesting operations. *Foreign bodies* did not exist during the analyzed period.

Wet gluten is determined because it provides information about the bread baking properties. The STAS value is at least 22%, and from the laboratory analyzes it can be seen that it can be used in a bakery.

Regarding rapeseed crop (grown within the company only in 2016 and 2017), the quality indices are presented in Table 3.

Table 3. Quality parameters of rapeseed crop in the period 2016-2017

Rapeseed culture			
Year 2016 Year 2017			
Parameters	**Value**	**Value**	**STAS**
Humidity	6.9%	7%	9-10%
Impurities	0	0.1%	2-4%
Seed pest	0	0	2-5%
Oil content	43.3%	51.28%	42-52%

Source: Documents of quality of the company.

According to Table 3, quality indices: *humidity, seed that have pests* and *the oil content* had normal limits, they did not exceed STAS, thus we can say that in both agricultural years, the rapeseed was qualitative. However, in 2017, both the humidity and the percentage of impurities recorded higher values than in 2016.

The seed for the two agricultural years for the rapeseed crop was treated with ROYALFLO. Regarding the sunflower crop (grown in the company in 2017 and 2018), the quality indices are presented in Table 4.

Table 4. Quality parameters of sunflower crop in the period 2017-2018

Sunflower crop			
Year 2017 Year 2018			
Parameters	**Value**	**Value**	**STAS**
Humidity	6.8%	7.3%	14%
Impurities	0.1%	0.1%	5.6%
Defective seeds	0	0	5%
Broken seeds	0	0	2%

Source: Documents of quality of the company.

Humidity analyzed in the sunflower crop in the two years, falls in the value of STAS, in 2017 being 6.8%, while in 2018, it recorded an increase compared to the previous year, with 7.35%. From the point of view of impurities and defective seeds, both crops presented a good quality in both years.

The seed from the sunflower crop was treated with: MAXIM XL 035 FS and APRON XL 350 ES.

CONCLUSIONS

Regarding the quality of the seeds followed in this paper, it can be seen that the values fit into STAS values and do not present a threat. Owning an analysis laboratory is a strong point for the activity field, because they can very easily monitor the parameters of the quality indices.

Following the analysis of the wheat crop quality indices, it was found that in 2017, the hectolitre mass recorded a value of 78.6%, with 7.67% more than the minimum value provided by STAS. But for a very good quality wheat the hectolitre mass must be over 80. In general, the hectolitre mass is higher for small grains and smaller for large grains, because the space between grains differs. In wheat, smaller grains have a smaller hectolitre mass, due to the higher percentage of shells. An increased humidity of cereals also causes an increase in the hectolitre mass. For all 3 years, the wheat had the optimum humidity, which means it was harvested in time, the grain was not unripe to retain humidity. Wheat was within STAS, and humidity was not an impediment to obtain a good price or to have to go through the drying process.

Regarding the other two crops analyzed from a qualitative point of view, rapeseed and sunflower, all the analyzed parameters were within the limits stipulated by STAS. Following the analysis we found that the seeds produced by the company are original, of high quality, because they do not show parasites, unusual smells, impurities and have a normal color specific to each type, but also because during the analyzed period, high average products were obtained per hectare (wheat - 6,914 kg/ha, rapeseed – 4,220 kg/ha, sunflower - 3,546 kg/ha).

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STATE SUPPORT OF SMALL PRIVATE COMPANIES AS THE BASIS FOR SUSTAINABLE RURAL DEVELOPMENT

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Abstract

The development of small private companies in agriculture, both in the Russian Federation and in the Penza region, has had a positive trend in recent years. This was facilitated by a variety of state support for small enterprises, and farms. So, during 2014-2018, the grants for developing agriculture were gained by the 199 of small farms, and the amount of financing was 547.3 million rubles. However, there are also constraining factors for the development of small business in the countryside: a decrease in the share of the rural population in the total population of Russia, an imbalance in the ratio of the average monthly income of the rural and urban population, and the lack of modern infrastructure in rural settlements. Directions of systemic changes in the forms and methods of state support of small businesses in the countryside are proposed, which provide an improvement in the quality of life in the countryside through an outstripping growth in the well-being of rural residents and an improvement in social infrastructure.

Key words**:** *government support, small business forms, sustainable rural development, agriculture, efficiency*

INTRODUCTION

The most important task of every state is to improve the quality and level of well-being and prosperity for the population. To achieve this goal is possible in a balanced manner, avoiding a significant gap between the socio-cultural level of development of urban and rural areas. Rural territories have powerful potential and carry out, along with production, cultural, recreational functions, such significant functions as resource, environmental, transport infrastructure and territorial security. In recent years, despite the dynamic economic growth of agricultural production, rural development indicators do not tend to improve. On the contrary, in some rural settlements, the situation continues to deteriorate. We systematized the negative factors of rural development [3].

First, the demographic situation remains tense. The proportion of the rural population in the total number is less than 26% and this indicator is declining every year: the countryside annually loses more than 100 thousand people both due to migration outflow, and due to the natural decline. In rural areas, the birth rate compared to the urban areas since 2015 has become lower. In 2017 the total rural fertility rate was 11.2%.

Secondly, the real disposable income of rural households over the past six years (2017 to 2011) increased by only 1.1%. Of course, a positive trend is a decrease in the ratio of disposable resources of rural households in relation to the same indicator for urban households, but this is due, first of all, to the decrease in growth rate of income within urban households. In 2016 the share of the poor in rural areas was 53.1%.

Thirdly, the housing conditions and social infrastructure of the village are significantly behind the urban one. In 2017 only a third of the total housing stock in the countryside was equipped with all types of amenities [2].

Entrepreneurship in the agricultural sector is the main driving force that ensures the socio-economic development of rural areas. Rural entrepreneurship largely influences and shapes the socio-economic climate in every region of Russia. Regional and municipal authorities should actively promote and help entrepreneurs in rural areas. The state is pursuing an active policy for the development of the country's agro-industrial complex and in recent years has taken steps to comprehensive development of the rural areas. Thus currently

it is necessary to solve a complex of problems existing in the countryside, and the growth rate of the rural population's well-being and its quality of life should significantly exceed the national average [6].

In this context, the purpose of the paper was to work out recommendations that have been made to improve the system of state support for small business forms that ensure the sustainable development of the rural territories.

MATERIALS AND METHODS

The period analysed in this study was 2014-2019.

The main data was obtained on the official website of the Federal State Statistics Service of the Russian Federation, the Ministry of Agriculture of the Russian Federation, the Ministry of Agriculture of the Penza Region and from other sources.

Among the research methods used to process the data in the current paper we should mention the following: monographic, economic-statistical and abstract-logical methods.

RESULTS AND DISCUSSIONS

The research materials show that according to the 2016 All-Russian Agricultural Census, in Russia there were 36 thousand agricultural enterprises, 24.3 thousand of which are micro and small enterprises, 174.8 thousand peasant (farm) enterprises (K(F)E), including individual entrepreneurs, 23.5 million citizens maintain personal subsidiary plots (PSP), of which 2.3 million produce products for additional or basic cash income. Compared with the 2006 All-Russian Agricultural Census, the number of K(F)E and individual entrepreneurs decreased by 38.7%. The main reasons are the cessation of inefficient K(F)E and the consolidation of farms [4]. According to the Federal State Statistics Service, the total area of farm land increased by 47.5% and reached 43.3 million hectares. The average size of land by farmers increased from 103 to 247.8 hectares, or 2.4 times. The share of agricultural production produced by K(F)E and PSP over the past four years averages about 45% [1]. As of 01.01.2020, the total size of cultivated areas developed by small farms (except for personal part-time farms) is 47.9 million ha, or 60.2% of the total cultivated area. The share of farms in the overall structure of agricultural production increased from 12% to 13.6% in 2019.

Monitoring of agricultural activity in the regions of the Russian Federation shows that the farming and individual sectors of agricultural production are becoming increasingly independent, developing, and becoming a factor in socio-economic stabilization in the countryside. Consider the development trends of small business in the countryside on the example of the Penza region (Russia) [8].

Currently, one fifth of grains is produced here, a fourth part is sunflower, a ninth part is sugar beets, a seventh part is milk and a sixth part is eggs. In 2019 the Penza region took the 6th place among the regions of the Volga Federal District in the volume of agricultural production in peasant (farmer) enterprises and among individual entrepreneurs. About 1.7 thousand peasant (farm) households with a total land area of more than 400 thousand ha are registered in the region. The average land size currently exceeds 500 hectares. Moreover, almost half of the farms do not have land plots, in every 20 farms the size of the land does not exceed 20 hectares. Over 200 hectares have land plots of more than 20% of farmers, where 92.3% of the total land area allocated for peasant (farm) farming is concentrated. In the Penza region, K(F)E and individual entrepreneurs in 2019 produced agricultural products in the amount of 11.6 billion rubles, or 7.2% more than in 2018. The structure of agricultural production of K(F)E and individual entrepreneurs is dominated by crop production, which in 2019 accounted for 82.3% of the total output.

Moreover, this trend continues throughout the entire period of existence of farms. The development of the farming sector has led to structural shifts in the production of certain types of agricultural products by category of farms in the Penza region. Between 2010 and 2019 the share of small agribusiness represented by peasant (farmer) enterprises and individual entrepreneurs increased from 3.4 to 11.3%, including crop production from 5.2 to 17.8%, livestock production - from 2.4 to 4.2 % In 2019, agricultural production amounted

to 18.0 billion rubles, or 17.4% of the total agricultural output in personal households of the population (54.7% in 2010). In 2019 in terms of the rate of change of agricultural production in households, the Penza region among the regions of the Volga Federal District took 4th place. In 2019 households, farmers and individual entrepreneurs produced 28.7% of all agricultural products in the region, and the share of households in comparison with 2010 decreased by 37.3%, while the proportion of peasant (farmer) households and individual entrepreneurs increased by 7.9%, which may indirectly indicate the gradual transformation of small family farms into commodity farms. The reduction in agricultural production in households was mainly due to a decrease in the livestock production.

Within the framework of the state agricultural development program, the Ministry of Agriculture in Russia supports the development of small forms of farming, in particular, solving the problems of small agricultural enterprises, popularizing the best practices of sustainable farms and cooperatives, improving the legal framework governing the conduct of economic activity K(F)E and individual entrepreneurs. Since 2015 the grant support for cooperatives has been provided, and other measures of state support for small agricultural enterprises are provided as part of the State Program for the Development of Agriculture. Since 2017 the mechanism of preferential lending has been launched. In 2018 the state support was provided to 2,353 novice farmers, 716 family livestock farms and 214 agricultural cooperatives. Moreover, compared with 2017, the average grant size increased. So, for beginner farmers it amounted to 2.06 million rubles (in 2017 - 1.77 million rubles), for family livestock farms - 7.75 million rubles (in 2017 - 6.11 million rubles), and for agricultural consumer cooperatives - 15.51 million rubles (in 2017 - 10.75 million rubles). In 2019, the federal project "Creating a system for supporting farmers and developing rural cooperation" was adopted, according to which promising young people can start their business in agriculture from scratch. In 2018 the regions increased funding for grant support to farmers and cooperatives - up to 11 billion rubles from the federal budget. The total amount of targeted state support for farmers and cooperatives in 2019 was increased by almost 1.5 times and amounted to about 19 billion rubles. In addition, an additional 10.8 billion rubles were received in the framework of a single subsidy and a mechanism for soft loans to farmers and cooperatives. Thus, according to the results of 2019, the share of farmers and cooperatives in the total volume of state support amounted to more than 19%. The share of small farms in the register of organic producers is more than 50% (Fig. 1).

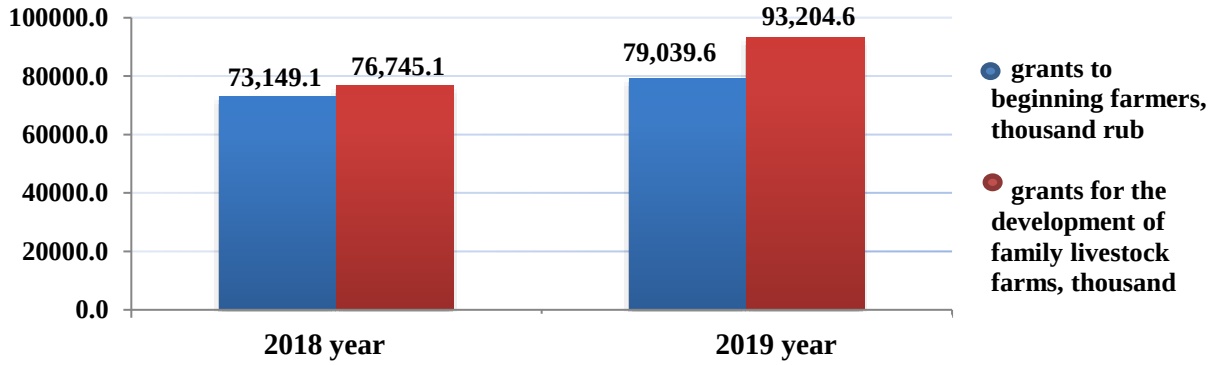

Fig. 1. State budget support for farms in the Penza region in 2018-2019, thousand rubles (Source: Ministry of Agriculture of the Penza Region, https://mcx.pnzreg.ru) [7].

Grant support to farmers and cooperatives is aimed at creating new farms and expanding existing industries. So, in rural areas over the past seven years, more than 48 thousand new permanent jobs have been created. The average salary in K(F)E, according to the Federal State

Statistics Service, in 2018 amounted to 9.7 thousand rubles, while in the enterprises that received grants, the average salary is about 17 thousand rubles. All these measures give a significant incentive, first of all, to the creation of new industries and to the development of small and medium-sized farms.

Due to the increase in the ability of regions to determine support priorities taking into account regional specifics in 2018, funding for grant support to farmers and cooperatives from the total "single subsidy" increased from 9 billion in 2017 to 11 billion rubles (27.7%). In 2019 10.3 billion rubles were allocated for grants to farmers and cooperatives in the regions from the federal funds.

For the development of small business in rural areas in the Penza region, the state budget support is provided, which is provided to farms and agricultural cooperatives in the form of grants and subsidies for the reimbursement of various costs.

The amount of the grants issued to novice farmers in the Penza region in 2018 amounted to 73,149.1 thousand rubles. Funds received 29 peasant (farm) households; the average grant size per farm was 2.5 million rubles. The amount of funding in this area in 2019 was increased by 5.9 million rubles and amounted to 79,039.6 thousand rubles; 37 farms were able to take advantage of grant support.

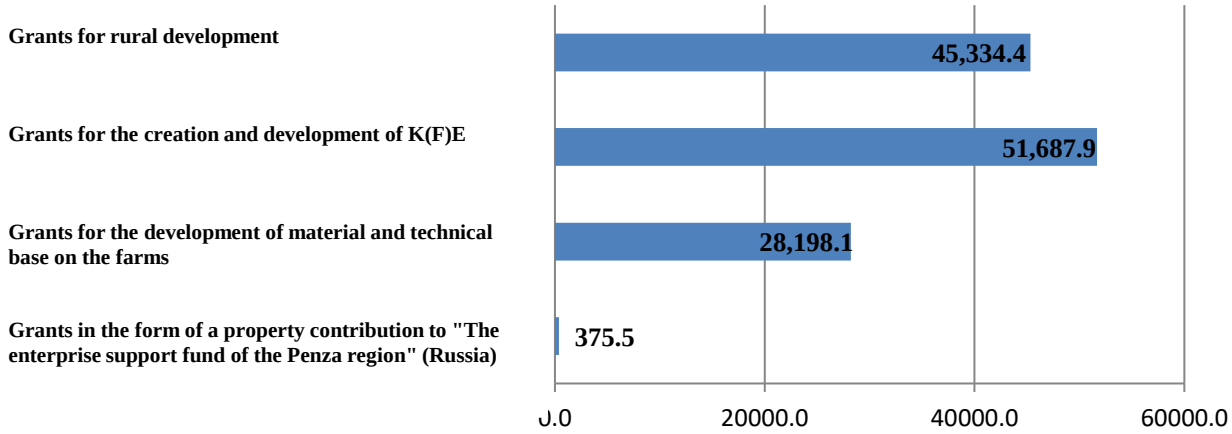

Fig. 2. State budget support for agricultural consumer cooperatives in the Penza region in 2019, thousand rubles (Source: Ministry of Agriculture of the Penza Region, https://mcx.pnzreg.ru/)[7].

Another form of the state budget support in the Penza region is the provision of subsidies for the reimbursement of a part of the interest rate on loans received by the small businesses. So in 2018 loans in the amount of 167.4 million rubles were subsidized, the amount of subsidies issued amounted to 3,498 thousand rubles, including 2,343 thousand rubles from the federal budget and the budget of the Penza region - 1,155 thousand rubles. In 2019, the funding for this subprogramme decreased significantly: the volume of subsidized loans amounted to 15.3 million rubles, the volume of subsidies - 760.9 thousand rubles [10].

Along with these forms, state budget support for consumer cooperatives is provided through grant support (Fig. 2). The total amount of financial support for agricultural credit cooperatives in 2019 amounted to over 125 million rubles.

The system of measures to support small business in rural areas in the Russian Federation is improved annually. So since 2019 the national project "Small and medium-sized enterprises and the support of individual entrepreneurial initiatives" has been implemented, which is designed for the period up to 2024. One of the target indicators of which is the creation of a system of support for farmers, the development of rural cooperation and the increase in the number of entrepreneurs in the field of agriculture to 126.7 thousand people.

Since 2019, in order to create conditions and stimulate the accelerated development of small agribusiness, a federal project "Creating a system for supporting farmers and developing

rural cooperation" has been implemented, which provides for additional state support measures K(F)E and individual entrepreneurs, and the creation of a single effective system of agricultural consumer cooperation. The main goal of the project is to increase the number of people involved in small and medium-sized enterprises in agriculture by 126 thousand by 2024 by creating new K(F)E and cooperatives. The volume of project financing for the entire implementation period is 37.4 billion, including 5.37 billion rubles allocated from the federal budget for 2019. It is necessary to attract more private farms to cooperation, as well as create new jobs [9].

To unite disparate agricultural producers, including smallholders and K(F)E into the cooperatives, under the federal project, there is government support for the development of agricultural consumer cooperatives in two areas:

- to reimburse part of the costs of cooperatives related to the purchase of agricultural products from members of the cooperative at a differentiated rate, which will allow cooperatives to increase the purchase price of agricultural products from their members and create competitive advantages over agricultural producers who turn in their own produce to harvesting points;
- to reimburse up to 50% of the costs of cooperatives for the acquisition of property with the aim of transferring to members of the cooperative or contributing to the indivisible fund of the cooperative [5].

Under the existing grant support mechanisms for beginning farmers, the maximum grant size has been increased from 3 million to 5 million rubles since 2020 for projects for the development of dairy and beef cattle breeding, and for other types of agricultural activities - from 1.5 million to 3 million rubles. A completely new direction in the use of the grant for all categories of recipients is the ability to allocate funds in the amount of up to 20% to pay for part of the cost of the project, which is implemented with the help of a preferential investment loan. Thus, projects for the development of peasant (farmer) enterprises will be implemented on the principles of project financing, which will allow for the implementation of projects of greater capacity and accelerate the development of farms.

To create a system of information and consulting support for the activities of small business in rural areas in the constituent entities of the Russian Federation, competence centers have been created that provide support for the activities of farmers, owners of private household plots and cooperatives at the stage of their formation, provide assistance in registering farms and cooperatives, prepare business plans and feasibility studies, applications for subsidies from the federal and regional budgets, loans from credit organizations, organize preparation and retraining for small agricultural enterprises, etc. A significant innovation in 2020 is the state program "Integrated Development of Rural Areas" for the period 2020-2025, which is designed to narrow the gap in the quality of life between the rural and urban population, create comfortable living conditions, and reduce the outflow of residents from rural areas. In the period 2020-2025, the state will invest nearly 2.3 trillion rubles in improving the living and working conditions of the villagers. The main directions of the program are aimed at: creating conditions for providing affordable and comfortable housing to the rural population, developing the labor market (human resources), creating and developing infrastructure in rural areas. Since the beginning of 2020, 476 projects on the construction or reconstruction of almost 400 social and engineering infrastructure facilities, including schools, kindergartens, cultural centers and other facilities, have already been implemented in 47 entities. It is planned that in 2020 the state program will affect more than 1 million people [11].

Thus, the implementation of the above measures will ensure an increase in the well-being of the rural population, an increase in real incomes, entrepreneurial activity, and a reduction in the gap between the income ratio of the urban and rural population of Russia.

CONCLUSIONS

The analysis of the state support system for small business forms showed that the existing

financing measures are effective and have a diverse character, including not only the direct financing and compensation of producers expenses, but also information and consulting, organizational support, infrastructure development. However, they do not fully ensure the progressive development of the rural territories.

In order to improve the system of state support for small business forms that ensure the sustainable development of rural areas, it is necessary to implement a set of measures:

- conduct annual monitoring of rural development according to key indicators of the socio-economic development;
- create a list of priority, most significant rural areas that have a negative development scenario and need priority government support measures; identify trends and prospects for their strategic development (20-30 years);
- identify demanded and effective types of production and processing of agricultural products for the grant support; evaluate organizational, economic, infrastructural factors that increase the efficiency of these industries;
- create training and counseling centers on the basis of agricultural universities for those receiving state funding in the form of grants;
- make appropriate changes to the regulatory framework governing the functioning and support of small business forms.

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A METHODOLOGICAL APPROACH TO THE DEVELOPMENT OF ORGANIC FOOD PRODUCTION IN THE CONTEXT OF THE BUDGET CRISIS IN THE RUSSIAN FEDERATION

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Abstract

In this paper, we study classical and modern approaches to the formation of a scientifically based methodology for managing industrial processing of organic agricultural raw materials for the production of organic food. In the current crisis conditions in the Russian Federation of national budgets of all levels, the development of the organic food industry without a justified methodological approach is impractical. In most cases, the economy of organic production is not allocated to an independent field of study and is identified with the traditional economy of production, "organic food production" - there is industrial processing of organic raw materials in accordance with the requirements of organic production standards, isolated in space and subject to mandatory certification by specialized bodies quality control. We study the conditions for the development of organic production within an existing enterprise, as well as the mechanism for creating a separate unit for the production of organic food products. We show that industrial processing of organic products should be carried out on the basis of and strict observance of fundamental organizational and economic principles. In particular, while in traditional production deliveries can be seasonal or one-time, in organic food production a prerequisite must be guaranteed availability of suppliers or a hub of organic raw materials for at least a month of uninterrupted production. Moreover, the classical cluster approach in terms of organic production can be unrealizable and the author's concept of cooperative development of organic food production (industrial processing of organic products) is preferable.

Key words**:** *organic industrial production, methodical approach, integration and cooperation, cluster*

INTRODUCTION

For the sectors of agricultural production and processing at a certain period in the evolution of institutional relations, the most favorable development conditions arise [17], containing a combination of potentials and resources, the possibility of organizing communication between business entities and the optimal institutional superstructure at that time. This fully applies to the economy of organic production and processing of agricultural raw materials, which over the past 40 years has determined the key trends in consumer processes and, in the course of the development of post-industrial society and neocapitalist production, has become dominant in global consumption [7, 8]. Global patterns of development did not pass agricultural production processes in Russia, but were aggravated by excesses and distortions both in the formation of the legal framework and the consequences of the complete independence of the production choice of economic entities. As a result, a lack of understanding of the essence of organic production, an increase in inter-regional and intra-regional differentiation of processing enterprises by the level of development of production and economic potential, the absence of infrastructure facilities, the widening gap between the conditions of production of agricultural organic raw materials and processing capacities. Despite the widespread increase in organic producers declared by self-regulating organizations of organic producers, in many regions industrial organic processing of agricultural raw materials is only emerging or completely absent [19].

By organic food production, on the basis of existing regulatory legal acts, we mean the totality of production processing capacities of

enterprises that produce certified organic products ready for use in industrial volumes.
The development of organic food production in the Russian Federation is currently complicated by the presence of a number of institutional, sectoral and socio-economic factors, Table 1.

Table 1. Factor analysis of the organic processing industry

Institutional	regulatory framework	lack of full national regulatory framework in the field of organic production and processing
	labour reproduction	lack of highly qualified specialists in the field of organic agriculture and organic food production
	fiscal policy	high cost of borrowed funds in financial and credit organizations for legal entities [6]
	export policy	lack of a full and affordable infrastructure for the export of organic products
	licensing policy	lack of an established system of national certification, problems with the recognition of domestic certificates abroad
Industry (production)	production modernization costs	increase in the final retail price of the final product due to the high cost of machinery and equipment necessary for the organic production of food and organic agriculture [18]
	hidden pricing options	environmental protection, improving animal welfare [5], minimizing the use of mineral fertilizers and crop protection products and taking measures to develop rural areas
	certification costs	the need for mandatory certification of production processes
	production sharing	the requirement of mandatory isolation of organic production from traditional
	production and marketing infrastructure	lack of full-fledged logistics in the organic agriculture and organic food production industry, as well as stable supply channels for processing enterprises with organic raw materials of both plant and animal origin
	management subjectivity	distrust of managers of business entities to new high-cost technological processes of organic production [10]
Socio-economic	territorial differentiation	consumer demand for organic products is concentrated mainly in large cities
	consumer perception	low consumer literacy in the differences in organic products, eco and farm
	resistance to change	lack of a full understanding of the usefulness of consumption of organic products among the population
	differentiation of incomes	low purchasing power of the bulk of the region's population, redistribution of preferences towards savings
	structure of consumer demand	the highest concentration of organic products in the baby food segment, the minimum ratio of organic products in other consumer segments

Source: Compiled by the author based on the information from [5, 6, 10, 18].

The result of this is the proactive nature of the transition to organic production and processing technologies, the minimal scale of modernization of production capacities, low labor productivity and the profitability of economic entities in the agro-industrial complex. In this regard, the comprehension of modern scientific vision, the creative search for the necessary organizational approaches and the generalization of practice to solve the problems of managing the development of organic food production at the regional level become especially relevant.

MATERIALS AND METHODS

The development of organic production was considered in the fundamental works of a number of authors:
-The study of philosophy and general theoretical approaches to organic production (Rudolf Joseph Lorenz Steiner, Spiritual and

Scientific Foundations of the Successful Development of Agriculture. Agricultural Course, 1924. Koberwitz, Czech Republic) [15];
-The concept of organic farming (Albert Howard, The Waste Products of Agriculture: Their Utilization as Humus, Oxford: Humphrey Milford & Oxford University Press, 1931) [1];
-The organizational and economic mechanism for the development of organic farming (Lady Evelyn Barbara Balfour, The Living Soil and the Haughley Experiment, 1975) [12];
- Concepts and declarations in the areas of development of organic production (IFOAM - Organics International, 2008-2014) [9].
This review confirms the existence of a significant segment of scientific literature on the development of organic production. Nevertheless, in domestic and foreign sources, the problem of developing the production, engineering and social infrastructure of industrial processing enterprises is often omitted, which creates a theoretical and methodological vacuum in the selected industry. The study of the development of processing enterprises and, in particular, their transition to organic technologies for food production prompts the search for new ideas that enrich and develop management methods.
In preparing the article, scientific papers of Russian and world scientists on the topic under study [2, 3, 4, 13, 16], materials from research institutions were used. The objects of research are typical food processing industry enterprises that are potentially ready for the reception and processing of organic raw materials in accordance with Russian and international quality standards. In the study of theoretical and methodological aspects of organic production, monographic and logical methods were used. The study of the current state of development of processing activities was carried out on the basis of statistical and economic analysis, as well as a comparison of the results of the work by the comparative analysis method. The development of a methodology for identifying methodological foundations was carried out using abstract-logical and computational-constructive methods, the method of pairwise comparisons.

RESULTS AND DISCUSSIONS

In the research of the formation and functioning of the organic processing industry in the context of identifying the development potential of the production of organic products, we investigated the transition period at the food industry, when both traditional and organic products are present at the factory. To this end, a **method for the process separation of traditional and organic production (activation-assimilative method)** was developed and justified, based on their isolation from each other based on a system of measures for identifying batches of organic products, protection against mixing and substitution.
The existing historically developed system for processing agricultural raw materials is based on the postulate that if raw materials meet key quality parameters (fat content, protein content, fat thickness, oil content, etc.), then the raw materials are classified and sent to the main production. At the same time, processing enterprises do not need information on the conditions and methods of production of this raw material. The intensification processes adopted by agricultural producers are aimed at maximizing yield and productivity (Fig. 1.)
Organic technology basically requires that the raw materials used in the processing process be of environmentally friendly origin or close to it (the absence of mineral fertilizers, antibiotics, biological products, ionizing radiation, technological aids, etc. in the production process), which significantly increases the quality level of the required agricultural products and the conditions of its origin.
Our proposed method consists of two key functions:
1. **Activation** of production potential, the allocation of organic processing in an isolated structural unit, operational quality control at all stages from the purchase to processing and release of the finished organic product, interaction with state regulatory authorities and delivery to the place of sale;
2. **Assimilation** of the newly created organic unit in the overall production process with the formation of stable relationships and interdependencies from each other.

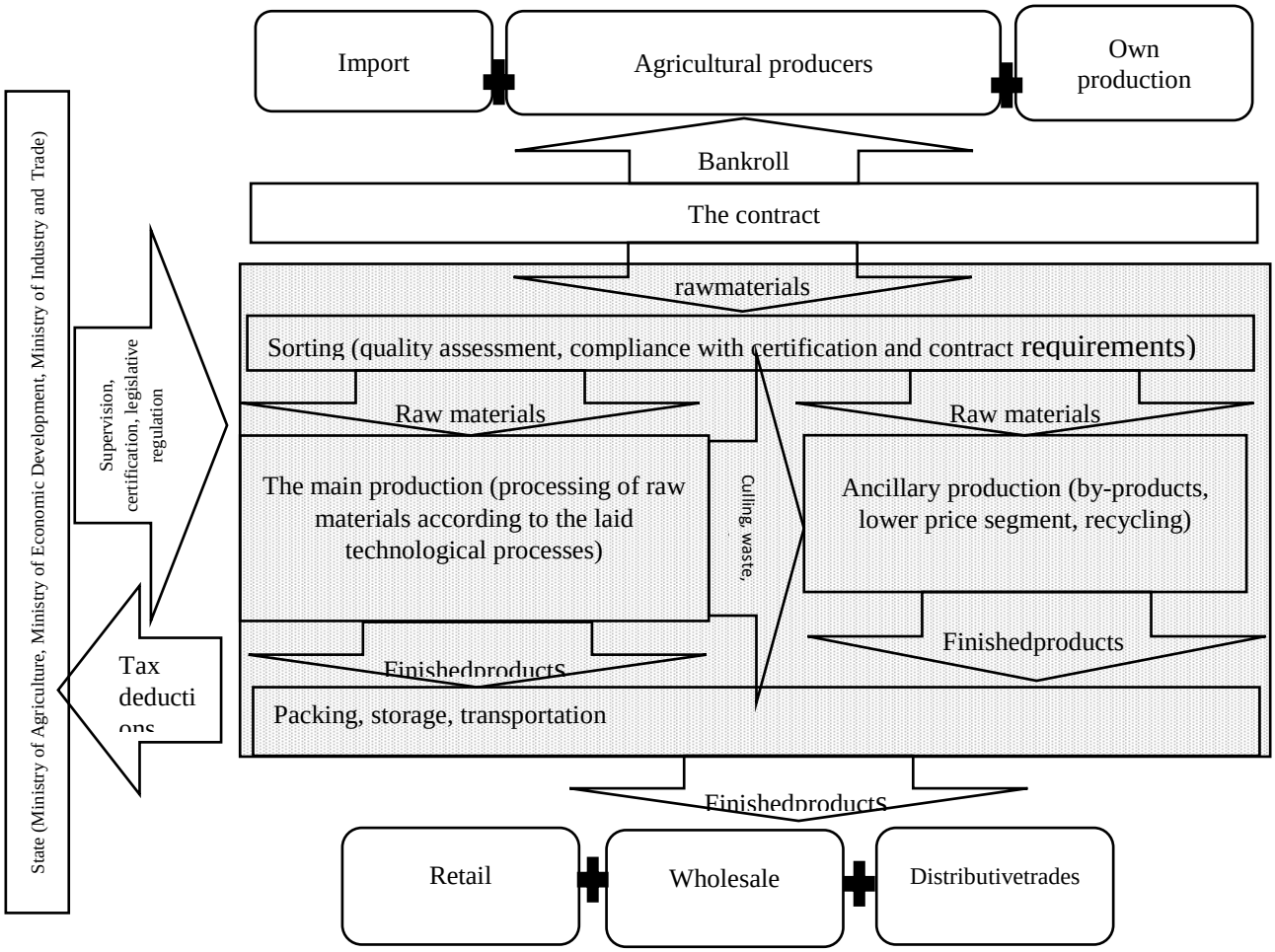

Fig.1. The current system for processing agricultural raw materials.
Source: developed by the author.

The activation function, in turn, is based on the implementation of the following priority principles for the organization of production:

- the principle of filling - the newly created organic production must be fully provided with certified organic (organic processing) and high-quality and clean (production using organic technology) raw materials from the moment the production process is launched for the future no less than 1 month in advance. This principle determines the preventive studies of agricultural producers of various forms of ownership in the home region and beyond for the conclusion of direct contracts for the supply of the required raw materials, as well as reserve supplies in case of interruptions and force majeure;
- the principle of local isolation - since the requirements for conducting organic processing provide for the absence of potentially polluting factors in the production, the commissioned production capacities of organic processing should be locally isolated from the main production in order to avoid the effects of the latter;
- the principle of operational control - consists in maintaining quality control and rejecting non-conforming raw material requirements by the processor's specialists, as well as the certificate holder (the state body authorized to conduct licensing and certification activities) from the moment a batch of raw materials arrives from the supplier until the finished goods are shipped to the retailer (i.e. hours into own distribution networks). Products rejected during the control should not be included in the final batch labeled "Organic". Rejected raw materials, in turn, should not enter the technological process of organic production. At all stages, supervisory specialists are required to make notes in the quality control journals of "Organic";
- the principle of openness - a processing company that undertakes to produce certified

organic products is obliged to constantly and tightly interact with control and supervisory authorities regarding the conformity of manufactured products to the requirements of Organic, and must also have the right to feedback and assistance from relevant state organs.

The assimilation function is based on strict observance of the following principles:

- the principle of process integration - organic processing and production using organic technology should not be carried out in isolation from the main production. The implementation of this principle is possible both in the course of procurement (if high-quality pure raw materials are found in the general supply, it can be redirected to the "clean workshop" for production using organic technology) and in the process of organic production (rejected semi-finished products, waste during production supervision and surplus organic production should be redirected to the recycling and production of other types of inorganic products), and in the course of monitoring the quality of the finished product (in The rejected product is deprived of the "Organic" mark and sold on a par with the products of the main production);
- the principle of interdependence - the conduct of organic production should not be carried out to the detriment of the core, just as, in turn, the conduct of the main production should not interfere with the implementation of the organic. Production processes should be built in close interdependence from each other and resources (labor, production, financial) should be distributed proportionally in equal priority orders.

The implementation of the activation-assimilative method contributes to the speedy adaptation of organic workshops in the technological process of existing enterprises, without prejudice to the main activity (Fig. 2).

Such an approach will allow maintaining stable production volumes, guaranteeing quality and compliance with licensing and certification requirements, as well as attracting additional investments both from private investors (innovative potential, high demand, stable production) and from government bodies authorized to distribute support and incentive funds (export potential, import substitution, closed production cycle).

In the conditions of uneven territorial and logistic distribution of material, labor and production resources of the administrative regions of the Saratov region, the implementation of the principles of organic production is significantly complicated. Initiative economic entities of the food and processing industry need to timely and comprehensively approach the organization of the process of supply and purchase of agricultural raw materials of quality corresponding to the certification of organic. For these purposes, the question of methodological support for the implementation of procurement activities from the standpoint of scientific validity and minimizing the costs associated with the process is urgently raised. Regardless of industry affiliation (plant growing or animal husbandry), processing enterprises are not able to provide for the most part independent production of the required volumes of raw materials for uninterrupted organic production, which determines the need for the development and scientific justification of methodological principles for the implementation of procurement measures. Agricultural production enterprises applying for the title of "organic producers" are required to withstand extremely high requirements for production technologies and the quality (including chemical composition) of agricultural raw materials produced.

The high cost of the above-mentioned measures is obvious and, in connection with this, these economic entities need to implement measures aimed at reducing costs and establishing solid channels for the sale of manufactured organic products.

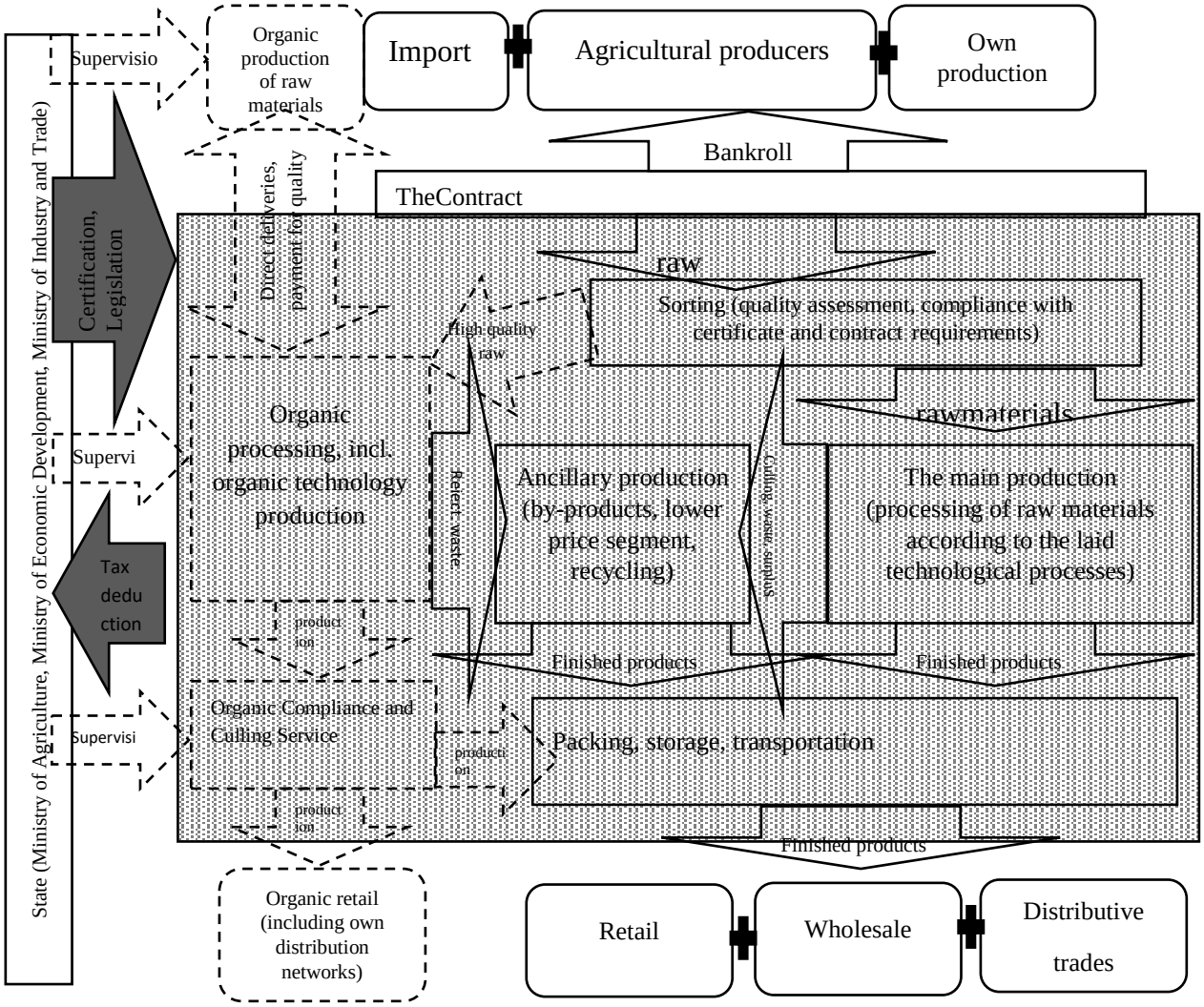

Fig. 2. A model of the organization of processing using the activation-assimilative method
Source: developed by the author

To date, the above prerequisites clearly demonstrate the urgent need for the development and implementation of scientifically based methods that can, in their effectiveness, facilitate the transition to organic production and create a sustainable supply chain linking organic producers with food processing plants certified for organic production.

In the course of research on the development of the scientific foundations of organic production, we deeply and comprehensively studied the regional characteristics of agricultural production, including organic production in the Russian Federation, identified certain industry-wide patterns and prerequisites that allowed us to develop and propose a **sufficiency method** consisting in the concentration of agricultural organic raw materials through the creation of raw material hubs for the purpose of subsequent distribution exporting it to processing enterprises, as well as for export within the framework of concluded agreements, partnership agreements and other forms of exchange agreements.

The hubs we offer should be large sorting nodes with facilities and equipment that allow the reception, storage, verification and transportation of agricultural organic raw materials. The territorial location of each hub should be justified by the equidistance from the key producers of raw materials to the hub's specialization (Fig. 3).

The key feature of the hub should be the maximum organizational simplicity and multifunctionality of activity. The hub's mission is to provide logistic support to the organic industry. In this regard, the hubs are called upon to implement transport, storage, partially trade, administrative and other

functions aimed at simplifying the procedure for the supply of agricultural organic raw materials.

As part of the implementation of the sufficiency method, consignments of agricultural organic raw materials will be accumulated and sorted by hubs and retrofitted as part of contractual obligations with processing enterprises.

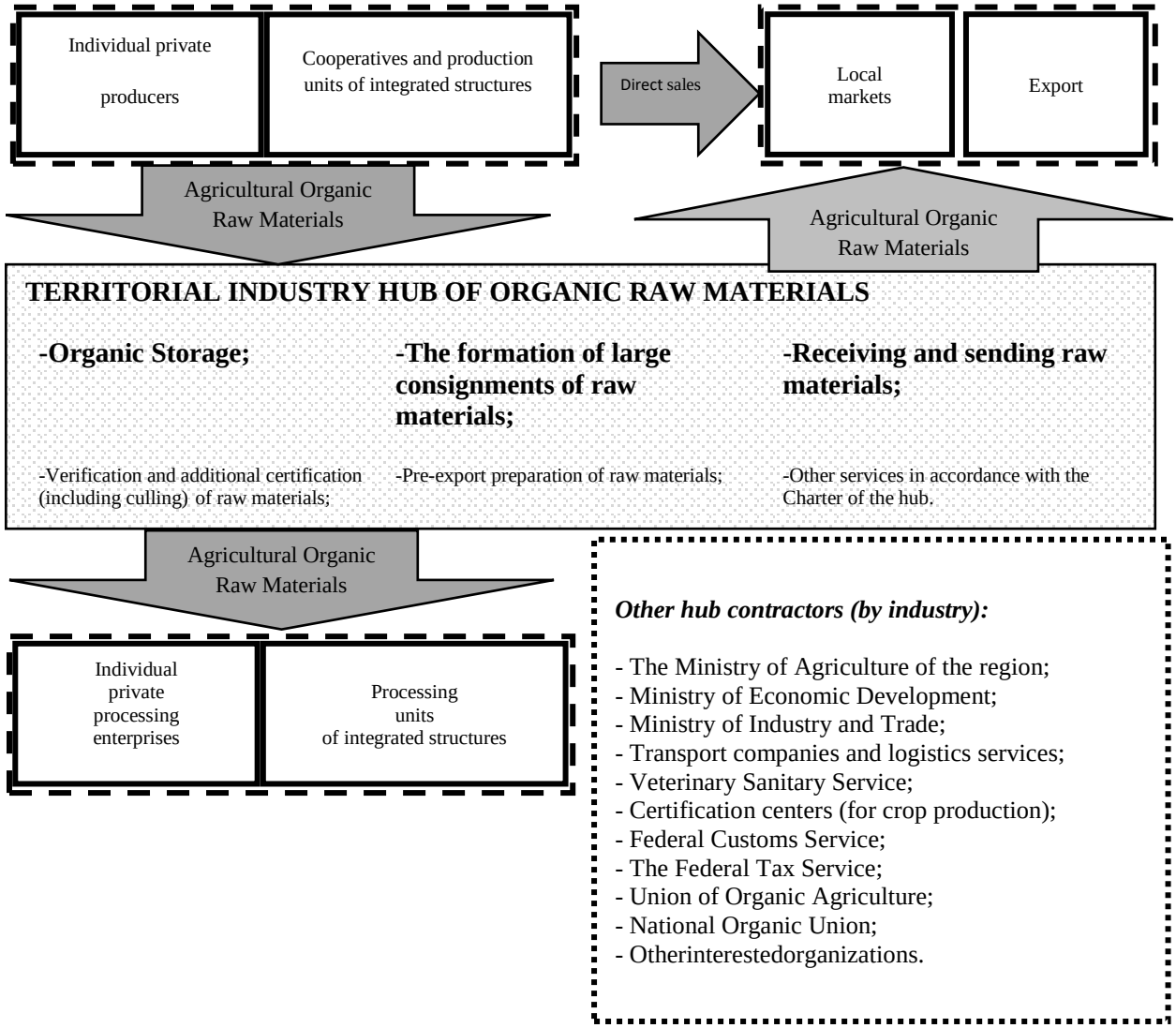

Fig. 3. Organizational and production model of the territorial-industrial hub of organic raw materials (sufficiency method)
Source: Compiled by the author

Thus, with the introduction of hubs, manufacturing enterprises eliminate the costs of promoting and marketing their own raw materials, focusing their attention and budget on maintaining and observing the requirements of Organic. An additional advantage of this method is the complete elimination of the threat of overstocking agricultural producers.

From the point of view of processing enterprises, the organization of hubs makes it easier to implement the activation-assimilative method, reduce the cost of purchasing products, minimize the risk of disruption of supplies, implement a triple system of confirming the quality and compliance of raw materials with organic requirements (manufacturer-hub-processor).

The widespread implementation of the sufficiency method will simplify the sales and supply of agricultural raw materials, realize the export potential of organic products, and reduce risks and costs for all participants in organic production.

Well-known and undeniable is the conclusion of M. Porter (1998), that the profitability of single companies, even according to the most optimistic forecasts, is significantly lower than that of integrated structures. A documented fact is the growing dynamics of the main indicators, expectations and potential of enterprises-subjects of integration, since in the process of developing the strategy, a combination of production capacities, accumulated capital, investment attractiveness and potential liquidity with a sufficient degree of representativeness is taken into account.

In the process of combining individual organizations into a single integral interdependent integrated structure, independent potentials merge into a common totality, which in turn allows achieving synergies and multiply increasing the efficiency, competitiveness and profitability of the resulting integrated totality.

Long-term studies of integration processes in agricultural sectors [14] make it highly probable that as a result of the creation of integrated structures, the potentials of industries and their constituent producers are realized more efficiently. At the same time, attention is focused not on targeted support for specific manufacturers or manufactured products, but on supporting accelerated identification and matching of economic interests of economic entities in the industry. At the same time, an increase in purchase prices, a decrease in production costs, and a reduction in transaction costs are achieved, which, ultimately, leads to an increase in production volumes by each specific enterprise and industry as a whole.

The ideal model for implementing **the method of organic integration** is the complex formation of near-cluster structures in the industry containing a closed production cycle from raw materials to ready-to-eat organic products (Fig. 4).

In the context of the crisis of budgets of all levels of the Russian Federation, and also taking into account the rather low level of development of agricultural production by industry average, the creation of an integrated structure specializing in organic production is impossible in the short and medium term due to the high depreciation of capital goods, low genetic potential in crop production, the lack of full-fledged systemic pedigree work in animal husbandry, the borrowing of business entities, as well as a number of subjective factors based on the reluctance of heads of agricultural enterprises to lose organizational independence after entering an integrated structure.

The only possible and least expensive option for implementing the method of organic integration is the creation of consumer supply and marketing cooperatives of organic production, which are naturally able to realize and popularize the production of organic raw materials among business entities, as well as ensure uninterrupted supply of appropriate quality to processing enterprises.

One of the strongest competitive advantages of the consumer cooperation system in organic production is the wide potential for diversification and integration of its activities.

The goal of diversification and integration is to achieve the synergy effect.

This effect is expressed in the fact that with the smooth interaction of departments and lines of activity, the sum of the indicators of their effectiveness when working separately is less than the efficiency of work in the system. At the same time, members of the consumer cooperative are financially interested in mutual development and are insurers of each other in case of force majeure circumstances.

If the participants in a consumer supply and marketing cooperative specialize in the collection and further sale of organic agricultural raw materials of their own production, then, respectively, the transaction and logistics costs are distributed between them evenly, and the profit received is distributed according to shares between all participants in the cooperative in equal shares, which contributes to an increase in sown area, technological modernization, increase labor productivity.

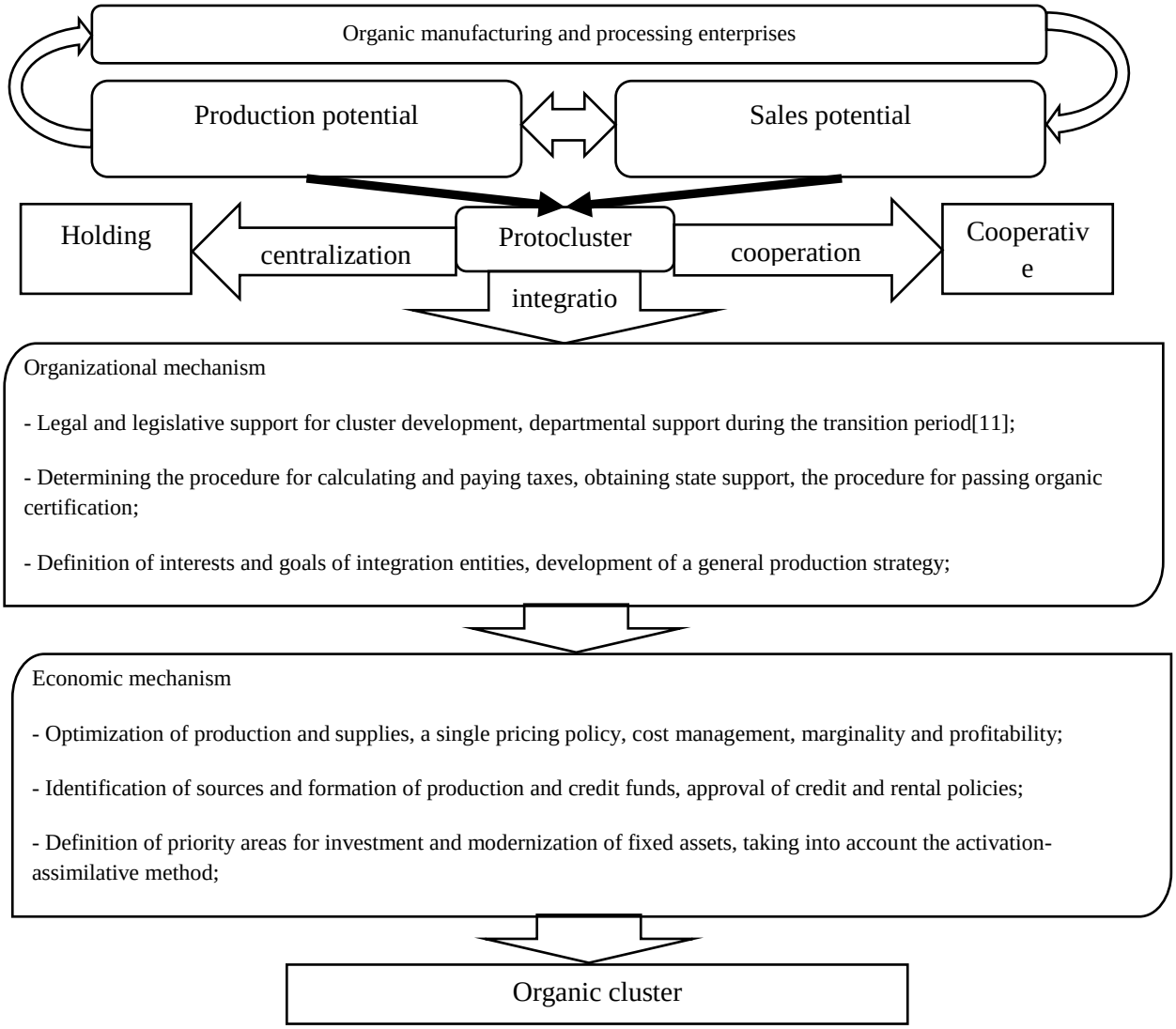

Fig. 4. A typical implementation model of the organic integration method
Source: Compiled by the author.

The advantages of cooperation in organic agriculture include the simplification of procurement procedures jointly by members of the cooperative, the simplification of the procedure for obtaining state support and subsidies, and the increase in the reliability of subjects of cooperation as borrowers for financial and credit institutions.

From the point of view of the processing industry, the conclusion of a contract for the supply of organic raw materials with a consumer cooperative if its participants have their own organic production is also more attractive in terms of reducing the risks of supply disruption, improving the reliability and quality of the supplied raw materials, as well as the possibility of concluding long-term contracts when developing a long-term development strategy. At the same time, unlike full integration, the processing enterprise does not lose organizational independence, since it is not a member of the cooperative and is not obliged to coordinate its actions and business processes with other shareholders.

As a result, the organizational and economic model of the agricultural organic consumer cooperative will be as follows (Fig. 5).

Thus, the agricultural organic consumer cooperative takes on the implementation of the principle of sufficiency, acting as an organic hub, able to accumulate organic raw materials through its activities, carrying out procurement activities at enterprises that are not members of the cooperative.

Implementation of the proposed methodological foundations for the production of organic food products increases the efficiency of integration processes, increases

production volumes, optimizes the composition and cost structure of agricultural production and processing enterprises, and reduces risks due to integration and cooperation ties.

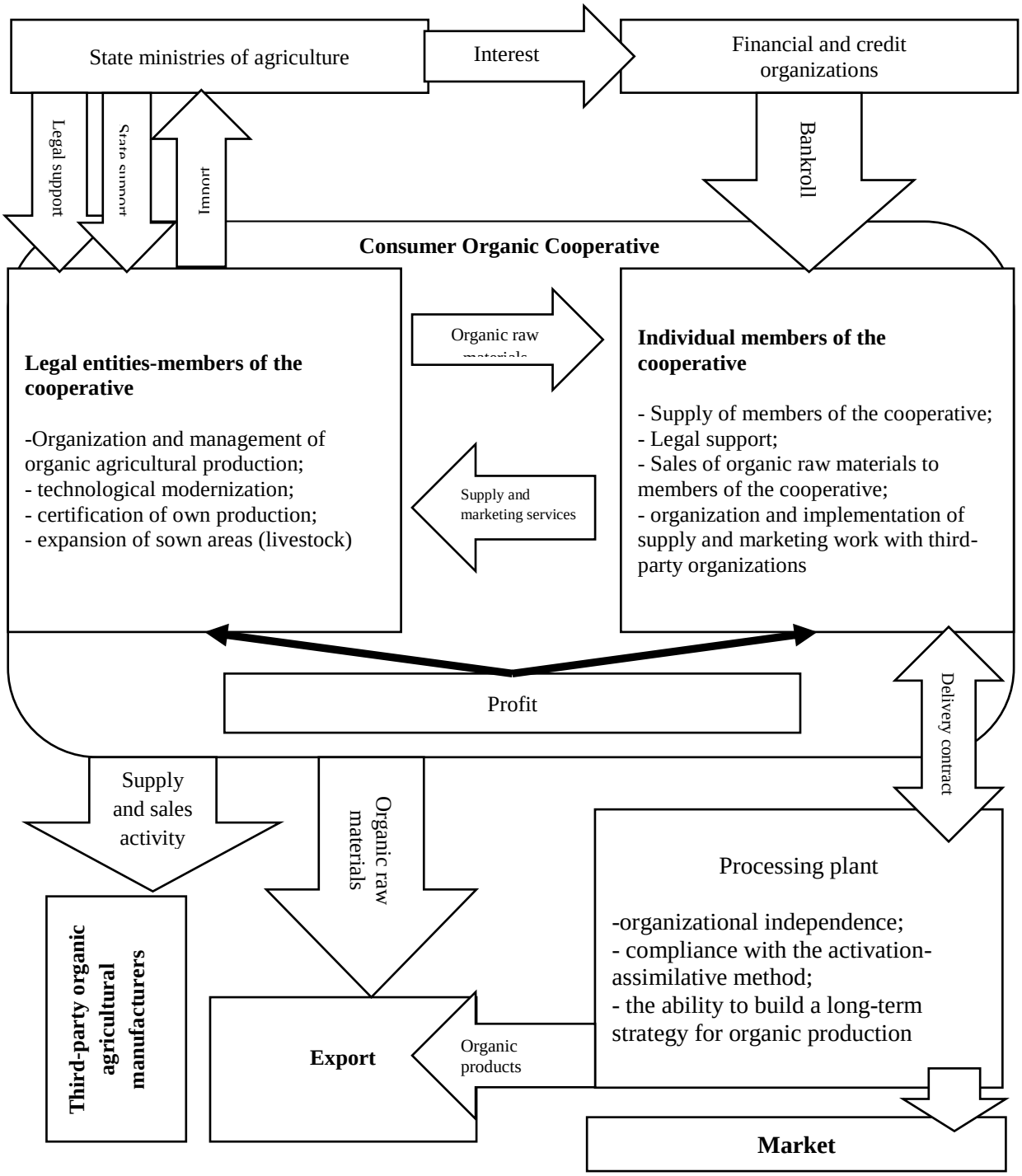

Fig. 5. Organizational and economic model of agricultural organic cooperation
Source: developed by the author.

Systematic development of production and consumer cooperative processes creates opportunities for the growth of production and processing of organic products, the expansion of organic production, the availability of loans, the improvement of the transition period for the creation of organic production, provides for the enlargement and diversification of production and, accordingly, increases the efficiency and competitiveness of organic agricultural producers and processing enterprises, as well as their products. As a result, the systematic

development of integration and cooperation processes will positively affect the development of the organic production industry of the Russian Federation as a whole.

CONCLUSIONS

The presented model of the methodological foundations of organic food production reflects a system of interrelated relationships between entities based on the account of the production potential of the latter. The model, together with the proposed cooperation mechanism, is a set of organizational and economic principles for the systemic development of food industry enterprises in Russia, designed to create deep ties between both organic and inorganic units of a processing enterprise, and with producers of organic raw materials.

The inclusion of all participants in organic production in the implementation of the proposed methodological foundations will clarify the need for strengthening and cooperation of organic enterprises, primarily in Russia, as a basis for increasing efficiency. and industry competitiveness in the region. Implementation of the proposed mechanism increases the efficiency of production processes, increases production volumes, optimizes the value chain of organic food products, reduces trade margins by implementing the sufficiency method on the hub platform. The systematic development of the processes of production and consumer cooperation creates opportunities for the growth of production and processing of products in the form of small businesses, the expansion of agricultural production, and the reduction of the subsidiary burden on state budgets of all levels. The logistics network ensures the consolidation and concentration of organic production and, accordingly, increases the efficiency and competitiveness of private farms and holdings, processing enterprises, hubs and their products. As a result, the systematic implementation of the proposed methodological foundations will positively affect the well-being of rural residents and economic entities of the organic industry and the degree to which their needs are satisfied.

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ASSESSING THE QUALITY OF THE LOCAL DEVELOPMENT STRATEGIES IN ROMANIA, EVIDENCE FROM 2014-2020 PROGRAMMING PERIOD

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Abstract

The LEADER Program has become an important part of the EU Rural Development policy since 1990. The program aims to offer solutions that are adapted to the needs of the rural communities and territories. The objective of the present work is to assess how the Local Development Strategies (LDS), created by the Romanian Local Action Groups (LAGs) between 2014 and 2020, respond to those needs. The study was conducted in the Nord-West Development Region of Romania, using quantitative and qualitative data from 31 LAGs. Two main types of data were used. The first set contains key rural development indicators - as defined and used by EU - and information from their own SWOT analysis, and are used to find out the needs, while the second set contains the objectives assumed by LAGs. A principal Component Analysis was performed in order to identify the factors that determine the quality of the Local Development Strategies. The results show that the Local Action Groups have not used a unitary methodology for selecting the indicators. More often than not, they chose to use irrelevant indicators that were not covered in official data and in the established methodologies of the European Union. A positive correlation was identified between the local characteristics (territory and population) and the budget allocation. However the strategies fail to address and respond to the needs and opportunities from the priorities that deal with knowledge transfer and innovation (P1) and the shift towards a low carbon and climate resilient economy (P5).

Key words**:** *Local Action Group, Principal Component Analysis, needs, objectives, budget*

INTRODUCTION

LEADER (acronym from the French initiative "Liaison Entre Actions de Développement de l'Économie Rurale") is a local development method which has been used for 20 years to engage local actors in the design and delivery of strategies, decision-making and resource allocation for the development of their rural areas, to reduce differences between rural and urban territories as well as to meet the basic needs of the population [9, 20]. The program was first implemented between 1991 and 1994, under the Common Agricultural Policy reform as a bottom-up Rural Development alternative, and it was followed by a second edition, LEADER II, that lasted from 1994 until 1999. The next stage of the program was LEADER+, the programming period being the years 2000-2006. An important element of this edition was its popularisation in all EU rural areas and the encouragement of local leaders to work out their own development strategies [17]. During the 2007-2013 programming period, LEADER has grown to become a mainstream methodological approach to EU rural development [9] and become a part of the programs financed from the European Agricultural Fund for Rural Development [17]. In the 2014-2020 programming period, the LEADER approach has been extended under the broader term Community-Led Local Development and has been implemented by around 2 800 Local Action Groups (LAGs), covering 61% of the rural population in the EU [9].

The LEADER approach has proven its effectiveness in promoting the development of rural areas by fully taking into account the multi-sectoral needs for endogenous rural development through its bottom-up approach. [12]. The program encourages the participation of different representative stakeholders in the creation of the Local Action Groups (LAGs) and their Local Development Strategies (LDS) [10]. The strategies should identify the problems and opportunities of the rural areas in

order to prioritize future investments using CAP funding [25].

„In the present programming period (2014-2020) LEADER committed to follow the six important EU rural development priorities [12]:

P1:fostering knowledge transfer and innovation in agriculture, forestry and rural areas;

P2:enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management of forests;

P3:promoting food chain organization, including processing and marketing of agricultural products, animal welfare and risk management in agriculture;

P4:restoring, preserving and enhancing ecosystems related to agriculture and forestry;

P5:promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors;

P6:promoting social inclusion, poverty reduction and economic development."

Researches underlining the development of Local Action Groups are insufficient and fragmented, and are generally focused on the results of the program [21] on the new type (bottom-up) governance they promote, or on the stakeholders satisfaction [8]. Authors like [3, 20, 21], presented in their works the economic impact that LAGs had in their territories. They showed positive results regarding job creation and economic development. Meanwhile the studies focused on governance and partnerships pointed out a strong influence of local elites and public sector in decision-making process, contrary to the bottom-up approach of LEADER [16, 23, 7]. In former communist states like Poland [28] and Romania [19] was discovered some level of distrust between the stakeholders. However, the assessment of the LEADER program should not only be focused on the implementation of the Local Development Strategies [17] but also on processes that govern their creation.

As illustrated in Table 1 Romania had a larger share of rural territory compared to EU-28, but also bigger challenges. Here the LEADER Program was implemented starting with the year 2007. In the first programming period there were 163 LAGs but their number has increased in the last funding cycle to 239, with a total public value of 563.5 million euro (2014-2020). [19] showed that in the period 2007-2013 in Romania, the local actors found it extremely difficult to create LDSs on their own. This is not only due to lack of experience, but also due to lack of initiative. They preferred to choose from a list of default measures. That was contrary to the LEADER principles, where innovation and bottom-up approach should underlie portrait the local needs [19]. Without that it risks transforming the strategies into miniature copies of the National Rural Development Program.

Table 1. Main rural development indicators in Romania and EU-28 (2014)

Indicator	Romania	EU-28
Percent of rural territory (%)	59.8	52
GDP (PPS) / capita in rural areas (EU-28 = 100)	33.9	72.8
People at risk of poverty or social exclusion in rural areas (% from total)	54.8	27.3
Young/old population ratio (population 0-14 y.o. / population 65+ y.o.) in rural areas	98.1	80.7
Labour productivity in agriculture (EURO / Annual Work Unit)	4,744	15,627

Source: CAP Context Indicators, 2014. https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/performance-agricultural-policy/cap-indicators/context-indicators_en, Accessed on 21.01.2020.

LAGs need to find a balance among the different objectives of the rural development policy and to translate this balance into the funding of projects [27]. The present paper aimed to assess the quality of the Local Development Strategies created by the Local Action Groups. In order to determine this aspect it was necessary to answer some crucial questions. What indicators were used to create the strategies? Do the strategies accurately reflect the realities of their territories? To which extend the LAGs objectives respond to

the needs and opportunities identified in the strategies? Have the local action groups provided the tools and resources necessary to meet the objectives?

MATERIALS AND METHODS

The research was conducted on 31 Local Action Groups (13% in the Romanian total) from the Nord-West Development Region of Romania (Fig. 1) that corresponds to the second level of the European Nomenclature of Territorial Units for Statistics. The region has a total surface of about 34,000 km^2, representing 14% of the total country area. A characteristic feature of the region is a high cultural and ethnic diversity. The Local Action Groups territories (Fig. 1.) cover all types of relief, from mountains to hills and plains. They have somewhat homogeneous features in terms of economic, social and cultural environment. In 2014, compared to the previous programming period (2007-2013), the number of LAGs had grown from 25 to 31, and had both a higher average size (804 km^2 in 2007 to 881 km^2 in 2014) and population (37,644 in 2007 to 39,247 in 2014). The LAGs, as part of the measure M19 Support for local development through LEADER, had a total budget of over 72 million euro, most of it as part of Component A (51 million).

Fig. 1.The LAGs territory in the North-West Romanian Development Region (2014 -2020).
Source: [26].

Data collection

Quantitative and qualitative data related to the beginning of the 2014-2020 LEADER edition in Romania were collected from official sources and publications such as: National Institute of Statistics, Eurostat, Local Development Strategies (LDS) and other documents of Local Action Groups (LAG). The difficulties that appeared in the collection process highlighted the many problems that LAGs still confront regarding the lack of transparency and organization. Most of the LDSs presented facts about their territory but have not offered sources for the cited data and, in some cases, not even the data itself.

Two main types of data were collected. The first set contains key rural development indicators defined by European Commission [13, 14] and information from their own SWOT analysis, and are used to find out the needs and potential of the LAGs territories. In 2014, in order to lay down rules for the application of the common monitoring and evaluation framework of the common agricultural policy, the European Commission defined and adopted 45 CAP indicators [15]. The Context Indicators were divided in three main sections: socio-economic, sectorial and environment indicators. However, in Romania most of them cannot be found at local level, being available only at county or reginal levels. Data such weak points, strengths and opportunities were divided in categories based on their correspondence to the rural development priorities as defined by the EU. This approach was chosen based on the results of a focus group in which 5 LEADER researchers and experts participated. Another reason for the method was the principle that the SWOT analysis should be used in order to justify the measures selected by LAGs in their strategies, as mentioned in [12] of the European Parliament and of the Council from 17 December 2013, on support for rural development by the European Agricultural Fund For Rural Development.

The second set, the budget allocated for each rural development priority, reflects the response of the LAG to those needs and opportunities. Similar methods were used in other studies regarding LEADER. In Greece [2] ranked the LAGs according to indicators that represent the budgets per measure in the related intervention area in order to discover the characteristics of the most integrated and

effective strategies. [27] showed with a similar approach that the Andalusian LAGs have not presented any clear specialisation pattern, but supported a wide range of small and medium-size projects across the different axes.

However, the method presents some limitations. For better results the findings should be correlated with an investigation of the roles the stakeholders and LAGs employees played in creating the LDSs.

Methods for data analysis

A number of 46 variables (Table 2) were collected and analysed using the Statistical Package for the Social Sciences (SPSS 11.0). A Principal Component Analysis (PCA) was conducted in order to identify the factors that determine the quality of the Local Development Strategies (LDSs) of the Local Action Groups in the North West Development Region of Romania. A similar approach was used by [27] to examine the relationship between variety in the LDSs and employment safeguarding for the programming period 2007–2013 in Andalusia, Spain.

Principal Component Analysis method is based on the theory that in a population the information can be dispersed for variables and factors that explain the most important part of the total variability [1]. However, the factors cannot represent all the information inherent in the items. Consequently, there is a trade-off between simplicity and accuracy. This trade-off has to be addressed in any principal components analysis when deciding how many factors should be extracted from the data [22]. In this case the principal components were selected using the computed eigenvalues, and the interpretation was performed using a varimax matrix.

RESULTS AND DISCUSSIONS

In 2014 a Local Action Group had on average an area of 88,123.7 ha and a population of 39,247 persons (Table 2). In terms of age structure it had a lower ratio of population with ages between 15 and 64 (61.82%), compared to EU-28 (in rural area: 65.5%) and to national level (rural area: 66.3%), meaning a smaller population of working age. In the same time the percent of the older population it is higher than both EU-28 and national level.

On average a LAG had a third (31.33%) of its territory covered by arable lands, followed by meadows (29.9%) and forests (28.8%). Out of its total territory 61.8% is covered by HNV area and 15.4% by Natura 2000 Sites of Community Importance (SCI).

The Local Action Groups had in average a low employment rate (15.88%), and a high proportion of firms active in tertiary sector (67.99%).

Regarding the budget allocations, most LAGs preferred to focus on measures from Priority 6 -Promoting social inclusion, poverty reduction and economic development in rural areas, which on average got more than half of the budget (55.62%),. On the other side, almost none of the LAGs had budget allocations on Priority 5 - Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy. Therefore, because of the lack of data in order to perform the Principal Component Analysis the priority P5 was excluded from research.

The Principal Component Analysis

The factorial analysis depicted fourteen principal components (PC) that together explain 87.16% of the variance. Out of those, the first ten accounted for 71.5% of the variance, a satisfactory level as shown in other studies [27].

PC1. The link between the LAGs territorial characteristics and their Local Development Strategy (LDS)

The territorial characteristics of the LAGs explained an important part of the variance. There was a strong positive correlation between the percentage of natural areas (Forests; Meadows; HNV areas and Natura 2000 SCI areas) and the weak points identified in priority P4 - Restoring, preserving and enhancing ecosystems related to agriculture and forestry, meaning that they took into consideration the needs of those territories.

Table 2. Descriptive statistics of the main LAGs characteristics

Variable	Mean	St. Dev.	Min	Max	MU
Area	88,123.7	37,235.4	27,656	161,414	HA
Population	39,247.1	188,51.3	11,891	92,558	Number
Density	46.1	16.5	22.6	99.9	Pop./Km^2
Population in rural areas	91.3	9.7	75.9	100	% total
Population in urban areas	8.7	9.7	0.0	24.1	% total
Population under 15	16.3	3.8	10.0	23.0	% total
Population between 15-64	61.8	5.6	50.0	71.0	% total
Population over 64	21.9	5.7	11.3	35.0	% total
Romani Population	4.7	1.8	0.0	8.7	% total
Forest area	28.8	13	8.3	53.9	% total
Natural areas	4.3	1.7	1.5	8.1	% total
Artificial areas	4.4	1.8	1.7	8.8	% total
Arable Land	31.3	17.2	3.8	63.7	% total
Meadows	29.9	9.1	13.1	45.8	% total
Permanent Crops	1.4	1.2	0.1	4.3	% total
Natura 2000 SCI	15.4	15.8	0.0	66.8	% total
HNV areas	61.6	34.1	0.0	100.0	% total
Unemployment	4.3	1.6	1.9	8.5	% population between 16 and 64
Employees	15.9	5.1	7.0	26.0	% population between 16 and 64
Firms Primary Sector	6.9	7.6	0.0	31.5	% total
Firms Secondary Sector	25.2	13.5	0.0	65.2	% total
Firms Tertiary Sector	67.9	14.4	31.4	92.5	% total
No. Of Firms Per 1,000 Pop.	6.7	6.1	2.3	36.3	Firms/1,000 pop.
Overnight Stays	23,258.4	21,325.8	6.0	79,094.0	Number
Accommodation Units	445.5	437.1	14.0	1,623.0	Number
Traditional Products	1.1	3.1	0.0	15.0	Number
P1_Budget	3.2	4.9	0.0	18.3	% total
P2_Budget	13.4	10.6	0.0	48.1	% total
P3_Budget	7.7	9.5	0.0	44.0	% total
P4_Budget	0.4	1.1	0.0	4.8	% total
P6_Budget	55.6	11.7	30.2	77.3	% total
WeakPointsP1	10.6	8.8	0.0	35.4	% total
WeakPointsP2	12.3	8.1	0.0	33.3	% total
WeakPointsP3	11.4	6.4	0.0	23.7	% total
WeakPointsP4	4.2	4.9	0.0	15.4	% total
WeakPointsP6	59.2	12.4	34.8	92.6	% total
StrenghtsP1	5.9	5.6	0.0	18.2	% total
StrenghtsP2	18.2	6.6	7.1	31.3	% total
StrenghtsP3	4.9	4.3	0.0	17.6	% total
StrenghtsP4	8.8	4.4	0.0	17.6	% total
StrenghtsP6	58.4	11.1	34.4	78.6	% total
OpportunitiesP1	7.3	8.7	0.0	37.5	% total
OpportunitiesP2	7.5	5.6	0.0	20.0	% total
OpportunitiesP3	15.8	9.4	0.0	36.0	% total
OpportunitiesP4	2.8	4.1	0.0	16.7	% total
OpportunitiesP6	63.7	12.8	37.5	90.0	% total

Source: Local Development Strategies of Local Action Groups and the National Institute of Statistics.

The LAGs with more natural areas also had better results in touristic activities (Overnight Stays, Number of accommodation units) and less weak points identified in the priority P6 - Promoting social inclusion, poverty reduction and economic development in rural areas, hinting that those they have a better economic situation. However the same thing cannot be said about the LAGs with a higher ratio of arable land and permanent crops, which usually have more weak points identified in priority P6.

Table 3. Descriptive Statistics for the first three components PC1, PC2, PC3

PC	Eigen Values	% variance explained	% variance accumulated	Indicators and correlation with the PCs (The most discriminant variables above ±0.3)
PC1	6.056	13.168	13.168	Arable Land (%): -0.911 Artificial Areas (%): -0.824 Forrest (%): 0.822 Meadows (%): 0.811 Accommodation Units (no): 0.751 HNV area (%): 0.749 Overnight Stays (no): 0.650 Natura 2000 SCI (%): 0.571 Weak Points identified in priority P4 (%): 0.365 Permanent Crops (%): -0.477 Weak Points identified in priority P6 (%): -0.416
PC2	4.767	10.363	23.531	Rural Population (%): -0.883 Urban Population (%): 0.883 Population (no): 0.751 Area (ha): 0.680 Priority P2 Budget (%): -0.619 Employees (% out of pop. between age 15 and 64): 0.592 Priority P6 Budget (%): 0.579 Weak Points identified in priority P4 (%): 0.414 Priority P4 Budget (%): 0.307 Opportunities identified in priority P2 (%): -0.412
PC3	3.638	7.909	31.44	Firms in secondary sector (%): 0.876 Weak Points identified in priority P1 (%): 0.807 Firms in tertiary sector (%): -0.778 Permanent Crops (%): 0.556 Priority P1 Budget (%): 0.538 Weak Points identified in priority P2 (%): -0.393 Density (Pop./Km^2): 0.346.

Source: Extraction Method Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization

PC2. Rural/peri-urban influence on economic development

The LAGs with a higher proportion of weak points identified in priority P4 also had higher budget allocations on the same priority, meaning that they tried to provide the means to respond to their needs. The elements identified in P4 are positive correlated with P6, suggesting a synergy between those two priorities.

The budget allocated to priority P6 is positive correlated to the percent of urban population, the opposite being true for the percent of rural population. A similar situation was reported by [5] who showed that LEADER projects favoured those territories where a business framework is already well established, at the expense of the areas less developed.

The LAGs that identified more opportunities in priority P2 have also allocated a higher budget to measures from the same priority (Table 3).

PC3. Factors that explain budget allocation for priority P1

A positive correlation was found between the weak points identified in priority P1 and the budget of the measures from the same priority, meaning, once again, that the LAGs tried to offer the tools to respond to the needs of their territories.

Interestingly, the budget of P1 is positive correlated to the share of companies activating in the secondary sector, but negative

correlation was found with the share of firms from the tertiary sector.

PC4. Correlation between the age structure and the opportunities

As expected, the LAGs that have a higher share active population have identified more opportunities in priority P1 - fostering knowledge transfer and innovation in agriculture, forestry, and rural areas, the opposite situation being true for the Local Action Groups with an older population. This suggests a focus of the LAGs on the potential of their human resources. (Table 4)

PC5.Territorial characteristics and opportunities/strengths identified

The LAGs with a higher proportion of strengths in priority P1 had allocated less money to measures from P1. Surprisingly the same was true for the LAGs with more opportunities identified in the first priority.

In the LAGs that were more densely populated mores strengths and opportunities were identified in priority P6 - Promoting social inclusion, poverty reduction and economic development in rural areas.

PC6. The relations between the components of the SWOT analysis and the traditional products

Table 4. Descriptive Statistics PC4 to PC6

PC	Eigen Values	% variance explained	% variance accumulated	Indicators and correlation with the PCs (The most discriminant variables above ±0.3)
PC4	3.247	7.059	38.499	Population Over 64y.o. (%): 0.842 Population with age between 16 and 64 (%): -0.824 Unemployment (% out of pop. between age 15 and 64): 0.709 Opportunities identified in priority P4 (%): 0.676 Opportunities identified in priority P1 (%): -0.449
PC5	3.112	6.765	45.265	Area (ha): 0.680 Priority P1 Budget (%): -0.357 Strenghts identified in priority P6 (%): -0.736 Opportunities identified in priority P1 (%): 0.702 Opportunities identified in priority P6 (%): -0.597 Density (Pop./Km^2): -0.303
PC6	2.678	5.822	51.087	Opportunities identified in priority P6 (%): 0.321 Traditional Products (no): 0.894 Priority P4 Budget (%): 0.634 Weak Points identified in priority P2 (%): 0.616 Weak Points identified in priority P6 (%): -0.372 Strenghts identified in priority P3 (%): -0.340 Strenghts identified in priority P2 (%): -0.361

Source: Extraction Method Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization

Contrary to expectations there is a negative correlation between the number of products that were certified as traditional and the strengths identified in priority P3 (that deals with quality schemes), suggesting that only some the LAGs have seen the potential of those products.

The strengths identified in the priorities P3 and P2 (enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management of forests) were, as expected, negative correlated to the weak points identified in priority P2.

PC7. Correlation between age structure and economic development (Table 5)

PC7 shows the correlation between the age structure and economic development. LAGs with a younger population and a higher number of firms per 1,000 inhabitants had a higher number of tourists as well.

PC8. The links between the natural areas and the opportunities

The percentage of Natural Areas presented a strong and positive correlation with the opportunities identified in priority P3. The

result suggests that the LAGs have seen the potential to link those areas to concepts like short supply chains or even local brands. In the same time a negative correlation was found with opportunities from P6.
This indicates that LAGs try to focus the resources from this priority in areas that already have some level of economic development.

PC9. Factors that explain the challenges identified in the priority P6
LAGs with more tourism related activities have also reported more needs in priority P6, which suggests that they have a good understanding of the environment in which they work. As expected, fewer problems were identified in the territories with a higher employment rate (Table 6).

Table 5. Descriptive Statistics PC7 and PC8

PC	**Eigen Values**	**% variance explained**	**% variance accumulated**	**Indicators and correlation with the PCs (The most discriminant variables above ±0.3)**
PC7	2.482	5.396	56.483	Overnight Stays (no): 0.469 Population Over 64 y.o. (%): -0.340 Nuber of firms/1,000 inhabitants (no): 0.848 Density (pop./Km^2): 0.715 Population under 15 y.o. (%): 0.382
PC8	2.482	5.396	61.878	Opportunities identified in priority P6 (%): -0.469 Opportunities identified in priority P3 (%): 0.882 Natural Areas (%): 0.755

Source: Extraction Method Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization.

PC10. Aspects that influence the budget allocations for priority P3
Surprisingly a negative correlation was found between the budget of the priority P3 - Promoting food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture and the budget of the priority P2 - enhancing farm viability and competitiveness of all types of agriculture.
Another interesting aspect is that the LAGs have opted to invest in priority P3, even after they reported a high number of strengths regarding the same priority (Table 6).
Discussions
The results portrayed several important aspects regarding the quality of the Rural Development Strategies made by the Local Action Groups in the Nord West region of Romania.
During the creation of the strategies, the LAGs have not used a unitary methodology for selecting the most relevant indicators. More often than not, they chosed to use irrelevant indicators that were not covered in official data and in the established methodologies from [13, 14].
This situation can be explained, on one hand, by a weak administrative and organizational capacity of Romanian institutions and their inability to offer relevant data at municipalities level. On the other hand, as [19] pointed out, LAGs found it extremely difficult to create strategies on their own.
This is not only due to lack of experience, but also due to lack of initiative. Some of the strategies have not presented sources for the data used. More worrying are the cases where only the conclusion is mentioned, but not the data itself. The lack of organization and experience in their many forms seems to be a more widely spread problem, as pointed out by [23] in Andalusia and [10] in Spain.

Table 6. Descriptive Statistics PC9 and PC10

PC	Eigen Values	% variance explained	% variance accumulated	Indicators and correlation with the PCs (The most discriminant variables above ±0.3)
PC9	2.35	6.109	66.987	Accommodation Units (no): -0.329 Overnight Stays (no): -0.338 Employees: 0.356 Population with age between 16 and 64 (%): -0.331 Weak Points identified in priority P3 (%): 0.856 Population under 15y.o. (%): 0.599 Weak Points identified in priority P6 (%): -0.508
PC10	2.085	4.534	71.521	Priority P2 Budget (%): -0.385 Priority P6 Budget (%): 0.389 Natural Areas (%): 0.322 Priority P3 Budget (%): 0.899 Strengths identified in Priority P3 (%): 0.619

Source: Extraction Method Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization.

A positive correlation was identified between the local characteristics (territory and population) and the way in which the budget allocations were made. Although Romania had a higher percentage of rural territories than the EU-28 average, it also faced bigger problems. The percent of people at risk of poverty or social exclusion in rural areas was two times the average of EU-28 and the gross domestic product per capita was considerably smaller. This situation could explain the Local Action Groups focus on measures from the priority P6 that deals with poverty reduction and economic development, allocating, in average, more than half of the total budget. However, some authors [16, 23, 7] have expressed concerns about this matter, suggesting that the local authorities tried to use their power and influence in order to obtain more funds and measures for themselves. The focus on P6 was more evident in urban areas. In Andalusia, Spain, [5] also reported that LEADER projects favoured those territories where a business framework was already well established, at the expense of the areas less developed. Another interesting situation was presented by Rodriguez et al., in 2019 in the same Spanish region. Their results showed that most of LAGs that spent high amounts of money on the big project within Axis 3 (that dealt with poverty reduction and job creation) did not achieve good results in terms of employment safeguarding.

A positive result was the fact that some of the LAGs correctly identified the problems and opportunities that the large territories of natural areas (forests; meadows; HNV and Natura 2000 SCI) come along with, and they offered within their strategies the financial support needed to address them. The results also suggested a synergy between the priorities P4 and P6, probably based on the touristic potential of the natural areas. The findings also point towards the fact that the more rural LAGs attempted to rejuvenate their territories using the measures from the priority P2, especially 'Installation of young farmers'. The budget allocated to this priority is also correlated the amount of identified opportunities. These results suggests that the LAGs focused on the main features of their territories and selected measures and instruments that best respond to them.

The results show that the priority P1 - Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas is underfunded. Some LAGs that identified more weak points in this priority have allocated a higher budget, but most of them failed to offer the resources needed to address the problems and to capitalize on the existing opportunities. Also, the P1 elements present no substantial synergy with other priorities. This represents a serious matter as the innovation and knowledge transfer plays a key role for in the development of rural areas, especially in terms of diversification, competiveness and governance. [11, 24]. A similar result was reported by [4]. They showed that the expenditure levels on knowledge transfer and

innovation are extremely low in Romania and Bulgaria compared to other EU members.

One of the most important priorities of the EU is promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sector [15]. In the North-West Development Region of Romania, [6] reported a favourable attitude from the population toward renewable energy. However the study shows that only two LAGs had measures the priority P5, although around half of them pointed out in the strategies weak points and opportunities corresponding to this priority. This situation is probably a combination of several factors, like the lack of initiative [19] and information of the stakeholders, and a low demand from the private sector.

Most of the Local Action Groups identified opportunities in Priority P3, especially regarding the need for cooperation between producers, short supply chains and quality schemes. In 2014 on their territories existed 33 products that were certified as traditional, 11% from national total [18].

However the budget of this priority was not correlated with the budget of P2, suggesting a lack of synergy between the measures of the two priorities.

CONCLUSIONS

In the 2014-2020 Programming Period the importance of the LEADER Program has increased in Romanian, and became an important rural development tool in the Nord-West Developing Region of Romania.

The present paper showed that Local Action Groups still retain some of the problems from the last edition (2007-2013) regarding lack of organisation and experience, as previous research pointed out [19]. The results show that the Local Action Groups have not applied the methodology established by the EU Commission, focusing instead on less relevant indicators.

LAGs need to find a balance among the different objectives of the rural development policy and to translate this balance into the funding of projects (Rodriguez et al., 2019). In this case a positive correlation was found between the needs, opportunities and the budget. A common feature is the fact the LAGs preferred to offer a high budget to measures from the priority P6 in order to combat poverty and to promote job creation. On the other hand, almost none of the LAGs have allocated resources for the priority P5. A few measures were also reported in Priority P1 that deals with knowledge transfer and innovation, a crucial aspect for a sustainable rural development.

This research pointed out the most important problems, as well as the most positive results in making a local development strategy. As the new version LEADER Program is closing in, its findings are more relevant than ever. However, in order to obtain a complete picture, more research is still necessary, especially focused on the roles that the partners and employees of the LAGs played in creating the strategies and in their implementation.

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RESEARCH ON THE BEHAVIOUR DURING THE STORAGE OF SOME APPLE VARIETIES FROM THE GROWN ASSORTMENTS IN THE SOUTH-EAST AREA OF ROMANIA

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Abstract

Keeping the fruits in the best conditions, for a long period of time and with the least quantitative and qualitative depreciations can be done if a whole complex of factors is taken into account. The research carried out aimed at the evaluation of the behaviour at the storage and of some physico-chemical characteristics of some varieties of apples from the assortment grown within Moara Domnească fruit farm. In order to achieve the objectives, 4 varieties of apples (Goldspur. Generos, Idared, Florina) were studied. Physical-chemical analyzes were performed which consisted in determining the mass losses and by damaging the fruits, their firmness and determining some chemical components (soluble SU, titrable acidity). Mass losses were recorded in all 4 varieties analyzed. The best varieties for storage were found to be Idared variety and Florina variety which recorded the lowest losses, generally below 10%.

Key words**:** *apples, losses, physical-chemical analyzes, storage, varieties*

INTRODUCTION

Apple is one of the most popular fruits [14]. The apple crop is so widespread, on the one hand, due to the nutritional and therapeutic value of the fruits, and on the other hand, to the high economic value [13]. Apples have special biological characteristics, being among the few fruits that keep their freshness for a long time, can be transported over long distances and consumed at any time of the year. It contains a lot of essential nutrients that are necessary for the normal growth and development of the body [6]. Keeping the fruits in the best conditions, for as long a period of time and with as little quantitative and qualitative depreciation as possible, can be done if a whole complex of factors is taken into account [7]. In Romania, the recommended apple assortment is very rich, comprising both varieties created within the research units from all over the country, as well as varieties introduced from abroad, which were tested and proved to be adapted to the pedoclimatic conditions from us. However, the base of apple production is provided by a relatively small number of varieties, already become traditional, such as: Jonathan, Golden Delicious, Red Delicious, Idared or Starkrimson. The first step to a successful storage is a harvest made correctly, according to each variety and its characteristics [8]. If the fruit is harvested too late or too early, there is a greater risk of disease-related loss during storage [3]. The disadvantages of too early harvesting: weight loss, so a reduction in harvest, because the fruits have not fully grown, have not reached their normal size [5]. Weight loss is also great for storage, as the water evaporation from the fruit is more intense; lack of qualitative properties such as taste and pleasant aroma; the coloration is weak and the colour does not become bright enough during storage; predisposition to some physiological disorders, such as: soft opaque, intense browning and bitter stains etc; The disadvantages of delayed harvesting are: harvesting losses due to anticipated fruit fall; increasing the degree of mechanical damage during transport and handling; reducing the storage time, because the fruit left on the tree

for a long time becomes very ripe, overripe and no longer suitable for storage, and should be used immediately; predisposition to some physiological diseases and disorders such as gray rot, monilioosis, internal browning and stoicity [1]. Keeping the fruits in the best conditions, for a long period of time and with the least quantitative and qualitative depreciations can be done if a whole complex of factors is taken into account [2]. These factors that influence the preservation can be divided into several groups, namely: the group of factors that contribute to the formation and growth of fruit in plantations; the group of factors and conditions for harvesting, handling and transporting fruits; the group of environment factors of fruit preservation. The success of storing fruits in storage is conditioned and depends to a large extent on the factors belonging to the first two groups. It is absolutely necessary to know the main factors that we must take into account in order to introduce only fruits corresponding to this purpose in the storage [11]. These factors specific to the first two groups are: ecological factors, natural from the region where trees and fruits grow; agrotechnical factors, represented by the crop technology; the biological particularities of the growth and development of trees and fruits; the conditions under which the fruits were harvested; the conditions of handling, conditioning and transport of the fruits from the place of production to the warehouse [4].

The duration of fruit preservation, following treatments with some insectofungicides, is generally negatively influenced. Thus, some substances reduce the life of apples [9]. Other products, applied before harvesting, with respect to the break time, have determined a good protection after harvesting against the storage diseases that can compromise the fruit [15]. These diseases are bitter rot (*Gloeosporium* spp.), wet rot (*Penicillium* spp.), Gray rot (*Botrytis* spp.) and bitter rot (*Alternaria*) [12]. The best conditions for storing apples are in warehouses with temperature and humidity controlled. The standard storage conditions are: a temperature of 3-4°C, and a relative humidity of air between 85-95%. The storage life can be up to 7 months.

MATERIALS AND METHODS

The research carried out aimed at the evaluation of the behaviour at the storage and of some physico-chemical characteristics of some varieties of apples from the assortment grown within Moara Domnească fruit farm [10]. They were stored in the freezing cells of the specialized storehouse within Moara Domnească. The analyzed fruits come from the harvest of 2019. In order to achieve the objectives, 4 varieties of apples (Goldspur. Generos, Idared, Florina) were studied and 20 pieces were analyzed from each variety. Within 2 days after harvesting, physical and chemical analyzes were performed, which consisted in determining the mass losses and by destroying the fruits, their firmness and the determination of chemical components (soluble SU, titrable acidity). After a period of 125 days from storage, assessments were made regarding the losses registered by destruction. The harvesting was done on 5th September. The last phytosanitary treatment was performed with Captan 80 WDG fungicide at a dose of 0.15%. The pause time of 14 days until harvest was observed.

Testing these varieties allows appreciation of the best variants suitable for competitive products. The experiences were organized in 3 variants, with 3 repetitions per variant. Physico-chemical analyzes were performed, consisting of the following determinations:

Determination of the average mass and the structural textural firmness of the apples. The determinations were made on a sample of 20 fruits for each variant, the average sample consisting of apples representative regarding size, degree of ripe and coloration. Structurally textural firmness was effected with the Effe-gi manual penetrometer, by penetrating at 4 points in the equatorial area, after the local removal of the epidermis.

Determination of solubility and titratable acidity. This operation was performed on samples of 3 kg of fruit from each variant, using standardized laboratory methods. The soluble dry matter was determined by the

refractometric method, using the ABBE mass refractometer, expressing the results in percentages. The content in acidity was determined by the titrimetric method with the expression of the results in percent malic acid.
During storage the daily control of the thermo-hydric factors in the cold room was carried out, in order to ensure the optimum conditions for maintaining the quality [2] (temperature 3-4°C and 90% RH). Also, the ability to maintain the quality of the fruits was evaluated by finding out about the changes in appearance that occurred regarding dehydration, the appearance and evolution of the different storage diseases. After removing the apples from the storage space, determinations were made regarding the level of the quantitative and qualitative losses recorded by the fruits, the modification of the fruit firmness (determined by penetration), the evolution of the content of soluble dry matter and the titrable acidity and the appreciation of the firmness of the fruits after storage.
The determination of mass losses and breakdowns produced during the storage period was made by weighing the resulting fruit samples, respectively of the depreciated (diseased) fruits, in comparison with the initial quantities stored.

RESULTS AND DISCUSSIONS

It can be seen from the data presented in Table 1 that the varieties had a different behavior regarding the losses registered during the storage. All have registered changes materialized in mass losses and through destruction. The lowest percentage of depreciation but also of losses through weight loss was observed in Idared variety, which had a percentage of 1.60% loss by breakdown and 3.70%, weight loss. The most significant losses were determined in Goldspur variety, 34.21% losses by damage caused by the attack of *Gloeosporium* ssp. and 20.31% mass losses by dehydration (Photo 1).
The variety Florina has withstood satisfactory for the duration of the storage having losses through damage and losses of mass of less than 10% (Photo 2).
Generous variety recorded losses by breaking down by more than 10% and by mass below 10%, the depreciation starting to appear after approx. 90 days of storage.

Photo 1. *Gloeosporium* ssp. to Goldspur variety
Source: own determination.

Photo 2. *Alternaria* to Florina variety
Source: own determination.

The best varieties for storage were found to be Idared variety and Florina variety which recorded the lowest losses, generally below 10%. The mass losses were registered in all 4 varieties analyzed (Fig. 1).
The fruit firmness registered a decrease during storage, to all studied varieties, being in the interval of 3.88-5.18 kgf/cm^2. The most significant decrease was remarked in Generos variety, 16% and the lowest, in Idared variety, 0.67% (Table 2).

Table 1. Losses registered during the apple's storage

Variety	Losses (%)			Remarks
	Total	Mass	Broken	
Generos	20.29	9.80	10.49	Start of depreciation by dehydration and breaking after 15.12.2019
Idared	5.30	3.70	1.60	Good looking fruit with freshness, little depreciation.
Florina	14.16	5.88	8.28	Fruits were stored well, with attractive aspect with beginning of *Alternaria* atack.
Goldspur	54.52	20.31	34.21	Depreciations caused by dehydration and tart of *Gloeosporium ssp.* attack

Source: own determination.

Table 2. Evolution of apples firmness during storage Penetration value (kgf/cm²)

Variety	Initial	Final	Differences %
Generos	4.75	3.99	-16.0
Idared	4.47	4.44	-0.67
Florina	6.14	5.18	-15.6
Goldspur	4.37	3.88	-11.2

Source: own determination.

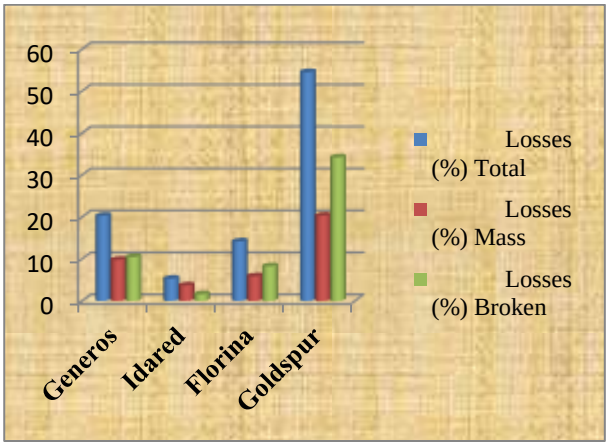

Fig. 1. Losses registered during the apples storage
Source: own determination.

The soluble SU content had both increases and decreases, this aspect being shown in Table 3.

Table 3. Evolution of soluble SU content during the apples storage

Variety	Soluble SU (%)		
	Initial	Final	Differences %
Generos	12.41	15.80	+27.3
Idared	13.16	12.70	-3.5
Florina	14.06	14.50	+3.1
Goldspur	12.06	13.90	+15.2

Source: own determination.

At Idared variety the soluble SU content registered a decrease of 3.5%. The other analyzed varieties had increases of SU solubility during storage, the values being from 3.1%, to Florina variety, to 27.3%, to Generos variety. In conclusion, soluble SU values increase as the storage period increases (Fig. 2).

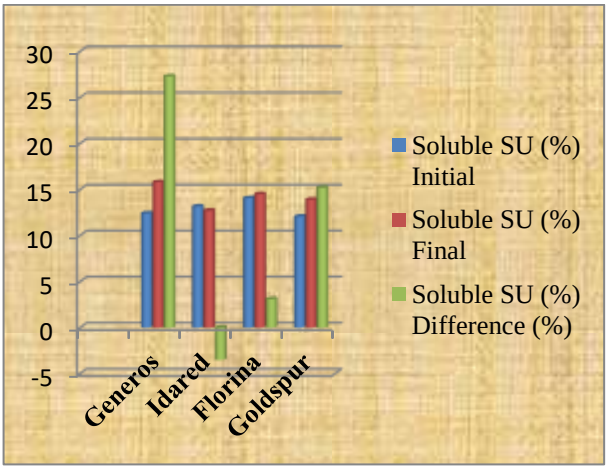

Fig. 2. Evolution of soluble SU content during the apples storage
Source: own determination.

Table 4. Evolution of titrable acidity content during the apples storage

Variety	Titrable acidity (%)		
	Initial	Final	Differences %
Generos	0.44	0.30	-31.8
Idared	0.59	0.70	+18.6
Florina	0.63	0.40	-36.5
Goldspur	0.49	0.30	-38.7

Source: own determination.

As shown in Table 4, the values of the titrable acidity registered, in the case of the majority of the studied varieties, decreases. Except for Idared variety, where there was an increase of the values of the titrable acidity following the storage, of 18.6%, in the other varieties there were determined decreases that exceeded

30.0%. The most significant decrease was observed in Goldspur variety, of 38.7%.

CONCLUSIONS

Mass losses were registered in all 4 varieties analyzed. The best varieties for storage were found to be Idared variety and Florina variety which registered the lowest losses, generally below 10%. The analyzed varieties had increases of SU Solubility during storage, the values being from 3.1%, to Florina variety, to 27.3%, to Generos variety. In conclusion, soluble SU values increase as the storage period increases. Fruit firmness decreased during storage, for all studied varieties, falling within the range 3.88-5.18 kgf / cm^2. Decreases of titrable acidity were determined in Generos, Florina and Goldspur varieties, which exceeded 30.0%. The most significant decrease was observed in Goldspur variety, of 38.7%. By analyzing the behavior of these varieties in storage and the changes that occur after storage, we were able to determine the varieties that are suitable for storage for long periods and that do not undergo significant changes, being compliant for sale.

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THE IMPORTANCE OF CURRENT CONSUMPTION PATTERNS OF YOUNG GENERATIONS FOR THE PRIORITY OF HEALTH NUTRITION ASPECTS IN THE FUTURE CAP. A PRELIMINARY STUDY

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Abstract

Knowledge about the current consumption patterns of young consumers play an important role in a food chain aimed to improve and maintain healthy lifestyles. In this context, CAP has a vital role to assure a sustainable environment to sustain such practices. Few studies attempted so far to discuss aspects of healthy consumption related to CAP, thus, the current research intends to assess young generations' habits regarding healthy consumption. Data collected through a questionnaire from 150 students enrolled at UASVM Cluj-Napoca, Romania were analysed using descriptive statistics and chi-square test to test gender differences. Findings indicate that most students adopt mixed diet containing both animal and vegetable products, vegetarian diet being more preferred by female students ($p<0.05$). No statistically significant differences were found among gender groups with respect to the perception on having a healthy diet ($p>0.05$), the perception being relatively low (33.33%). Lack of time, high prices and taste of fast-food were reported as motives for adopting a less healthy food diet. Investigating the consumption habits among young people is the starting point for developing public policies that promote sustainable consumption patterns. Future CAP reform should take more into considerations nutrition and health issues.

Key words**:** *consumption patterns, young consumers, gender, healthy lifestyle, policies*

INTRODUCTION

Changes of Common Agricultural Policy (CAP) over time contributed to improvements and better adapted policies to the international context aimed to respond to both end actors of the food chain, producers and consumers. First concerns were related to ways to increase the agricultural productivity and to facilitate food supply security [17]. As emphasized by [12], current challenges of CAP regard economic, environmental and territorial aspects. The focus was on creating food chains that provide food quality and food safety while assuring preservation of natural resources and sustaining the rural economy [20].

As reported by [8] public health should be the "core objectives" of CAP measures and food safety should not dominate the health debate related to agriculture.

The connexion between healthy lifestyle and CAP is not a frequent subject in the scientific literature. [27] studied the link between nutrition, health and CAP measures by analysing the different views of key stakeholders from agriculture, trade and public health sectors. According to their results, there is a need for a stronger involvement of civil society to address nutrition and health related problems and to influence policy makers. [22] assessed the role of CAP to achieve "more sustainable and healthier food systems in Europe", showing the importance of involving all actors in this process, including EU citizens. Throughout its history, CAP had a direct influence on food availability and accessibility [8] and an indirect impact on consumer choices and health. This was due to the food prices (not always affordable for everyone) and to some measures, which subsidized the production of less healthy foods such as dairy products, red meat (both rich in saturated fats) and sugar instead of the production of fruit and vegetables [1, 4] . According to [4], CAP measures did not conduct to a good health of the population: the over-production of beef, milk and sugar and the consumption of ultra-processed foods [19] have negatively influenced the population diet, representing risk factors for cardiovascular diseases,

diabetes and cancers. In this context, including health concerns within CAP became a challenge for policy-makers [1].

A set of new concepts related to agricultural policies and food appeared in the scientific literature in the last decade: "A common Sustainable Food Policy" [1], "Sustainable production", "Sustainable diets" [3], "Sustainable eating patterns" [2], indicating continuous concern for finding optimal ways to ensure sustainable food systems for all actors involved starting from the producers and ending with the final consumer. The definition of "Sustainable diets" that stands out most is provided by [10]: "are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations […] are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources".

Dietary patterns in European countries were profoundly transformed [5, 19]. There are some common changes, such as the increase in meet and vegetarian proteins availability and consumption, the increase in eating out habit, the increase in fast food availability, the increase in the demand for local food, but also differences between countries some of them being more oriented towards sustainable diets, while others being more oriented to unhealthy diets [5]. As reported by [22], "a number of EU food systems show unsustainable production and unhealthy consumption patterns." According to [6], changes in consumption patterns could positively improve the whole food system. There are evidences in the literature that support the argument that education is a fundamental tool for promoting sustainable consumption and improving population health [11,18]. Intervention strategies, such as increasing availability of healthy products, providing promotional materials for healthy foods [23] or introducing fruits schemes in schools [12] should be based on consumer behaviour studies among young generations. Studies about the above-mentioned aspects in Romania are sparse. In this context, the current research attempts to assess young generations' habits regarding healthy consumption by evaluating students' daily eating habits.

MATERIALS AND METHODS

The study was carried out using a questionnaire during the 2017-2018 academic year at a major university from Romania: University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. The preliminary study included 150 students, the questionnaire being self-administered. The data were compiled and analysed using Intercooled STATA 10.0 (College Station, TX). The behaviour of students was measured using descriptive statistics (percentages, mean, standard deviation). Chi-square test and Fisher's exact test with 5% level of significance were used for differences in responses between male and female students.

RESULTS AND DISCUSSIONS

The sample is composed of 48% female and 52% male students with ages ranging from 18 to 40 years (mean 24.04, S.D 2.17) The majority reside from the urban area (65%).

The most used diet is the one that contains both animal and vegetable products (mixed diet, 86.67%). Even though respondents follow different types of diets (Fig. 1), the percentage is rather small with only 12.67% of the respondents following a semi-vegetarian or an ovo-lacto-vegetarian diet.

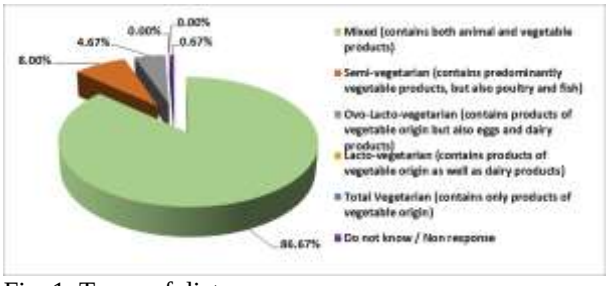

Fig. 1. Types of diets
Source: Own calculation.

This result indicates that the analysed group of students either prefers to follow the traditional diet and food consumption patterns or has insufficient access to information about the other types of diets such as the vegetarian ones,

which are associated with sustainable food consumption behaviours.

Eating traditional food is perceived in many countries as a way to preserve the culture, being perpetuated through generations [5]. Eating meat is associated with personal values (pleasure), but also with social and cultural ones [15]. According to [21], a meat-based diet is considered less sustainable than a plant-based diet due to high consumption of energy, use of land and water resources.

[15] emphasize the concerns of scientists related to reducing meat consumption and lack of awareness at the consumers level. They also suggest policy makers to pay more attention to dietary recommendations, which may lead to more sustainable diets among consumers. The role of future CAP is substantial for promoting healthy diets through a strong network of food-system actors [22].

Analysing if there is any difference between female and male respondents, it was found that more female students adopt a vegetarian diet than male students ($\chi2=17.73$, $p<0.001$). Similar results were found in a study carried out in Germany on college students [13].

[24] also reported a significantly greater proportion of vegetarianism among women than men at university level, but also a constant evolution towards this type of diet among young female adults. According to [25], vegetarian pattern is more frequent among British female students than male students, who are more oriented to "convenience, red meat and alcohol patterns.

To understand the eating habits, respondents were asked to evaluate a set of practices associated with eating in terms of their frequency of occurrence (Fig. 2 and Fig. 3). The use of technology during meals (phone, TV, laptop) and the choice of eating at unfixed hours were found to be the main motives associated to an unhealthy consumption lifestyle. Differences were noticed among gender groups, with prevalence for female students who seem to be behaving in unhealthier way than male students. Female choose to talk on the phone or text messaging during meals ($\chi2=14.25$, $p<0.01$) and also skip daily meals more often ($\chi2=11.92$, $p<0.05$). Skipping meals due to body weight tracking seems to be a rare practice for both gender groups with no significant difference between them ($\chi2=1.86$, $p>0.05$), as well as saving money for other purchases ($\chi2=7.10$, $p>0.05$).

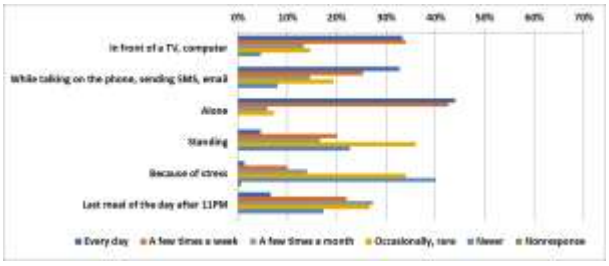

Fig. 2. Eating habits
Source: Own calculation.

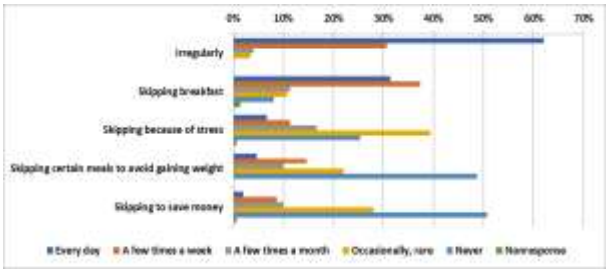

Fig. 3. Habits of skipping meals
Source: Own calculation.

The perception on having a healthy diet is similar among gender groups ($\chi2=3.91$, $p>0.05$), registering a relatively low percentage (33.00%). [16] found a positive self-perception of diet among Brazilian population and a strong association with age: old people have a better self-perception of diet than young people, due to the preventive behaviour against chronic diseases. The same study reported a lower positive perception of healthy diet among females. Preventing various diseases (74.00%) and controlling the weight (18.00%) are the main reasons for a healthy diet (Fig. 4), whereas lack of time (57.58%) and the higher food expenses (14.14%) are the main reasons for adopting a less healthy diet (Fig. 5). Moreover, fast-food is considered convenient time wise and less expensive than healthier food products. Lack of time is reported in several studies as one of the main barriers to healthy eating [9, 7, 13]. Motives such as health, weight control and food prices were assessed as significant factors of food choices in a cross-sectional study conducted among four countries, one of them being Romania [14] .

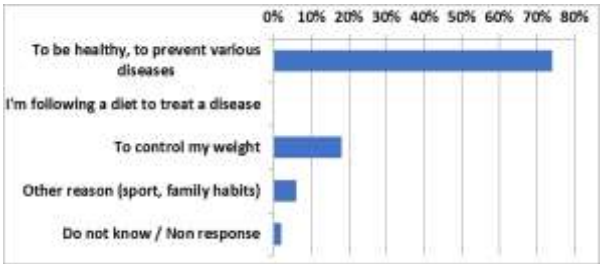

Fig. 4. Reason for adopting a healthy food diet
Source: Own calculation.

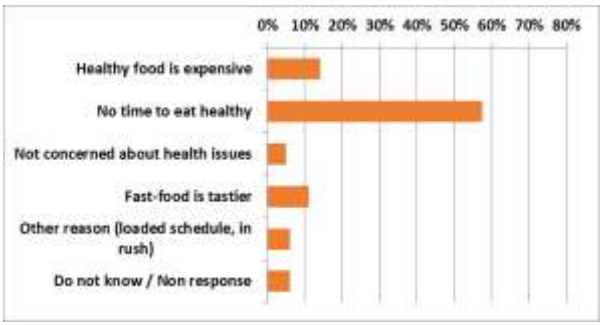

Fig. 5. Reasons for adopting a less healthy food diet
Source: Source: Own calculation.

The majority of respondents (96%) grew up with a rather healthier diet as they were used to consume healthy foods such as fruit and vegetable. Regardless the current type of diet, this habit learned from parents in their childhood period (8-14 years) is still adopted. Daily consumption of fruit and vegetables was reported by about half of respondents. Large percentages (43.33% fruit consumption, 38.00% vegetable consumption) were found also for respondents who are used to eat at least once per week. However, no statistically significant differences were noted among gender ($\chi 2=0.89$, $p>0.05$).

[22] brings up a discussion about the role of CAP in sustaining healthy food systems and analysed the past and proposed future CAP regulations. If in the past, the production and consumption of fruit and vegetables was not a priority for CAP support measures, the proposed regulations (EC, 2018) pay more attention to fruit and vegetable and apicultural sectors.

CONCLUSIONS

The results of the study show that most students have a mixed diet, which contains both animal and plant-based products. At first sight, this behaviour does not necessarily illustrate an unhealthy food habit, because generally the best way to have a well-balanced diet is to consume a variety of foods. But, it depends a lot on the equilibrated choice of foods belonging to the following groups: fruits and vegetables, lean meat, fish, eggs, fibres, dairy products reduced in fat. The Romanian traditional diet is mostly based on meat (especially pork) and other animal-based products rich in saturated fat. Improvement in the food choices among students (eating less animal and more plant proteins, reducing red and processed meat consumption) combined with a healthy lifestyle (having regular meals and a normal sleep schedule, allowing enough time to physical activity) can contribute to their personal wellbeing. In the same time, their food choices will influence a lot the social and environmental sustainability.

The reasons reported by students for adopting a healthy life style are mostly connected to their own health: preventing various diseases or controlling weight. Their concerns do not include aspects related to environment or social aspects, e.g: eating local products could reduce pollution and support local economy, consuming food products obtained through intensive agricultural practices based on excessive use of pesticides could damage the environment and indirectly affect the population' health.

Daily consumption of fruits and vegetables reported by about half of respondents is a positive habit, their production having a low environmentally impact comparing with the animal production.

The contribution of CAP should be more present by building instruments that contribute to the sustainability of an environment that sustains healthy consumption practices. First attempts are in the proposal of CAP 2021-2027, one of the specific objectives being: "improve the response of EU agriculture to societal demands on food and health, including safe, nutritious and sustainable food, as well as animal welfare" (EC, 2018). In this context, special attention should be focused on promoting sustainable diets for consumers, especially for young generations. On the other hand, producers' role is undoubtedly important, their contribution being possible by

adopting processes that are more sensitive to the health aspects. The role of universities is crucial in providing education for a healthy lifestyle [27]. More than that, a life science university should create a healthy environment for its students based on the self-production of healthy foods. This was already done by the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca which produces healthy food stuffs (vegetables, fruits, dairy products, eggs, meat products) available for students but also for the large public of the city. This is a model of entrepreneurship university which encourage the consumption of local food produced in the didactic farms and internal laboratories. This orientation is in line with other research findings [27], which emphasize "the importance of university microenvironments on creating behaviours in university student populations".

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EWES AND GOATS' CONTRIBUTION TO THE RAW MILK DELIVERED TO DAIRIES IN ROMANIA IN THE PERIOD 2009-2018 AND FORECAST FOR 2019-2023 HORIZON

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Abstract

The paper analyzed the ewes and goats contribution to the amount of raw milk marketed to milk processing industry in the period 2009-2018 and set up the forecast for the 2019-2023 horizon, using the empirical data provided by the National Institute of Statistics and using the fixed basis index, descriptive statistics, Pearson correlation coefficients and T test of significance, linear regressions, determination coefficient and average annual gain. An increased number of ewes and goats by 9.9% and, respectively by 60.7% was achieved in 2018 versus 2009. This led to a higher contribution of these categories of animals, 2.17 % in case of ewes and 1.39% in case of goats in raw milk amount sold to dairies in 2018. A string and positive relationship was found between the number of ewes and goats and the amount of raw marketed milk, r = 0.856 and, respectively, r = 0.771. This was also attested by the regression models which reflected that the increase by one unit of the ewes' number will led to a surplus of 14.344 raw milk, and by an increase with one unit of the goats' number will result 38.698 gain collected milk. In 2023, it is estimated that raw milk delivered from ewes will reach 31,016.5 tons, and raw goat milk sold will accounts for 20,200 tons. To increase their incomes from delivered milk, sheep and goat farmers have to grow the female livestock by improving breed structure, reproduction performance, feeding and milk quality.

Key words**:** *raw ewes and goats milk collected by dairies, trends, forecast, Romania*

INTRODUCTION

Sheep and goat breeding belongs to the traditions of Romania, closely connected to the existence of the Thraco-Dacians in the Carpathian-Danubian Pontic space where transhumance was practiced over than 2,500 years [8, 29].

The actual sheep breeds: Tsurcana raised mainly in the mountains, Tsigaia grown in the hilly areas, Ratsca (the Corkscrew horned Valachian sheep) raised in the Banat region and Carabasa (the Black headed breed) grown in the Teleorman area are descendants from the ancient "arkar" Scythian-Dacian breed, as proved by the scenes carved on Traian's Column in Rome and on the Tropaeum Traiani Monument in Adamclisi, Constanta County, Romania, by the sheep bones and the pair of scissors for sheep shearing found in the archeological excavations [20, 35].

Pastoralism is linked to the Romanians' history, Corkscrew horned Valachian sheep (Zachel) being considered a proof of the Valachian tribes and contributed to the ethno-genesis of the nations in the region [10, 11].

The movement of sheep flocks looking for grass and water sources contributed to the creation of other sheep breeds in the Balkans, in the North-East and Central Europe, and also to the spread of languages and genes to other people, as affirmed in its well known metaphor the greatest Romanian historian Nicolae Iorga: "We conquered the land with our sheep" [9].

The development of sheep and goat growing in Romania was sustained by the country favorable geographic position, the existence of mountains, hills and plains, large surfaces of pastures and meadows, high capacity of adaptation of the breeds to the local conditions, by the breeders' passion and love for these species which provided milk, meat and wool,

being raised in small and larger flocks with low inputs and being a real income source for the rural population and a factor of sustainable development of the local economy at the same time assuring the preservation of the biodiversity and environment protection [7, 14,15, 21, 22,23, 36].

Sheep and goat milk have specific features and qualities compared to cow milk, being richer in protein, lactose, fat, enzymes, minerals, vitamins (A, B_1, B_2, E etc), hormones, pigments. For its small sized fat globules (3-3.5 μm), the richness in α and β casein, essential amino acids, high digestibility, goat milk is an elixir and delicacy, a nourishing, healthy, easily assimilated milk, which sustain the immune system and protect our body of respiratory diseases and breast cancer [2, 3, 4, 5, 19, 38].

The content in casein in sheep and goat milk allows it to be used as raw material for producing dairy products rich in probiotic and prebiotic items like yogurt and cheese, which are more and more preferred by consumers [6, 16].

Romania is among the countries with an important sheep and goat livestock in the EU and gives its contribution to the EU milk production besides cows [13, 24, 25, 26, 30, 31, 33].

In this context, the purpose of the paper was to analyze the trends in sheep and goats milking livestock and raw milk marketed to dairies in Romania in the period 2009-2018 and to estimated the forecast for the 2019-2023 horizon, as it is important to evaluate the contribution of these species to milk output taking into account the high demand of raw milk in the domestic market.

MATERIALS AND METHODS

The paper analyzed the sheep and goats livestock, emphasizing the ewes and female goats livestock evolution as well as the raw milk collected from these categories of animals by dairies based on the data picked up from Tempo Online Data base of the National Institute of Statistics for the period 2009-2018.

The used methods in this study have been: (i)the fixed basis index, (ii)comparison method, (iii)descriptive statistics regarding: mean, standard deviation, kurtosis, skewness, maximum and minimum levels, and coefficient of variation, (iv) Pearson coefficients of correlations and T test for significance, (v) linear regression equations, (vi) coefficients of determination, (vii) and forecast based on the average annual gain in the last decade.

The results have been presented in tables and illustrated in graphics, and the conclusions presents the main ideas resulting from this research work.

RESULTS AND DISCUSSIONS

Sheep and Goat Livestock

The sheep livestock started to increase since 2002 and continued till nowadays. The sheep breed structure in Romania consists of five breeds whose relative importance is the following one: 55.% Tsurcana, 22.1 % Tsigaia, 10.9% Merino, 5.6% Karakul and 5.7% crossbreds and 0.2 % other breeds. The average herd size is very small, accounting in average for 4.18 sheep.

Sheep farming is practiced in about 271 thousands holdings of different sizes, the smallest one being dominant, being spread mainly in the hilly and mountain areas. The growing systems are of a large range including both extensive, semi-extensive and intensive systems [13, 31, 36].

The number of sheep increased during the last decade in Romania by 11.32% from 9.14 million in 2009 to 10.17 million heads in 2018. In the same period, the number of ewes and young female sheep raised by 9.9%, from 7.81 million in 2009 to 8.59 million in 2018, reflecting a share of 85% in sheep livestock (Fig. 1).

The goats livestock registered a higher growth rate in the analyzed interval, + 67.8% from 0.92 million in 2009 to 1.54 million heads in 2018. The number of female goats raised by 60.7% from 0.75 million to 1.21 million in the same interval, and, as a consequence, its weight in goats livestock declined from 82.2 % in 2009 to 78.8% in 2018 (Fig. 1).

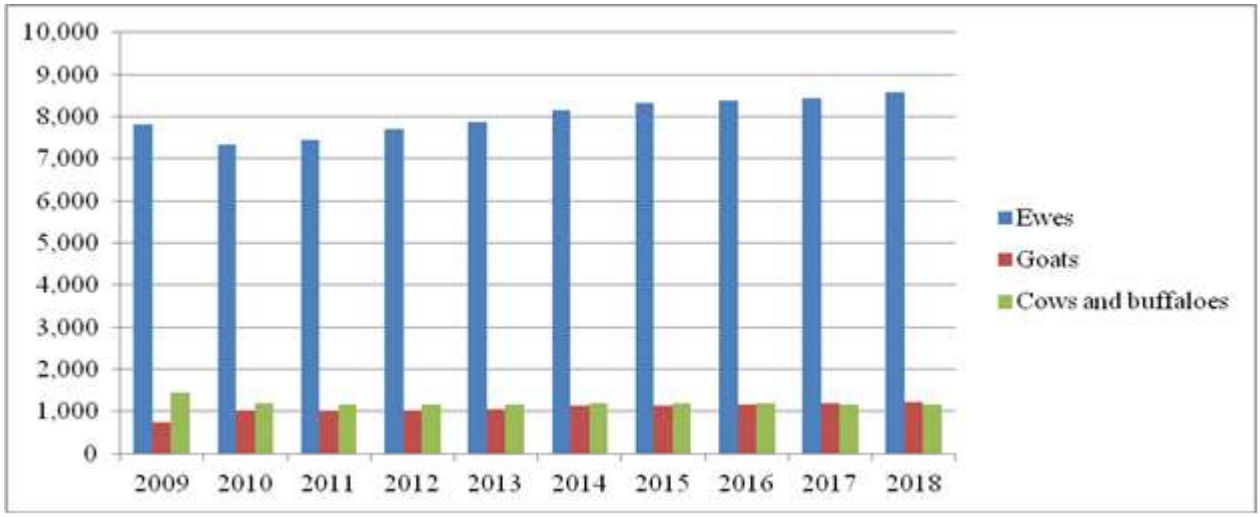

Fig. 1. Dynamic of ewes and female goats in Romania, 2009-2018 (Thousand heads)
Source: Own design based on NIS, 2020 [17].

The goat livestock is differently distributed in the territory of Romania depending on the local conditions, relief, traditions, availability of foodstuffs [33].

Ratios in milking livestock

Taking into account the dynamics of the categories of animals producing milk for commercialization in Romania, the ratio between the number of ewes and female goats declined from 10.3/1 in 2009 to 7.1/1 in 2018.

Table 1. Dynamics of the ratios in milking livestock in Romania, 2009-2018

	No. of ewes per female goat	No. of ewes and female goats per dairy cow and buffaloes
2009	10.3	5.9
2010	7.1	7.0
2011	7.3	7.2
2012	7.5	7.5
2013	7.4	7.6
2014	7.3	7.8
2015	7.3	7.9
2016	7.2	8.0
2017	7.1	8.2
2018	7.1	8.5

Source: Own calculations.

The ratio between the number of ewes and female goats, on one side, and the number of dairy cows and buffaloes, on the other side, increased from 5.9/1 in 2009 to 8.5/1 in 2018, reflecting two aspects:

-a higher growth rate in case of the number of goats compared to the number of ewes;

- a higher growth rate in case of the number of ewes and female goats compared to the number of dairy cows and buffaloes (Table 1).

This is a confirmation that the importance of ewes and female goats increasing in Romania's milking livestock and their contribution to milk production registered an ascending trend in the last decade.

Raw milk collected by dairies from ewes and goats

Raw ewe milk delivered to the milk processing units registered an increasing trend, the growth rate in the interval 2009-2019 being 83.9%. Therefore, in 2018, raw ewe milk accounted for 25,254 tons compared to 13,729 tons in 2009 (Fig. 2).

Raw ewe milk is sustained by Tsurcana breed which was able to produce in an extensive system an average milk output ranging between 68.23 kg and 76.81 kg within Carasebes Research Station [34].

This breed is the most preferred by breeders because its high performance in milk, wool and meat and resistance to the environment conditions. It is able to produce 140-160 milk per year with 5.9% protein and 7.85 fat, in 150-200 days of lactation. The average milk production is 70-90 kg. It is nicknamed "the queen of the mountains" as its production is by 20% higher than Tsigaia milk production [3, 37].

Tsigaia breed comes on the 2nd position producing 52.2 liters in 60 days of lactation under the conditions of Reghin Research Station.

Merino breed is ranked the 3rd with 43.3 liters in the 1st month of lactation and 22.36 liters in the 2nd month as proved under the conditions within Palas Research Station [1].
Also in Romania, there are crossbreds between the local breeds and imported breeds in order to obtain the heterosis effect. For example, in Arad county, the F1 cross-breds between Tsurcana breed and Lacaune breed produced 1.2-1.5 liters per day compared to Tsurcana breed which achieved just 0.6-0.8 liters per day [18].
Raw goat milk marketed to dairies increased four times from 4,008 tons in 2009 to 16,136 tons in 2018 (Fig. 2).

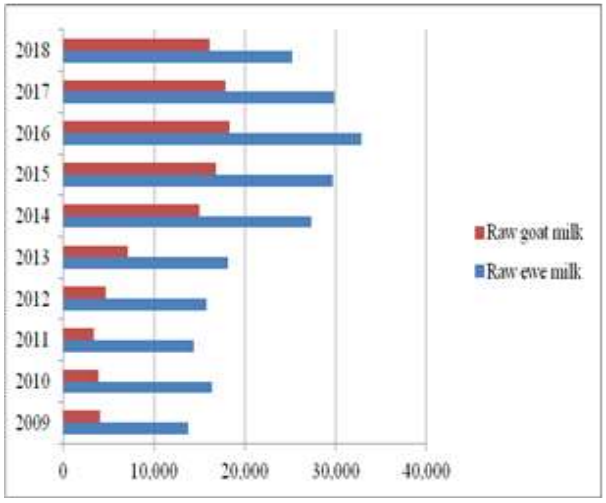

Fig. 2. Dynamic of raw ewe milk and raw goat milk marketed to dairies, Romania, 2009-2018 (tons)
Source: Own design based on NIS, 2020 [17].

Raw goat milk sold in the market is assured by Carpatina breed, the most preferred by breeders, Alba de Banat (Banat White Goat Breed) and Saanen, the most productive breed. Carpatina Goat Breed has a high milk potential as prived in Slobozia, Ialomita County where the average milk production was 289.8 liters, 4.12% fat and 3.7% protein, a good performance compared to other breeds and in a shorter period of lactation [32].
Saanen goats breed is able to produce more milk than the ewes showing that goat raising is more efficient than sheep breeding. However, despite goat milk and also ewe milk are used for producing high quality, tasty, natural and healthy yogurt and cheese, Romanian consumers are not yet accustomed with these products, except the ones who are interested to have a healthy organic die [37].
Other authors affirm that Alba de Banat (The White Banat Goat Breed) and Carpatina Breed have also a high potential for producing milk, achieving 232.32 liters and, respectively 127.61 liters [39].
If we compare with raw cow and buffaloes milk commercialized to milk processing units, whose growth rate in the whole interval was 12.8%, it is easily to guess that the role played by ewes and goats in milk delivery has substantially increased.
However, dairy cows and buffaloes dominate milk market in Romania, but their share in raw milk output recorded a slight decline from 98.25% in 2009 to 96.44% in 2018.
The contribution of the ewes to raw milk sold production raised from 1.35% in 2009 to 2.17% in 2018, while the contribution of goats increased from 0.40% in 2009 to 1.39% in 2018 (Table 2).

Table 2. Dynamics of market share of farm species providing raw milk to dairies in Romania, 2009-2018 (%)

	Cows and buffaloes	Ewes	Goats
2009	98.25	1.35	0.40
2010	97.81	1.77	0.42
2011	98.07	1.56	0.37
2012	97.76	1.73	0.51
2013	97.23	1.99	0.78
2014	95.94	2.62	1.44
2015	95.19	3.07	1.74
2016	94.91	3.27	1.82
2017	95.57	2.77	1.66
2018	96.44	2.17	1.39

Source: Own calculations.

Taking into account the performance in ewe milk production, Romania comes on the 7th position in the EU after Greece, Spain, Italy, France, Portugal, Bulgaria, for 25.2 thousands tons delivered to dairies in 2018.
For its performance of 16.1 thousands raw goat milk sold to milk processing industry in 2018, Romania is ranked the 9th in the EU-28 after France, Spain, Netherlands, Greece, Belgium, Italy, Cyprus and Portugal [12].
All these achievements in continuous growth reflect the increased importance of sheep and goats, besides cows and buffaloes as a source

of milk and dairy products for satisfying better the market requirements under the actual milk crisis [27, 28].

Descriptive statistics for the number of ewes and goats, and raw ewe and goat milk collected by dairies is presented in Table 3.

The coefficient of variation for the number of ewes has a low value reflecting a close distribution of the values around the mean, a high homogeneity and the mean is representative. In case of the number of goats, the variation coefficient reflects a relative homogeneity of the values, the mean being still representative. Regarding raw ewe milk and raw goat milk, the coefficient of variation reflects that the values of these indicators are heterogeneous and that the mean is not representative.

Table 3. Descriptive statistics for the female livestock and raw milk collected by dairies from ewes and goats

	Mean	St. Dev.	Kurtosis	Skewness	Min	Max	Coeff of var. (%)
No. of ewes	8,009.4	439.1	-1.36	-.024	7,338	8,594	5.49
No. of goats	1,070.8	131.2	3.51	-1.62	754.7	1,213	12.25
Raw ewe milk	22,318.8	7,351.2	-1.97	0.14	13,729	32,794	32.93
Raw goat milk	10,719.9	6,582.09	-2.33	-0.008	3,366	18,335	61.40

Source: Own calculation.

Correlations between the number of milking livestock and the raw milk delivered to dairies

The calculus of the correlation coefficients led to the following results: r = 0.856 reflecting a high relationship between the number of ewes and raw milk collected, and r = 0.771, also showing a positive and strong connection between the number of goats and raw milk collected.

The significance test of the correlation coefficient attested that their values are statistically significant for $\alpha = 0.05$, in the 1st case, $t_{calc} = 4.656 > t_{critic} = 2.306$, and in the 2nd case, $t_{calc} = 3.421 > t_{critic}$.

Regression equations and R^2, reflecting the dependence of raw milk, Y, on the dependent variable, number of ewes and goats, X, are presented in Table 4.

Table 4. Correlations and regressions between raw milk delivered to dairies and the number of ewes and goats

Raw ewe milk and Number of ewes				Raw goat milk and Number of goats			
Regression model	Sign. F	R^2	r	Regression model	Sign. F	R^2	r
Y = 14.344X - 92,573,32	0.0015	0.734	0.856	Y = 38.698X - 30,721.3	0.0089	0.595	0.771

Source: Own calculations.

Regression of raw ewe milk depending on the number of ewes is illustrated in Fig. 3, which reflects that for an increase by one unit of the number of ewes, the raw milk collected will go up by 14.344, F test of the regression being F= 22.12, and Sign. F = 0.0015.

The determination coefficient, R^2= 0.7344 reflects that 73.4% of the variation in the raw ewe milk delivered to dairies is determined by the variation in the number of ewes.

Regression of raw goat milk depending on the number of goats is presented in Fig. 4. Taking into account the regression model, we understand that if the number of goats will increase by one unit, then, the raw goat milk will raise by 38.698 under F = 11.774 and Sign. F = 0.0089.

R^2 = 0.5954 shows that 59.5% of the change in raw goat milk marketed to milk processors depends on the variation of the number of goats.

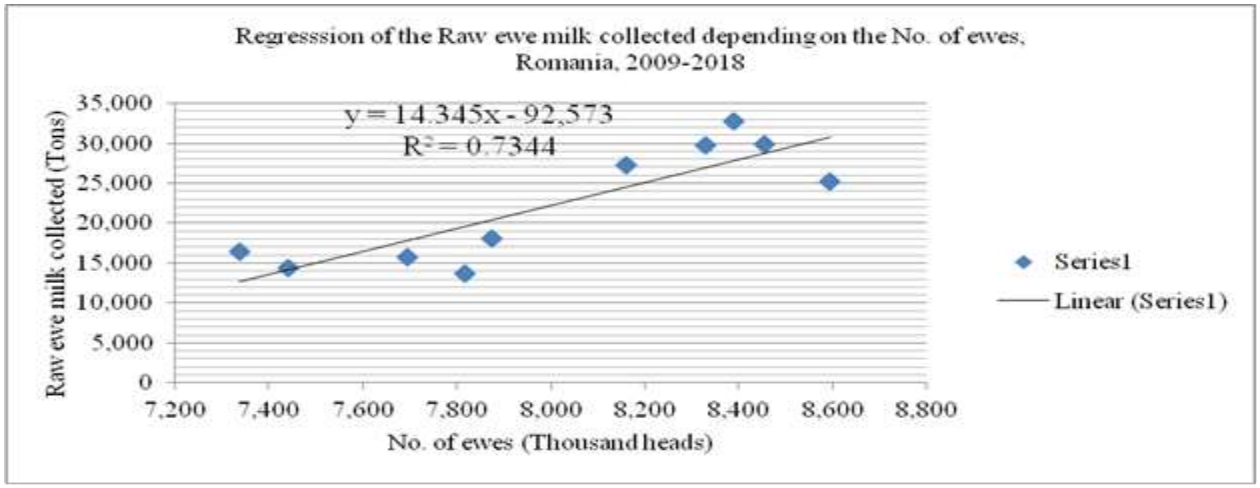

Fig. 3. Regression of the Raw ewe milk collected depending on the No. of ewes, Romania, 2009-2018
Source: Own design.

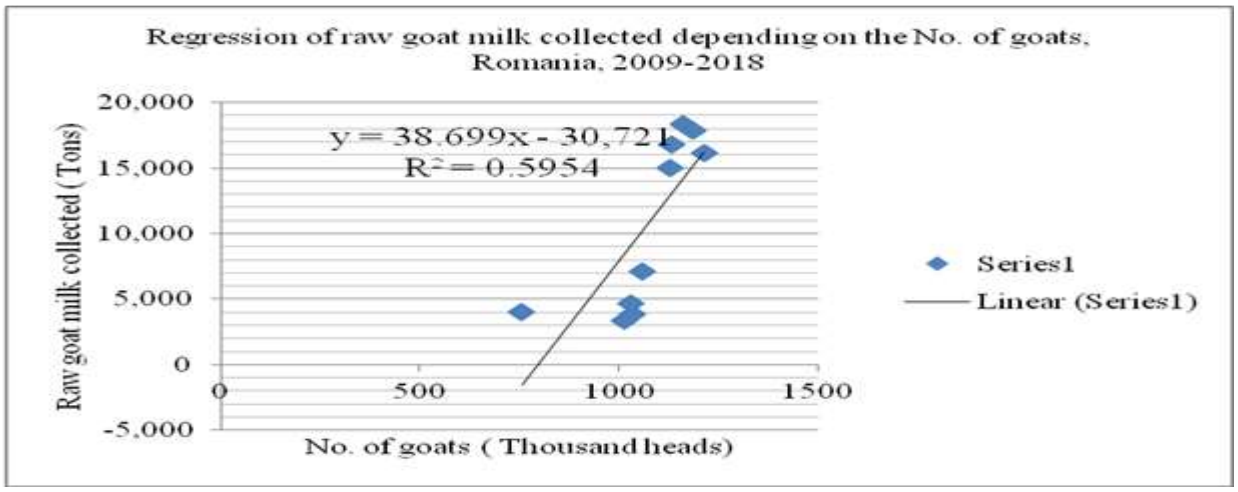

Fig. 4.Regression of the Raw goat milk collected depending on the No. of goats, Romania, 2009-2018
Source: Own design.

Forecast of raw milk collected by dairies for 2019-2023 horizon was determined based on the average annual gain achieved in the last decade, 2009-2018, which was: 1,152.5 tons for raw ewe milk and 1,212.8 tons for raw goat milk.

In 2023, it is estimated that ewes will provide 31,016.5 tons raw milk to milk processing units, while from goats it is estimated to be sold 20,200 tons raw milk (Table 5).

Table 5. Forecast of raw ewe and goat milk marketed to dairies for the 2019-2013 horizon (Tons)

	2019	2020	2021	2022	2023
Raw ewe milk	26,406.5	27,559	28,711.5	29,864	31,016.5
Raw goat milk	17,348.8	18,561.6	19,774.4	20,987.2	20,200

Source: Own calculation.

CONCLUSIONS

The paper pointed out the increased importance of ewes and goats in raw milk delivery to dairies in the last decade in Romania. This was determined by the high growth rate of the number of ewes and female goats by 9.9% and, respectively, by 60.7%, and as a consequence, their contribution to milk processing industry reached 2.17% in case of ewes and 1.39% in case of goats, all together meaning 3.56% of raw milk output collected in the country. Therefore, ewes and goats are an additional source of milk for processors who will be able to produce more yogurts and cottage cheese, and a source of income for

sheep and goats breeders. Between the number of ewes and goats and the amount of raw marketed milk is a high string relationship as attested by the correlation coefficients, r = 0.856 and, respectively, r = 0.771.

The regression models confirmed the same aspect and also that an increase by one unit of the ewes livestock will determine a surplus of 14.344 raw milk, and an increase by one unit of the goats' number will led to 38.698 gain of collected milk. The forecast for 2023 is that raw milk delivered from ewes will reach 31,016.5 tons, while raw milk collected from goats will accounts for 20,200 tons.

The sheep and goats breeders have to intensify their efforts to increase the contribution of sheep and goats to milk processing industry, and also their incomes, by paying more attention to the factors which have a positive impact on the livestock growth such as: breed structure, reproduction, feeding and milk quality.

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RAPE PRODUCTION AND ITS GEOGRAPHICAL CONCENTRATION IN ROMANIA

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Abstract

The paper analyzed the concentration of rape cultivated area and seed production in Romania in the period 2009-2018. using Herfindahl-Hirchman Index (HHI) and Gini -Struck Index (GSI), as well the regression and correlation between these indicators. In 2018, Romania had 633 thousand ha cultivated with rape and produced 1,673,327 tons seeds, 2.8 times more than in 2009. All the eight micro-regions are involved in rape cropping. but the largest surfaces are situated in the South Muntenia (39.07%), South-East (24.69), South-West Oltenia (10.03), West (9.07%). The highest contribution to rape seed output is given by South Muntenia (42.36%), South-East (22.89%), West (11.33) and North-East (6.43%). The HHI values > 0.25 reflected a relative high concentration of the cultivated area and seed production, mainly in four micro-regions: South Muntenia, South-East, South-West Oltenia and West. The Gini-Struck Index indicated a moderate concentration of the cultivated area and also of the seeds production, GS = 0.371-0.468 for surface, and GS = 0.379- 0.477 for production. The correlation coefficient r = 0.888 proved a positive and strong relationship between the two indicators, and the regression model, Y = 2.694 X - 163.83 reflected that one thousand more ha cultivated with rape will produce 2.534 thousand tons seeds in addition. Rape production is expected to continue to grow and to be more concentrated in the micro-regions mentioned above.

Key words**:** *rape, production, concentration, territorial distribution, Romania*

INTRODUCTION

The development of rape seed production during the last 30 years is obviously linked to the multiple uses of rape seeds for producing oil (edible, for biodiesel, lubricants), fodder for animals (rape meal), plastic materials, chemicals (varnishes and paints, detergents).
Of 100 kg rape seeds, it could be achieved 30-35 high quality oil and 50-55 kg rape meal for cattle feeding [3].
Rape comes on the 2nd position in the world among the oilseeds crops after soybean. In 2017, the global oil seeds production reached 479 million tons, of which soybean 73% and rape 16%.
The main rape seeds producers are the EU, Canada, China, India and Australia whose market share in the world output was 28.7%, 27.4%, 17%, 10.3% and, respectively, 5.6%, all these five countries summing 89% [12, 19, 37, 39, 44].
The EU is the top rape seeds producer in the world and in 2017 it carried out 22 million tons, but in 2018, the output was lower, 19.9 million tons because of the climate change [11].
The key rape seeds producers in the EU were are France, Germany, Poland, Romania, and United Kingdom [7, 44].
Being focused in assuring a healthy environment by reducing green house emissions, the EU issued the Biofuels Directive (2003) which provides that in 2020 about 20% of the energy for transport to be supplied from renewable sources like biodiesel and bioethanol. This was an incentive to stimulate rapeseeds production in the EU [10, 14, 17, 36, 38, 40, 41].
The energy productivity for rapeseed biodiesel output was estimated in research works at 24.41 MJ/ka and 7,084.45 MJ/ha cultivated with rape [20].
The importance of rape seed in oil production is given by its chemical composition consisting of fats (mainly oleic fatty acid 65%, etc), protein and Nitrogen-Free Extracts [1, 14].
Romania is recognized as an oilseeds producing and exporting country, being ranked the fourth in the EU. About 73% of Romania's

oilseeds production is representing by sunflower seeds and 25% by rapeseeds [22, 23, 24, 25, 35].

The high growth rate of rape seeds output was registered after Romania's access into the EU in 2007. The producers considered this an opportunity to extend the cultivated surface and to start applying new cropping technologies to get more income and contribute to the alignment of the country to the new orientation in biodiesel production [26].

Concentration aspects have been studied in many countries for many years, but just a few were done in Romania using Herfindahl-Hirschman Index and Gini-Struck coefficient. A few studies approached the development of the economy in the micro-regions in terms of GDP [2, 13, 16, 21, 31] and also concerning the concentration in tourism and agro-tourism [29, 33, 34].

The main studies regarding the concentration in Romanian agriculture approached the following topics: concentration of the farms cultivating maize [27], the concentration in pork production [28], concentration in milk market [30], concentration in apple production [32], concentration in sunflower seeds production [35].

In this context, the goal of the paper was to evaluate the geographical distribution of the rape crop in Romania in its eight micro-regions of development by means of two criteria: cultivated area and seeds production, trying to find out if the share of the micro-regions was converging or there were still discrepancies regarding the concentration of output in the country territory during the last decade, 2009-2018.

MATERIALS AND METHODS

The study area

Romania has a surface of 238, 297 km^2, of which agricultural 13,9 million ha, of which 60% arable land. The main cultivated crops are cereals, technical plants, oilseeds crops, vegetables etc.

The climate is a temperate continental one with some Mediterranean influences, characterized by territorial differences given by latitude and altitude of the relief forms.

The average annual temperatures accounts for 10-11^{0}C in the South to 8-9^{0}C in the North, the maximum level being reached in summer season, 22-24^{0}C, and the minimum in winter, -3 -5^{0}C.

The average annual precipitations are 637 mm, but they are lower in the Eastern part of the country (400-500 mm) and higher in the mountain area (1,000-1,400 mm).

Summers are usually hot in the plains of the South East, South Muntenia and West, with more than 25^{0}C for about three months. Autumn is short, characterized by dry and rainy periods. Winter is cold, the temperatures going down up to about -20^{0}C sometimes, and snow layer is not so thick. Spring is short and summer could start even at the end of April [43].

The favorable climate conditions and the diversity of soil types and quality stimulate the development of agricultural production, except the years when the effects of global warming are seen (long periods of drought and other extreme phenomena).

Data collection

The research work is based on the time series of data regarding the last decade, more exactly, 2009-2018, for which the National Institute of Statistics provides official information.

The studied indicators were: the cultivated area with rape and rape seed production.

The methodology used to characterize the concentration of rape seeds production in the territory of Romania consisted of:

-*Herfindahl-Hirschman Index, HHI*, commonly used to express the dispersion of an indicator in a geographical area or on a market [4, 42].

The calculus of HHI was made using the formula:

$$HHI = \sum_{i=1}^{n} (g_i)^2$$

where: $g_i = \frac{X_i}{\sum_{i=1}^{n} X_i} = \frac{X_i}{X_j}$

i = the micro-region of development, i = 1,2,....8;

X_i = the cultivated area with rape or rape seed production in the micro-region I;

X_j = the total surface cultivate with rape or the total rape seeds production in Romania;

g_i = the share of the micro -region i in the total area cultivated with rape or the rape seed production at the country level, X_j.

Gini - Struck Coefficient, GSI, was also used for reflecting the concentration of an indicator analyzed in a specific territory [9].

The mathematical formula was:

$$GSI = \sqrt{\frac{n \sum_{i=1}^{n} g_i^2 - 1}{n-1}}$$

The coefficient of structural change, CSC, whose formula is:

$$CSC g_i\text{-}g_0 = = \sqrt{\frac{\sum_{i=1}^{n} (g_{1i} - g_{0i})_i^2}{n}}$$

where:

g_{1i} = the shares of the micro-regions i in the moments 1 in the analyzed period;

g_{0i} = the shares of the micro-regions i in the moments 0 in the analyzed period.

The trend method was also used in order to establish the general tendency for the two indicators: cultivated area and production of seeds. In this purpose, taking into account the dispersion of the points in the graph, the polynomial equation, $Y = ax^2 + bx + c$ was chosen ad being considered the most suitable to describe the trend line.

The linear regression model was also utilized, in its classic form, $Y = bx + a$, to reflect the relationship between these two indicators, Y, the rape seed production, the dependent variable and X, the cultivated area with rape, the independent variable. In the formula given above, b = the regression coefficient and a = constant. *The correlation coefficient* was determined according to the well know Bravais-Pearson formula, and the *R square* for assessing how much of the variation of seed production is determined by the change in rape cultivated surface. The obtained results were illustrated in tables and graphics and finally the main conclusions were drawn.

RESULTS AND DISCUSSIONS

The cultivated area with rape in Romania increased by 50.6% in the period 2009-2019, reflecting the interest of the producers to extend the rape culture in the territory and to carry out a higher production of seeds. In 2018, in Romania it was cultivated the largest area cultivated with rape, 632,679 ha compared to 419,900 ha in 2009 (Fig.1).

For assuring a constant and efficient production from a year to another, like for any other agricultural crop, rape cropping requires a harmonized combination between:

(i) the natural resources (relief form, soil, water, heat, lightness, nutrients, microorganisms existing in the ground),

(ii) the biological material (varieties and hybrids adapted to the climate conditions, resistant mainly to drought, pests and diseases, and weeding), and

(iii) the cropping technologies (crop rotation, tillage system, sowing systems, fertilization, maintenance of the culture, machinery and equipments), and

(iv) the economic aspects reflected by production management, organization and optimization of the allotted resources for rape cultivation [5, 15].

In Romania, rape culture is advantaged by climate and soil conditions, by the existence of a large range of cultivars and hybrids well adapted to the plain regions and with a high production potential which allow to produce even more than 4,000 kg seeds per ha.

In general, rape requires relatively moderate rainfalls, 450-650 mm in summer season, an annual average temperature of 7-10^{0}C, mild winters and a thick snow layer for protection. Also, it prefers the soils like alluvial and reed soils, chernozem and the reddish-brown soil, which are rich in humus and chalk, with a neutral pH 6-7 and high capacity to maintain moisture. Taking into consideration these aspects, the most suitable areas for rape cropping in Romania are the plains from the South-East, South Muntenia, South-West, North-West, and South Moldova [3, 5, 6, 8].

The territorial distribution of the cultivated area with rape differs from a micro-region to another, depending on the soil and climate conditions. The largest surfaces cultivated with rape are situated in the South Muntenia, South-East, South-West Oltenia, West and North-East of Romania. In the analyzed interval 2009-2018, there were noticed some changes regarding the share of the cultivated area with rape by micro-region in the total surface cultivated at the national level.

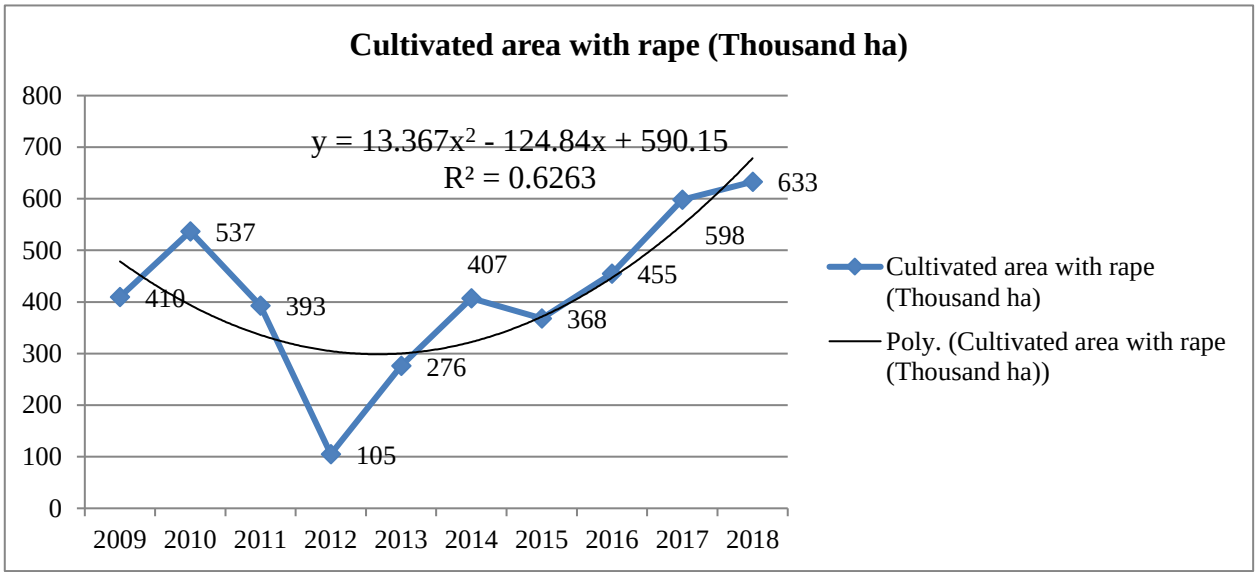

Fig.1. The rape cultivated area, 2009-2018, Romania (Thousand ha).
Source: Own design based on the data from NIS, 2020 [18].

Table 1. The geographical dispersion of the rape cultivated area by micro-region, in Romania, in 2018 versus 2009 (%)

Micro-region	2009	2018
North-West	1.94	4.82
Center	0.63	1.76
North-East	11.86	8.05
South-East	38.30	24.69
South Muntenia	35.21	39.07
Bucharest-Ilfov	0.70	1.88
South-West Oltenia	8.47	10.03
West	2.89	9.70

Source: Own calculation based on the data from NIS, 2020.

The South Muntenia micro-region is in the top and its share increased from 35.21% in 2009 to 30.07 % in 2018. In case of the South-East micro-region, its share declined from 38.3% in 2009 to 24.69 % in 2018. The share of the North-East micro-region decreased from 11.86% in 2009 to 8.05% in 2018, while in the South West Oltenia micro-region the weight increased from 8.47% to 10.03%.

The highest growth rate of the cultivated area with rape was registered in the West micro-region, and as a result, its share in the national cultivated area with rape recorded a significant growth from 2.89 % in 2009 to 9.7% in 2018 (Table 1).

Rape seed production registered variations from a year to another in the last decade, but the general trend is an increasing one. In 2018, Romania produced 1,610,907 tons rape seeds, 2.82 times more than in 2009. However, in 2018, the seed production was by 3.8% lower than in 2017, when Romania performed the highest level: 1,673,327 tons. The most critical year in the analyzed interval was 2012, when, besides the smallest cultivated area with rape, only 105,295 ha, the seed output was the lowest one, 157,511 tons, due to the long drought which affected not only rape but also agricultural crops (Fig. 2).

The geographical distribution of rape seed production in Romania, follows in general the territorial dispersion of the cultivated surface. The highest seed productions are achieved in the South Muntenia, South-East, West, South-West Oltenia and North-East.

Due to the change in the cultivated land and climate from a year to another, the share of the micro-regions in the rape seed output at the country level has also changed. In the South Muntenia, the share of the seed production increased from 36.74% in 2009 to 42.36% in 2018, but in the South-East, it diminished from 35.595 to 22.89% in the same interval. In the West, the weight of seed production increased from 3.48% in 2009 to 11.33% in 2018.

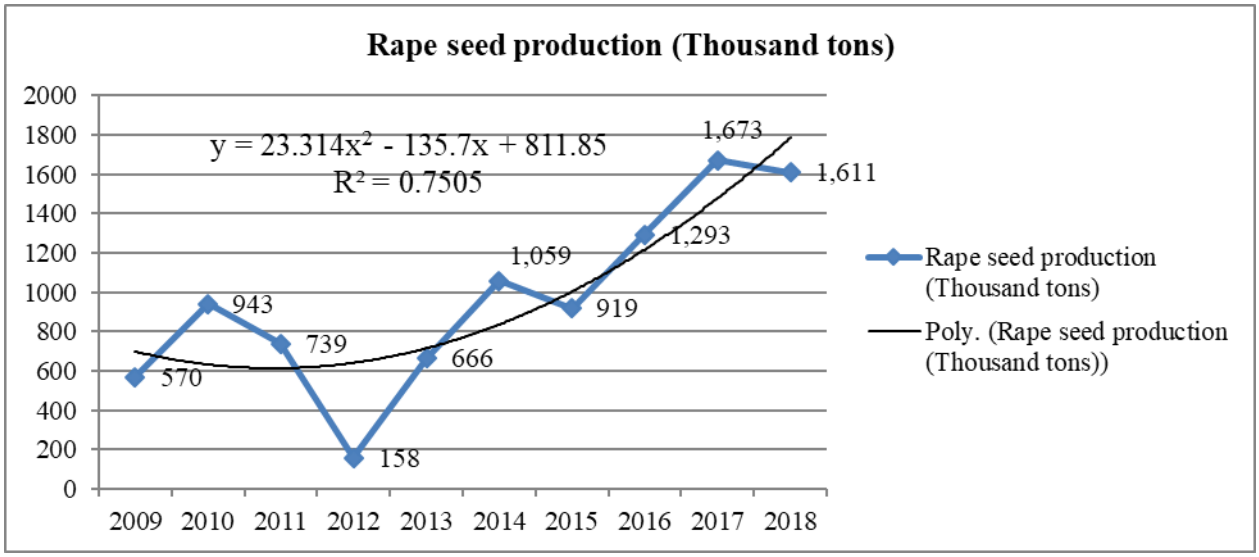

Fig.2. The rape seed production, 2009-2018, Romania (Thousand tons).
Source: Own design based on the data from NIS, 2020.

Table 2. The geographical dispersion of the rape seed production by micro-region, in Romania, in 2018 versus 2009 (%)

Micro-region	2009	2018
North-West	1.65	4.65
Center	0.66	1.88
North-East	12.40	6.43
South-East	35.59	22.89
South Muntenia	36.74	42.36
Bucharest-Ilfov	0.60	1.77
South-West Oltenia	8.88	8.69
West	3.48	11.33

Source: Own calculation based on the data from NIS, 2020.

The most affected micro-region was North-East where its share declined from 12.40 % to 6.43%. The share of the South-West Oltenia also went down from 8.88% in 2009 to 8.69% in 2018. The other micro-regions, North-West, Center and Bucharest-Ilfov had the smallest contribution to the national output: 4,65%, 1.88% and, respectively, 1.77% in 2018 (Table 2).

The coefficient of structural changes by micro-region in the last decade, regarding the cultivated surface with rape reflects that the highest increase was registered by the West micro-region 5.13%, followed by the Center micro-region 4.18% and Bucharest-Ilfov, while the lowest was in the North-East 1.02 % and in South-West Oltenia 1.78%.

Table 3. The coefficients of structural changes in rape cultivated area and seed production in the interval 2009-2018 (percentage points)

Micro-region	Rape cultivated area	Rape seed production
North-West	3.74	7.96
Center	4.18	7.99
North-East	1.02	1.47
South-East	3.13	1.81
South Muntenia	1.67	3.26
Bucharest-Ilfov	4.01	8.32
South-West Oltenia	1.78	2.76
West	5.13	9.24

Source: Own calculation based on the data from NIS, 2020.

Regarding the rape seed output, the highest changes were noticed in the West micro-region, 9.24%, in Bucharest-Ilfov 8.32%, in the Central area 7.99% and North-West 7.96%. The small structural variation reflects a constant level maintained along the analyzed interval (Table 3).

The Herfindahl-Hirschman Index values reflected the following aspects:

(i)regarding the cultivated area with rape:

- In the years 2012 and 2018, HHI < 0.25, which indicates the existence of a moderate concentration among the micro-regions of development of Romania;

-In the other years, HHI > 0.25 which means a movement to a relative high concentration of the cultivated surface in some regions

compared to the others. It is about the South Muntenia, South-East, South-West Oltenia and West.

(ii)regarding the rape seed production, in all the years of the studied period, HHI recorded higher values than 0.25 meaning that it is a relative high concentration of production in some regions, more exactly in South Muntenia, South-East, West, South-West Oltenia and North-East versus other micro-regions (Table 4).

Table 4. Herfindahl-Hirschman Index for rape cultivated area and seed production in Romania, 2009-2018

	Rape cultivated area	Rape seed production
2009	0.2932	0.2865
2010	0.3167	0.3248
2011	0.2757	0.2704
2012	0.2459	0.2508
2013	0.3161	0.3597
2014	0.2874	0.2915
2015	0.2867	0.3029
2016	0.2690	0.2861
2017	0.2528	0.2715
2018	0.2425	0.2650

Source: Own calculation.

Gini-Struck Index values are presented in Table 5. For the cultivated surface with rape, GS values are different from a year to another reflecting the structural variations in the micro-regions.

The highest GS was recorded in 2013, GS = 0.4673, while the smallest one, GS = 0.3664 was registered in 2018. These values indicate a moderate concentration of the cultivated area in a few micro-regions compared to the other zones.

Regarding the rape seed production, the GS values vary between 0.3791, the lowest level in 2012 and 0.5179 in 2013, the highest level. This reflects that in 2013, it was registered a trend of production concentration in a few regions, more exactly in South Muntenia and South-East and also in the West part of Romania, creating inequalities versus other micro-regions (Table 5).

Table 5. Gini-Struck Index for rape cultivated area and seed production in Romania, 2009-2018

	Rape cultivated area	Rape seed production
2009	0.4384	0.4296
2010	0.4680	0.4778
2011	0.4150	0.4076
2012	0.3717	0.3791
2013	0.4673	0.5179
2014	0.4308	0.4362
2015	0.4298	0.4509
2016	0.4056	0.4290
2017	0.2821	0.4091
2018	0.3664	0.4021

Source: Own calculation.

Regression and correlation between the rape cultivated surface and seed production reflects that between the two indicators, Y, the seed output considered as dependent variable and X, the cultivated area with rape, the independent variable, it is a strong and positive relationship, shown by the high correlation coefficient, r = 0.888.

The coefficient of determination, R^2 = 0.788, which attests that 78.85% of the variation of rape seed production is caused by the change in the cultivated area with rape. The difference up to 100% belongs to other influencing factors such as: yield, applied technologies, etc.

The regression model, Y = 2.694 X - 163.83 reflects that if X, the cultivated surface will increase by one thousand ha, seed production will raise by 2.534 thousand tons.

The regression coefficient is statistically assured, and confirm that the regression model is suitable to express the relationship of determination between rape seed output and the cultivated area with rape.

The availability of the regression model is confirmed by F-statistic whose value is higher that the tabled value, as well as by the null risk degree as given by Sign. F.

The lower 95% and Upper 95% thresholds reflect that the parameters of the linear regression model belong to the following intervals:

$-668.044298 < a < 340.374146$

and $1.557143 < b < 3.832312$

as shown in (Table 6).

Table 6. Regression model, coefficient of correlation and coefficient of determination between the cultivated surface with rape and seed production, Romania, 2009-2018

Regression statistics						
Multiple R	0.888018					
R square	0.788577					
Adjusted R square	0.762149					
Standard Error	229.0580					
Observations	10					
ANOVA						
	df	SS	MS	F	Sign. F	
Regression	1	1565574	1565574	29.83888	0.000599	
Residual	8	419740.7	52467.59			
Total	9	1955315				
	Coefficients	Standard Error	t-stat	*p*-value	Lower 95%	Upper 95%
Intercept	-163.8350761	218.6506	-0.7493	0.475126	-668.044298	340.374146
X Variable 1	2.694627	0.493314	5.462498	0.000599	1.557143	3.832312

Source: Own results.

CONCLUSIONS

The research pointed out the trends in concentration of rape cultivated area and seed production in the territory of Romania in the last decade, 2009-2018. In 2018, Romania had 633 thousand ha cultivated with rape. In the analyzed interval, the cultivated land with rape increased by more than 50%, while seed production was almost 2.82 higher in 2018 versus 2009. This reflect a continuous improved performance in rape seed yield by using integrated technologies with a high positive economic impact in rape cropping.

Romania comes on the 4th position in the EU for its production of rape seed production of 1,673,327 tons achieved in 2017. However, production was sometimes affected by climate change, especially by the long drought as proved in 2012.

Rape is cultivated in all the micro-regions of Romania, but the largest surfaces are situated in the South Muntenia (39.07%), South-East (24.69), South-West Oltenia (10.03), and West (9.07%) and production performance is carried in these regions as well.

The highest share of production by micro-region in Romania's rape seed output was found in South Muntenia (42.36%), South East (22.89%), West (11.33) and North East (6.43%).

In general, seed production increased in almost all the regions in the last decade, but with different growth rates.

Herfindahl-Hirchman Index proved that in Romania the concentration of the surface cultivated with rate is relative high, HHI > 0.25, as the largest areas are cropped by four micro-regions: South Muntenia, South-East, South-West Oltenia and West. Also, the concentration of rape seed production is relative high, as South Muntenia, South-East, West, South-West Oltenia and North-East produce the highest quantities of seeds compared to other micro-regions.

Also, Gini-Struck Index indicated a moderate concentration of the cultivated area and also of the seeds production, with values ranging between GS = 0.3717 and 0.4680 for surface, and GS = 0.3791 and 0.4778, for production.

The correlation coefficient between cultivated land and rape seed production was high and positive, r = 0.888, and the linear regression model, Y = 2.694 X - 163.83 pointed out that an increase by one thousand ha cultivated with rape will determine a production growth by 2.534 thousand tons.

As a final conclusion, rape production is Romania performed well during the last decade and it is expected to raise in the coming years, continuing to apply the modern integrated technologies in rape cropping.

The farmers have to pay a special attention to high value hybrids, crop rotation, tillage

system, sowing period and depth, plant density and the distance between rows, fertilization ratio between nutrients NPK and also to the phytosanitary protection measures to carry out a higher rape seed output.

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PARTICULARITY OF SENSORY EVALUATION OF "BOAR TAINT" IN THE PORK BY CONSUMERS

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Abstract

To define the peculiarity of sensory perception of offensive smells and "boar taint" by Ukrainian consumers in samples of cooked pig meat and fat from females, surgically castrated males and immunocastrated males. The independent examination of the samples of cooked meat and fat from pigs of different gender and different methods of castration. The hybrids were received from the crossbreeding of Irish sows of Yorkshire × Landrace pig breeds and terminal boars of the " MaxGrow " synthetic line. The expertise was conducted for men and women of all ages, who consume pork. Each expert evaluated 15 samples for a qualitative level of the smell for heat-treated meat and backfat. The samples were taken from the right thoracic muscle (m. rectus thoracis) of the right half-body. The evaluation was carried out in accordance with a specially developed five-point scale, which is acceptable for non-professional tasters. It has been found that the smell of skatol can be manifest to the level of its sensory perception by a person regardless of gender and the method of pig castration. The "boar taint" was difficult for precise sensory identification, because the meat of the sexually active boars is not common in porcine production and in processing technology, so most of consumers have never smelt it before. The sample identification for meat and backfat, conducted by men, was more standardized without any particular grade differences. The women decided the samples of immune castrated boars have better smell (with an advantage of 17–22 points). The result of the Ukrainian consumers evaluation of unpleasant smells and "boar taint" detected it in pork. This smell was mainly influenced by two basic factors - the physiological features of the animal organism and the individual peculiarities of the person's perception of a smell. Women and men in different ways perceived the smells of the studied samples. The boiled meat and backfat samples smell of immune castrates was estimated by consumers higher than surgical castrates samples smell was.

Key words**:** *pigs, immunological castration, pork, sensory evaluation, "boar taint", consumers*

INTRODUCTION

The sharp, offensive smell of meat and fat of sexually active boars is a factor influencing pig production technology and consumer quality of pork. This smell is related with the physiological features of sexually active boars. "Boar taint", according to consumers, is a defect in pig production and it requires additional costs for the production and processing of pork.

Offensive smell is mainly a sensory defect and it is not related to other pork quality characteristics. According to the research, presence of "Boar taint" is the result of the accumulation in the body of male pigs specific substances, such as: steroids, especially androstenone (5-alpha-androst-16-en-3-one), indole and its derivatives, including the most influential scatole (3-methylindole) (Rius et al., 2011) [14].

Androstenone is an endogenous compound with a smell similar to urine. It serves as a pheromone in the process of matting boars with sows. Androstenone is produced in boar's testes. It is a metabolite of the sex hormone testosterone, and it begins to accumulate in the muscular and adipose tissues of male pigs from the beginning of their puberty. Vice versa, scatole is a product of microbial fermentation

of feed in the large intestine of boars. It has the property to be absorbed into the bloodstream, to be accumulated in the fat layers of the animal's body, and to be expressed as an smell similar to fecal or "naphthalene"(Dijksterhuis et al., 2000) [4]. The mucous membrane of the nose of the human especially sensitive perceives the unwanted "Boar taint" during the process of thermally treatment of fat, meat or pork meat products. According to the research (Jensen et al., 2014) [11], the correlation between consumer negative evaluation of pork samples and the concentration of scatole was higher than the correlation between consumer negative evaluation of pork samples and concentration of androstenone. Therefore, scatolee is a more active compound in the formation of abnormal smell. However, scatole increased the perception of androstenone at high concentrations. This indicates the synergistic effect of both compounds. Other researchers (Bonnaeu et al., 2012, Font i Furnols et al., 2009) [2, 6] also indicate a high correlation between "Boar taint" and the presence of androstenone and scatole in pork samples.

The analysis of other scientific researches shows that there is a difference in the perception of "Boar taint" by consumers. Differences in the results of the astimation of abnormal smells of thermally treated meat and fat samples depend on the country, on the technology of animal production, on the breed or combination of breeds of pigs. There is also influence of some factors on the human detection of "Boar taint", such as: culinary habits and consumer preferences, methods of assessment, age, gender and level of sensitivity of people to the smell of androstenone (Font i Furnols et al., 2003, 2008) [7, 8].

Most pork consumers have a greater sensitivity to scatole smell than to androstenone smell. Scatole is identified by 99% of consumers. Some consumers acutely perceive androstenone at very low concentrations, but other consumers do not perceive it at any concentrations at the same time. According to the research about 1/3 of consumers were sensitive to androstenone, and 5 - 12% of them were classified as highly sensitive 9 (Aaslyng et al., 2013) [1]. There is an assumption that human sensitivity to androstenone is genetically conditioned (Keller et al., 2007) [12]. Most consumers in European countries have a high level of unacceptability of "pork with an abnormal smell" (Bonneau et al., 2000) [3]. Thresholds for the sensitive perception of "Boar taint" by humans are on average: for the scatole 0.20 - 0.25 μg/g, for androstenone 0.5 – 1.0 μg/g (Mortensen et al., 1986) [13].

The level of concentration of offensive smell in boar meat can be minimized by reducing the concentrations of these compounds in adipose tissue. Surgical castration, immunological castration, genetic selection, special feed additives and technological aspects of growing are measures to reduce its concentration. Currently, "humane" surgical castration using anesthesia and analgesia and an alternative method of immunological castration are the most approved practical solutions in pig production (Zamaratskaia et al., 2009) [18].

This method is based on the temporary suppression of male testicular function by reducing the release of gonadotropin (GnRF) into the blood. This suppression reduces the level of androstenone and scatole in the body (Zamaratskaia et al., 2008) [17]. Immunological castration is also more acceptable for animal welfare (Thun et al., 2006) [15]. However, the key factor of mass introduction into the production of immunological castration of boars is the normal perception and attitude of consumers to the production of such pigs. This assertion determines the economic feasibility of the "vaccination method". In many European countries, official comparative estimation of pork from animals of different genders and castration methods are carried out by various scientists (Weiler et al., 2000) [16].

In Ukraine the method of immunological castration of boars is already in use on some large pig farms. At the same time, the consumer evaluation of pig meat and fat was not carried out at the scientific and methodological level.

MATERIALS AND METHODS

During our research, we organized an independent examination of samples of

thermally treated meat and fat from pig carcasses of a commercial hybrid obtained from cross breeding sows combining Irish and Yorkshire Landrace (J×L) breeds with synthetic boars terminals «MaxGrow». Three gender groups of pigd were studied: female pigs (FE), surgically castrated boars (CM), who were surgically castrated at 2 days age, and immunologically castrated boars (IM), who were immunized with immunization Improvac*R twice: at 79 days age and at 4 weeks before slaughter. The young pigs were reared in identical conditions and were fed with full-feed compound feeds of their own production in accordance with the feeding scheme adopted on the farm. Pigs of each gender were reared separately to live weight 100-110 kg. Our research were carried out in accordance with the basic principles of working with experimental animals defined in the "European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes" (1986) and provided for by the Law of Ukraine "On the Protection of Animals against Cruelty" (2006). Random selection of five carcasses from each gender group and sampling for organoleptic estimation were completed in time 24 hours after slaughter of pigs and primary carcass treatment in rapid cooling to +2 - 4^{o}C. Meat samples were taken from the rectum (m. Rectus thoracis) of the right hemisphere. Samples of adipose tissue were taken from adjacent layers of fat. Equally, 250 g of meat and 250 g of fat were selected from each carcass.

In laboratory conditions 5 g of muscle tissue, 5 g of adipose tissue and 5 g of distilled water were placed into glass test 45 cm^3 tubes. Tubes with contents were covered with plastic lids and were placed in a water bath until the mixture was boiled. Samples, prepared by this way, were provided for organoleptic estimation by consumers. Estimation of the samples was carried out by non-professional tasters of different ages, including: 15 men and 19 women aged 22-49 years, who agreed to participate in sensory evaluation as pork consumers.

Samples were evaluated using a basic organoleptic index. This index is quality level of smell of thermally treated meat and fat. Each expert evaluated 15 encrypted samples. A specially designed five-point scale for non-professional tasters was used to estimate. Offered score had the following characteristics: 5 - excellent quality (the smell causes exceptionally pleasant sensations, encourages consumption); 4 - good quality (smell causes pleasant sensations); 3 - satisfactory quality (smell acceptable for consumption); 2 - poor quality (sample has offensive smell, with individual description); 1 - poor quality (strongly pronounced “Boar taint”).

RESULTS AND DISCUSSIONS

Analysis of the organoleptic estimation results revealed a number of features that exist in the sphere of consumers sensory perception of the smell of thermally treated meat and fat of pigs of different gender groups.

It has been found that presence of offensive smell is influenced by the individual physiological features of the animal body irrespective of pigs gender and castration method (Fig. 1).

Sample 8 (pig) had the lowest score 94 points. According to consumer estimation, it received 1 point (“Boar taint”) for 4 times and 2 points (offensive smell) for 9 times.

This distribution of points can be explained by the fact that scatole is the result of metabolic processes in the large intestine, where it is absorbed into the blood, and after this is deposited in the adipose tissue of the body, regardless of pigs gender. The total level of scatole in boars ranges from 0 to 0.8 mg/kg. Castrates and female pigs have lower its levels ranging from 0 to 0.3 mg/kg.

The mechanism of accumulation of scatole in pigs of different genders has not been fully studied. However, we have assumption that it may be related with differences in metabolism of boars, pigs, and castrates (Hendriks et al., 2002) [9].

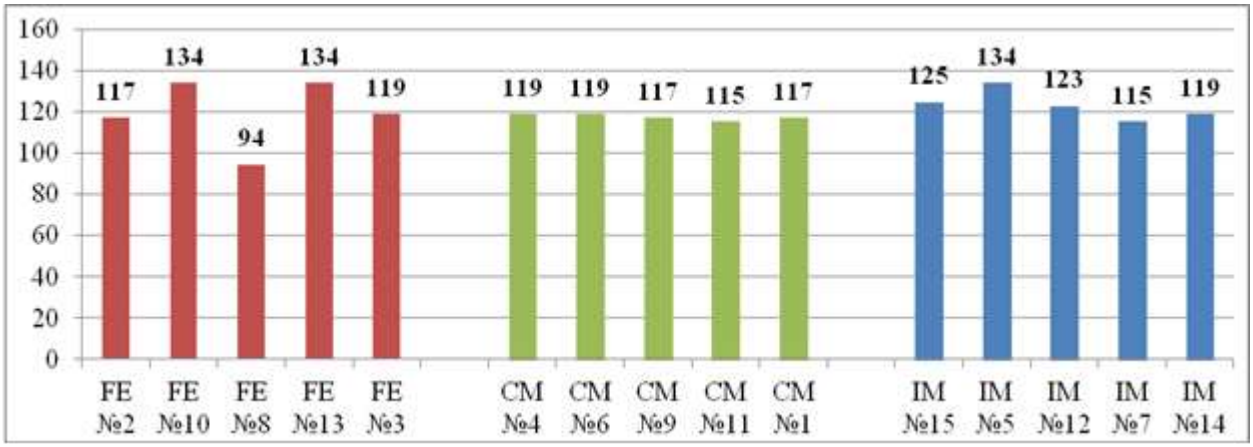

Fig. 1. Overall smell score of each tested sample, points
Source: own calculations.

This assumption also explains the fact in our experience that different tasters have not similar result of perception and estimation of samples smell. Sometimes tasters set completely opposite scores for the same sample.

In Ukraine, meat of sexually active boars is not widely used in pork production and processing technology. Consumption of meat with "Boar taint" is limited in the consumer experience and habits, so its smell is too difficult to identify accurately. Samples 4 (surgically castrated) and 14 (immunologically castrated) received a total 119 score each, but the differences in the marks of these samples among the tasters were very large - from 1 to 5 points.

There are 1-3% of animals with a level of androstenone in adipose tissue above the norm of 0.5-1.0 mcg/g among immunologically castrated boars. This level depends on technological and physiological reasons (Dunshea et al.,2001) [5].

However, most scientists testify that the content of scatole and androstenone in immunologically castrated boars samples is lower than the threshold level of human perception of unacceptable "Boar taint".

The concentration of these substances in the tissues of surgically castrated boars is lower than the concentration of "vaccinated" boars is (Font i Furnols et al., 2008, Bonneau et al., 2000) [7, 3]. Our results also indicate that women and men perceived different smell of the studied samples (Fig. 2).

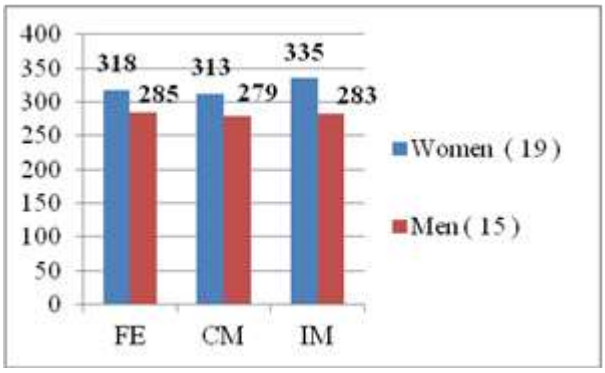

Fig. 2. Diagrams of the level of sensory evaluation of samples by women and men, points
Source: own calculations.

In our study, the overall total score of male samples of meat and fat of pigs of different gender groups was more uniform. The difference between the groups was 2-6 points in favor of pigs. However, women indicated that immunologically castrated boars meat had comparatively better smell (with a preference of 17-22 points). It is well known, that a person's level of smell perception is genetically determined and depends on the gender of the consumer and the country or consumer preferences of the population that evaluated it. With age, human susceptibility to smell may be changed. It tends to decrease in men and increase in women (Keller et al., 2007) [12].

Our independent testing of the sensory properties of thermally treated pigs meat and fat has shown results that indicate Ukrainian consumers have not detected the unpleasant "Boar taint" in the estimated samples of immunologically castrated boars compared to the samples of female pigs and surgically castrated boars (Fig. 3).

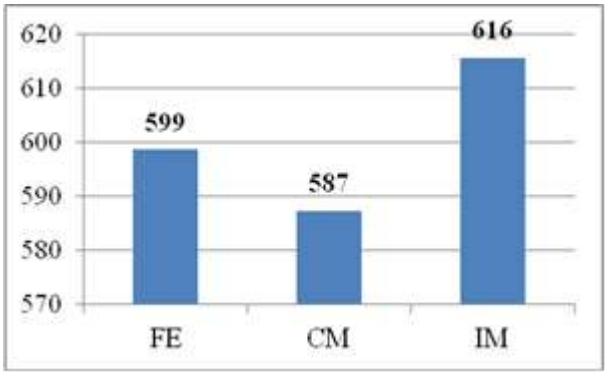

Fig. 3. Total distribution results of sensory evaluation thermally treated meat and fat samples of different gender pigs groups, points
Source: own calculations.

This result is consistent with the data of other researchers (Bonnaeu et al., 2012, Hennessy et al.,2006) [2, 10].

CONCLUSIONS

Comparative evaluation of thermally treated meat and fat samples of different gender pigs and castration methods revealed some peculiarities of sensory perception of "Boar taint" by Ukrainian consumers.

The physiological characteristics of an animal's body and the individual characteristics of a person's odor perception are two basic factors influencing consumer's assessment results of the offensive smell.

The smell of thermally treated meat and fat samples of immunologically castrated boars was estimated higher than this indicator of female pigs and surgically castrated boars.

For a fuller understanding the peculiarities of unpleasant "smell of boar" perception in pork according to the taste preferences of Ukrainian consumers, it is advisable to conduct a series of studies in different regions of Ukraine.

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RURAL DEVELOPMENT BEYOND EAFRD - ENHANCING ROMANIAN RURAL ENTREPRENEURSHIP THROUGH COMPLEMENTARY EU FUNDS AND PROJECTS

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Abstract

The development of rural entrepreneurship in Romania is highly influenced by the European funding. The European Union provides support for different areas, including rural development and agriculture. Also, it aids people in their development in terms of education and job integration. In order to support development programs and create social and economic value in rural communities, the EU has provided funds tackling specific needs of these communities. Along with the European agricultural fund for rural development (EAFRD, there are other funds, such as the ERDF and the ESF, that have an impact on rural development. With 35.3% of the ESIF allocated budget for Romania in 2014-2020, ERDF encourages the creation of new businesses, both in the agricultural and non-agricultural industries. In Romania, ESF projects are implemented in the idea of investing in people by creating new employment opportunities and ensuring better living standards among marginalized communities. The paper aims to present the impact of the EU structural and investment funds on rural entrepreneurship development by analysing results and good practices of these funds. Methods used include literature review, as a qualitative method, and computations and graphical representations in MS Excel, as quantitative research methods. For rural development, the implementation of ESIF funds in 2014-2020 complement the support provided in the context of LEADER initiatives, funded under the EAFRD. Community Lead Local Development (CLLD) is an example of how European funds work together for a common goal. In conclusion, results of the study enhance the importance of using a connected and integrated use of funds from various areas. National strategies imply financial aid from multiple funds, in order to have a coherent overall strategy, in accordance with the competitiveness requirements at the European level.

Key words**:** *rural development, rural entrepreneurship, EAFRD, ERDF, ESF*

INTRODUCTION

Rural entrepreneurship is a very common subject referring to the business ideas developed in order to help rural communities and people living in rural areas. The rural entrepreneurs have the aim to create business models in a context with difficult economic conditions and a lot of constraints. European rural development policies respond to the needs of the communities from rural areas, as well as for entrepreneurs, and provide economic support through European funds (Romanelli, 2016) [16].

In order for the rural communities to be developed, they need to be empowered to use local resources, to embrace an entrepreneurial spirit, and to create business models for rural economic growth, and perform economic activities and ideas financed by the European Union (Răzvanţă, 2019) [15].

In this context, agriculture continues to be of great importance for the rural areas, especially in terms of rural land user. In figures, agriculture represents more than 47% of EU region's total area of land usage (Fehera et al., 2017) [9].

There is a great potential for development for the rural areas in Romania have high, with agriculture and food sectors being the main source of income for the population. The lack of rural services, poor infrastructure, utilities, healthcare services, or education services define the rural areas in Romania, and when talking about rural development these issues have to be observed. Therefore, Romania's eligibility for European funds is proven by such needs, however the country's strategy for development of the rural areas has to be in line with the European strategy for rural

development in order to access these funds, such that entrepreneurs could very easily access them to start new rural businesses (Dan et al., 2017) [2]. The main objectives of the European Union's rural development policy concern growth of the rural regions, enhancing employment, and improvement of the living standards. Through the two pillars, rural development and market policies, the Common Agricultural Policy (CAP) supports many rural areas in Europe and help them in the development of the rural economy, and life in rural areas, through the national rural development programs (Common Agricultural Policy, 2013) [3]. Under the CAP, the European Agricultural Guarantee Fund (EAGF), for the financing of market measures, and the European Agricultural Fund for Rural Development (EAFRD), for the financing of rural development programs, were created (Council Regulation (EC) no. 1290/2005, and 2698/2005) [6, 7]. The European Agricultural Fund for Rural Development was created to deal exclusively with financing rural development, to improve the effectiveness of measures under the rural development policy (Malgorzata, 2019) [10].

In this context, national rural development programs (NRDP) have been implemented, and the allocation of financial resources from EAFRD encouraged rural entrepreneurs to participate in developing new business ideas for rural development. The EU cohesion policy was created to help the European Union's rural development policy, in order to give support towards business competitiveness, economic growth, sustainable development, job creation, and improve citizens' quality of life (Cohesion Policy, 2014) [4]. The objectives of regional policy are achieved through three funds: the European Regional Development Fund (ERDF), the Cohesion Fund (CF) and the European Social Fund (ESF). Together with the European Agricultural Fund for Rural Development (EAFRD), the European Maritime and Fisheries Fund (EMFF), and the Youth Employment Initiative (YEI), they constitute the European Structural and Investment Funds (Cohesion Policy, 2014) [4]. Most of the funds available in cohesion policy are directed to less developed European countries and regions, in order to support their growth and reduce the economic, social and territorial gaps that still exist at EU level.

In Romania, ERDF encourages the creation of new businesses, both in the agricultural and non-agricultural industries. Moreover, ESF projects are implemented in the idea of investing in people by creating new employment opportunities and ensuring better living standards among marginalized communities. Having an overview of the European funds context, this paper aims to present the impact of the EU structural and investment funds on rural entrepreneurship development by analysing results and good practices of these funds.

MATERIALS AND METHODS

The ERDF and the ESF work together with the European agricultural fund for rural development (EAFRD), and impact the rural development and rural entrepreneurship. This paper wants to emphasize how the ESF tackle the needs in rural development, and which are the priorities of these funds regarding rural communities. The latest statistical data from trusted sources regarding the absorption of the European funds were analysed. Moreover, this study comprises references concerning the evaluation of the regional development programs implemented in the rural areas, through administrative data collection and analysis, and development indicator analysis. Finally, the methodology comprises also representation and discussions on good practices resulted from accessing the structural funds. The study was conducted using literature review as qualitative method, by defining the main concepts regarding the concerned subject. Secondly, quantitative methods were used to analyse the statistical data, by using MS Excel, for the numerical computations and graphical representations of the data.

RESULTS AND DISCUSSIONS

Rural areas face several problems, such as underdevelopment, need for job creation, lack of infrastructure, low standards of education.

The EU rural development policy is targeted at providing solutions to such problems and exploit the rural areas at their full potential. The European Union has developed the Common Agricultural Policy as a set of common rules that each member state should implement based on their specific needs. In order to support the European rural development policy, the EAFRD was implemented.

It aims to provide financing for member states in order to help them develop their own National Rural Development Programs (NRDP). The national programs have to be designed in accordance with the priorities laid down by the national strategy plans and the strategic guidelines for the rural development policy adopted by the European Council (Chirițescu, 2011) [1].

The latest statistical data provided by MARD show that Romania was allocated with more than 8 € billion from EAFRD for the NRDP 2014-2020, and it was split over the six years as shown in Figure 1.

Fig. 1. EAFRD allocation according to NRDP 2014-2020 financial plan (€ billion)

Source: Data provided by (MARD, 2019) [11].

From the data recorded at the beginning of January 2020 , as we observe in Table 1, the EAFRD spending was about 4.57 € billion, with an absorption rate of 56%, for all the measures implemented in the program.

Table 1. EAFRD allocation and absorption for NRDP 2014-2020 (€ billion)

EAFRD Budget 2014-2020	Payment requests	Authorized amounts	EAFRD spending	EAFRD absorption rate
8.13	5.54	5.37	4.57	56%

Source: Data provided by (MARD, 2019) [11].

EAFRD financial aid influenced rural entrepreneurship by the allocation and entrepreneurs were encouraged to develop their business ideas for rural development.

Priorities of the EU funds concerning rural entrepreneurship were implemented through the measures defined in the national program. The main indicator showing growth was the increased number of new jobs created in the rural areas of interest, especially following the development of businesses in the non-agricultural areas. What is more, increasing the attractiveness of rural areas was another priority addresses within the 2014-2020 rural development program, through the stimulation of activities such as production, agro-tourism, and sanitary-veterinary and medical services (Răzvanță, 2020) [15].

Going beyond the common agricultural policy and EAFRD, the European Union provides other funds that support the development of rural areas as well, respectively the funds under the Cohesion Policy. This policy, also called the Regional Policy, has been developed with the aim to reduce disparities among regions and Member States by offering equal opportunities to people across Europe. The main issues tackled by this policy refer to fostering sustainable growth and innovation, and increase job creation in Europe's diverse regions. This policy provides all EU member states with support from the European Structural and Investment Funds (Cohesion Policy, 2014) [5].

In this paper, we will be referring to the following EU structural funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF), which contribute to the fulfilment of the objectives comprised in the EU's cohesion policy. These funds are complementary to the measures taken by the European Agricultural Fund for Rural Development for supporting the economic regeneration of rural areas (Chirițescu, 2011) [1].

The EU's long-term budget is represented in the Multiannual Financial Framework (European Council, Multiannual Financial Framework - MFF, 2013 [8]. In the 2014-2020 financial period, the Cohesion Policy, together

with the Common Agricultural Policy (CAP), accounted for 72% of EU spending, with € 775 billion recorded in the MFF for this period (Fig. 2).

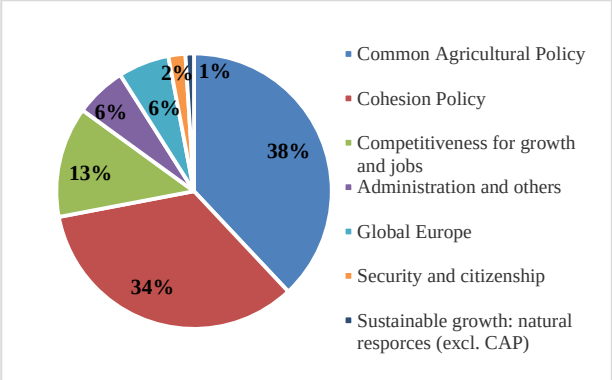

Fig. 2. EU Budget allocation in the 2014-2020 MFF
Source: European Commission (Moës, 2018) [13].

According to the numbers provided, these two policies are the biggest components of the EU budget (Moës, 2018) [13].
Table 2 presents the budget allocation of CAP and ESIF in the 2014-2020 period. Projects funded under CAP receive € 408 billion, and for the Cohesion Policy, respectively the ESIF, there were allocated € 367 billion. These projects must demonstrate their contribution to progress to the Europe 2020 strategy.

Table 2. CAP and ESIF 2014-2020 EU budget allocation

Common Agricultural Policy (CAP)		**Cohesion Policy (ESIF)**	
Fund	**€ 408 billion**	**€ 367 billion**	
EAFRD	77%	ERDF	55%
		ESF	23%
EAGF	23%	CF	20%
		YEI	1%

Source: European Commission (Moës, 2018) [13].

At national level, Romania was allocated with € 30.8 billion from the ESIF funding over the period 2014-2020. According to the country data on ESIF, the budget allocation by fund for the 2014-2020 period is directed as shown in Fig. 3.
The highest amount was allocated to the regional development programs, respectively 35% (ERDF), followed by rural development with 26% (EAFRD), and on the third place with 23% for the Cohesion Fund (CF). From the remaining three funds in ESIF, the social fund records a 15% budget allocation, being far by the YEI and EMFF, the least two being allocated with less than 1% each from the total ESIF budget for this period.

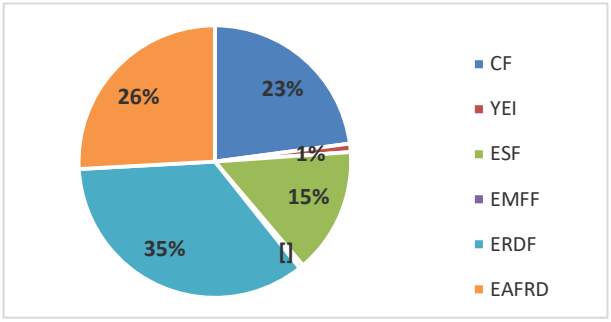

Fig. 3. Romania budget allocation by fund in 2014-2020
Source: (European Commission, ESIF, 2020) [5].

As we can see, rural and regional development programs are the most important areas of interest and have high potential for implementation.

European Regional Development Fund

The Regional Operational Program (ROP) for the period 2014-2020 was approved for Romania, financed by the European Regional Development Fund (ERDF). Within the priorities regarding regional and urban development, the objectives defined in the ROP 2014-2020 focus as well on improving the living conditions of rural and regional communities, by supporting the development of the business environment (MEF, 2015) [12].
In the 2014-2020 programming period, € 8.25 billion are allocated to the Regional Operational Program, of which € 6.7 billion represent EU support, through the ERDF, and € 1.5 billion national contribution (state budget, local budgets).
As we can see in Table 3, the budget allocation is split also on Romanian regions, mainly underdeveloped and developed regions.

Table 3. Budget allocation for ROP 2014-2020 (€ milion)

Region category	**EU support (ERDF)**	**National contribution**	**Total**
Underdeveloped regions	6,343.36	1,457.57	7,800.93
Developed regions (Bucharest Ilfov)	356.64	92.46	449.10
Total	**6,700.00**	**1,550.03**	**8,250.03**

Source: MEF, 2015 [12].

The underdeveloped regions could become more attractive for living, tourism, investments and labour market, thus the ROP objectives implements a differentiated financial allocation in coordinated with the actions under other operational programs by regions, based on their development level. This strategy prioritizes the regions lagging behind and puts a special focus on them, by allocated a higher budget for their development.

The ROP 2014-2020 comprises priority axes intended to direct financial interventions in certain investment areas. The ROP operates simultaneously in rural and urban areas, so it is therefore difficult to determine exactly what proportion of the expenditure goes to rural development. However, out of the 11 priority axes, we can define some specific action that impact the rural areas.

Priority axis 2 *("Improving the competitiveness of small and medium enterprises").* One of the objectives of this priority is to support new business ideas to be implemented in the rural areas, and to encourage initiatives of rural entrepreneurs and not only. Another objective is to provide the necessary support for developing advanced production capacities and new services. These priorities facilitate non-agricultural SMEs and business incubators implemented in rural areas.

Priority axis 5 *("Improving the conservation, protection and sustainable use of cultural heritage").* Beside the urban regions, Romanian rural areas are also considered very rich from the point of cultural heritage, and the preservation of such resources has become a priority for ROP 2014-2020. Thus, the objective under this priority axis is to promote local development by conserving and protecting natural heritage and cultural identity of both urban and rural regions.

Priority axis 6 *("Improving important regional road infrastructure").* Rural areas in Romania lack infrastructural opportunities and this leads to losing entrepreneurial development. Through this priority axis, ROP tries to solve economic discrepancies and underdevelopment of rural areas by developing urban-rural linkages and road infrastructure, mainly facilitating access and connections between cities and rural areas.

Priority axis 7 *("Diversification of local economies through the sustainable development of tourism").* There is a high tourism potential in the rural areas, thus prioritising local development in this way is favorable for growth. Actions taken under this priority axis promote development of infrastructure for balneary tourism, creation and expansion of leisure infrastructure, reconditioning natural attraction objectives, supporting marketing activities and tourism promotion.

Priority axis 8 *("Development of health and social infrastructure").* Investing in health and social infrastructure helps rural areas benefit from reducing health inequalities, promoting social inclusion, and combating poverty by increasing the accessibility for health, services in local communities, as well as by improving access to social, cultural and recreational services, especially for poor and isolated areas.

Priority axis 10 *("Improving the educational infrastructure").* In the context of rural and social entrepreneurship, many entrepreneurs go towards the idea of investing in educational development of rural communities, but they often face infrastructure barriers. Thus, the opportunities of accessing funds through the ROP 2014-2020 in the direction of improving the educational infrastructure comes in hand for the entrepreneurs and their business ideas. The objective of this priority axis tackles the necessity of increasing participation in early education and compulsory education, especially for children at high risk of early school leaving, and increasing the degree of participation in vocational and technical education and lifelong learning.

European Social Fund

The European Union is committed to create a socially inclusive environment and enhance job creation for the European citizens. The European Social Fund (ESF) contributes to ensuring fairer job opportunities and helping people get better jobs. It invests in human capital, by offering financial support for local, regional and national employment-related projects.

The challenges that the Romanian labour market faces are visible and problems related to employment and poverty are issues to be resolved in the context of decreasing disparities between member states. For the 2014-2020, Romania implemented the "Human Capital" Operation Program (OP) that aims at investing in employment, education and fight against poverty and social exclusion. In this respect, around € 5 billion (of which € 4.3 billion from the EU budget) were allocated for ESF. The objectives and priorities are to help youth, Roma and rural population, to find a job, and also to learn more about their skills and opportunities. The aim is to reduce poverty and social exclusion.

The OP "Human Capital" comprises 7 priorities, with the EU allocations from the European Social Fund described in Table 4, for the 2014-2020 period. These priority axes follow the nation strategy in line with the EU objectives.

Table 4. Budget allocation for OP "Human Capital" 2014-2020 (€ million)

Priority axis	EU support (ESF+YEI)	National contribution	Total
PA 1	3,022.37	266.68	3,289.05
PA 2	3,171.24	570.63	3,741.87
PA 3	11,001.99	1,956.15	12,958.14
PA 4	9,405.05	1,696.87	11,101.93
PA 5	2,011.00	108.78	2,119.78
PA 6	12,525.90	2,260.46	14,786.36
PA 7	2,582.07	466.60	3,048.67
Total	**43,719.63**	**7,326.17**	**51,045.80**

Source: MEF, 2015 [12].

Priority Axis 1 *("Youth Employment Initiative")*. The actions planned under Priority axis 1 are to be implemented in the less developed regions, respectively three eligible regions, where the youth unemployment rate exceeds 25%, namely: the Centre region (31.7%), the South-East region (31.3%) and the region South Muntenia (30.2%). The groups targeted here are unemployed young people, as well as people not participating in educational programs or trainings. The financial support helps project that are oriented towards providing counselling, job orientation, trainings for these groups of people.

Priority axis 2 *("Improving the situation of young people in the NEETs category")*. Given the fact that the need to support young people on the labour market has been identified in all regions of Romania, the aim of PA 2 is similar and complementary to the actions provided under PA 1, targeting unemployed young NEETs from the regions of Bucharest-Ilfov, North-East, North-West, West, South-West Oltenia, who are not eligible for PA 1, but who face similar problems.

Priority axis 3 *("Jobs for all").* The motto of this priority axis shows the desire to provide jobs for people from all categories, focusing mainly on unemployed and inactive people. The projects funded within this priority axis refer also to helping people setting up their own businesses, or enhancing their qualifications or experience.

Priority axis 4 *("Social inclusion and the fight against poverty")*. The objective here is to help marginalized and disadvantage groups to be employed, and to improve their working skills. Also social enterprises are provided with funding in order to develop their business ideas in these communities.

Priority axis 5 *("Local development under the responsibility of the community – CLLD").* This priority axis is complementary to the support for rural areas and smaller cities under the Rural Development Program.

Priority axis 6 *("Education and skills").* Supporting the participation in pre-school and pre-school education, especially of groups at risk of early school leaving, with a focus on children belonging to the Roma minority and those from rural areas.

Through the Operational Program "Human Capital" 2014-2020, the European Social Fund (ESF) is encouraging entrepreneurship and setting up new businesses. The measures envisaged aim to increase employment by **encouraging entrepreneurship and business start-ups,** with a focus on those with a non-agricultural profile in urban and rural areas.

The implementation of this OP is aimed to provide financial support to individuals for starting a business, as well as financial support to already established SMEs (with a history of up to one year of operation) to create new jobs.

CONCLUSIONS

The increasing competitive pressure of global markets on regional and rural development, on growth, on job creation and the societal challenges have imposed the need for synergies and complementarities between European Funds, in order to enable the European Union to maximize the impact and efficiency of the developed strategies.

Member States are required to define their local development strategies in accordance with the European requirements and ensure that there is coordination between funds in their implemented development programs. In this context, their strategies imply financial aid from multiple funds they will receive from the European Union, in order to have a coherent overall strategy that keeps up with the competitiveness at the European level.

Community Lead Local Development (CLLD) is an example of how European funds work together for a common goal. Local development under the responsibility of the community can be funded from various ESI funds, and develops a link between urban, rural and fisheries areas. In this project, local action groups create CLLD strategies able to target operations for one or more funds, with the condition that there must be consistency and coordination between the funds.

This methodology for ESI funds will allow the connected and integrated and multisector use of funds, considering the implementation of local development strategies elaborated by taking into account the needs and the local potential of the target communities. The main characteristics of such a program imply local innovative features, network collaboration and, where appropriate, cooperation.

In Romania, the CLLD tool will be used to implement interventions aimed at promoting social inclusion and combating poverty in marginalized communities. Given the complex needs faced by affected communities, in the context of limited access to quality social, health and education services and low labour market participation, an integrated approach is needed to ensure the effectiveness and sustainability of implemented interventions.

For rural areas, interventions within the Operational Program "Human Capital" 2014-2020 complement the support provided in the context of LEADER initiatives, funded under the NRDP. The approach used in the OP "Human Capital" will aim to increase the effectiveness/sustainability of the measures implemented, by setting up a coordination and monitoring mechanism, in order to correlate the different interventions and ensure the transfer of good practices and successful replication. interventions in several areas. Actions at local level will be implemented in compliance with the provisions of local development strategies developed by Local Action Groups (LAGs).

ESF actions will aim to improve the skills of the workforce, as well as to improve access to and participation in education (both compulsory and lifelong learning) and to reduce early school leaving for children in rural areas.

In conclusion, cooperation between EU funds are defined at national level, and there is proved that in the context of rural and social development, these funds are complementary and integrative.

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STUDIES REGARDING PERSONAL SKILLS NEEDED IN ENTREPRENEURSHIP. CASE STUDY IN FRANCE, LITHUANIA AND ROMANIA

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Abstract

A study regarding the importance of personal abilities in entrepreneurship was conducted in France, Romania, and Lithuania on several 204 peoples with higher education. The applied methodology was that of opinion polls, in which the subjects were asked to give information regarding the importance in entrepreneurship, of some personal skills such as "To quickly analyze the data and make decisions", or "To direct and lead R&D activity". The importance of these skills was quantified in the questionnaire by granting notes from 1 to 6, notes whose value was directly proportional to the importance give it to the respective ability. Regarding the assessment of the importance of the ability "To quickly analyze the data and make decisions", from the total respondents, 29 % gave the maximum mark (note 6), and 24% gave mark 5. Regarding the respondent's position for ability entitled "To direct and lead R&D activity'', the overall answers have the same values (29% of the respondents gave mark 6 and 24% of them gave mark 5). Regarding the distribution of the answers by countries, it is found that the maximum score (6) was granted by 58% of the Romanian respondents, by 31% of the French respondents, and by 8 % of the Lithuanian respondents. In conclusion, the study achieved regarding the importance of personal skills in the entrepreneurial process carried in the three countries, showed the conditioning of the success of a business by personal entrepreneurial qualities, like: "To quickly analyze the data and make decisions", "To persuade others", "To be oriented to achieve" and' 'To direct and lead R&D activity". These answers placed Romania on the first because its own participants agreeing that these qualities are the personal skills of a successful entrepreneur.

Key words: *innovative company entrepreneurship, personal skills*

INTRODUCTION

The way in which the process of entrepreneurship in Europe can be seen may differ, and here the socio-cultural factors [4, 5, 8] and the geopolitical influences specific to each country are involved [1, 2, 19]. The experience of countries with tradition tells us the answer is yes [10-11]. It seems that age and the level of education have an important role in terms of attitude towards entrepreneurship [12, 13, 14].

Assessing the opportunity of a business is another important phase in the entrepreneurial process. Thus, estimating profits, estimating losses respectively estimating the feasibility of potential business is criteria that define the basis of a successful entrepreneur [15, 17]. A potential business will always be analyzed also in terms of personal benefit (ability to accumulate). Thus, in a pilot study conducted in the US on 155 students who were asked to evaluate in writing the probability to involved in a business that was presented to them, it was found that the answers obtained varied according to:

1)Interactions of the interviewed persons with the business environment;

2)Measuring the opportunity depending on the degree to which the interviewees can

accumulate money. In this study, 45% of respondents replied that they would enter the business based on their market relations, and 52% of the respondents stated that they would enter into such a business if they had a personal benefit (estimation based on ability to accumulate) [15]. The studies has shown that the opportunity of a business is evaluated equally both in terms of personal gain (accumulation capacity) and in terms of knowing the behavior of the target group (consumers) [17]. In another study conducted in South Africa [7], focused on the population the position regarding the entrepreneurship, (here the workforce of the population studied was 75% concentrated in agriculture), the answers obtained were located around of some parameters such as: "financial availability", "health", "relationships", "market". The most agreed used model was that of family entrepreneurship, which aims at improving the financial situation of family members. Thus, in this case, entrepreneurship is seen as an activity that combats poverty and leads to an increase in personal wealth and quality of life [7].

Regarding the ability to coordinate R&D activities, studies conducted on companies in Indonesia [18] have shown that this ability is closely related to the innovative character of the entrepreneur. The study concluded that those who can coordinate R&D activities also have innovative skills, and this has a positive effect on the sustainable development of the products of the company. The greater the innovation capacity of the company, the better the financial performance of the business, because the ability of the entrepreneurs to generate financial and marketing performance will create a competitive advantage for the company [18]. The founders of the companies must pay attention to the creation of an innovative entrepreneurship spirit and by creating networks/links with various stakeholders from the market. If they will provide innovation opportunities to their employees, then they will offer the company a competitive advantage. The specialized literature indicates in the chapter of entrepreneurial sub-competencies, associated behaviors such as: "seeking opportunities", "daring to take decisions", "taking calculated risks", "ability to lead a team", " brings people together and stimulates them to action" [16]. Other studies that aimed to assess the perception of the importance of competencies such as innovation and creativity in the entrepreneurial process were conducted on 200 students from Spain and the USA [3] showed that students perceive the quality of being innovative as a determinant of entrepreneurial success [3].

Other researches were conducted to find the answer to the question: "how do companies transfer knowledge from academia to economics". In this regard, interviews were conducted with top managers from several European high-tech companies, companies that have the potential to transfer the knowledge accumulated from the academic to the industrial environment [9]. In one such study, 8 companies from the countries with the largest gross domestic product in Europe (Germany, England, France, Italy, Spain, Poland, Holland, Belgium) and 2 companies from the European countries with the smallest gross domestic product were selected (Austria, Denmark) [9]. The study highlighted that large companies have more advantages than small firms when faced with large knowledge inputs, as they have more funds that can encourage their employees to improve their knowledge and skills.

This study concluded that all the entrepreneurs of the high-tech companies from the analyzed European countries, have the role to catalyze the acceleration of economic development. They do this through the joint technological initiatives with the higher education organizations from the field of microelectronics, nanotechnology, biotechnology, and informatics. After that, these companies provide high-tech services for research and development in the field of aerospace production, biotechnology, chemical industry, and computer equipment [9].

MATERIALS AND METHODS

In the present study, the opinion poll method was used [10-14]. The extent to which

individuals and/or each group agreed with the statements in the opinion poll was quantified by notes from 1 to 6 [10-14]. For this purpose, groups of people from Lithuania, France, and Romania were selected. The persons participating in the survey had higher education and worked in the biosciences field. The respondents' distribution by age and country is presented in Fig. 1 and Fig. 2.

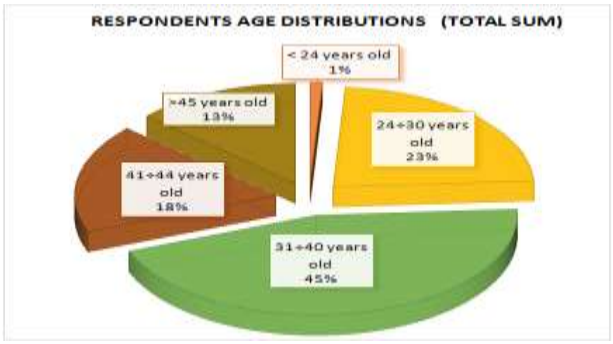

Fig. 1. Respondents distribution regarding the interest for entrepreneurship, by age.
Source: Own calculation.

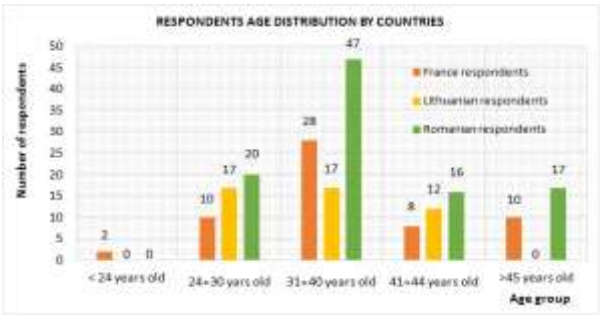

Fig. 2. Respondents distributions regarding the interest for entrepreneurship by age groups and countries.
Source: Own calculation.

RESULTS AND DISCUSSIONS

Results obtained from survey received from three European countries regarding skills and abilities for entrepreneurship in the life *sciences field reveal the following aspects:*
(1) The interest in the career in entrepreneurship is maximum for subjects between the ages of 31-40 years, which represents 45 % of the total of the interviewed subjects (Fig. 1). Regarding answer distribution by countries, we found that 47% are Romanian respondents, 28% are French and 17% is Lithuanian (Fig. 2). These answers indicate that the specialists from the age group situated between 31-40 years old, situate Romania in the first place regarding the interest in the entrepreneurship followed by France and Lithuania. These distributions suggest that the Romanian and French respondents are convinced that the entrepreneurship represents a way to increase the life quality [6, 7, 19].
(2) Regarding the assessment of the importance of the ability "To quickly analyze the data and make decisions", from the total respondents, 29 % gave the maximum mark 6, and 24% gave mark 5 (Fig. 3).

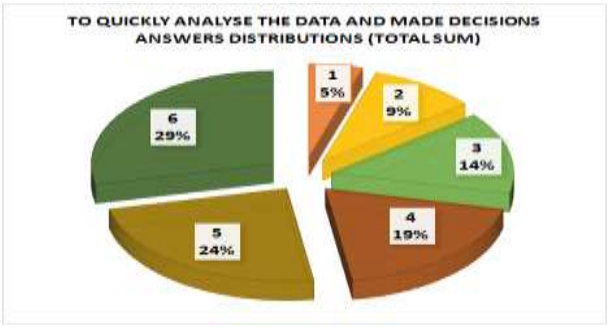

Fig. 3. The answers distribution regarding respondents' opinion of the entrepreneur's ability ''To quickly analyse the data and make decisions''
Source: Own calculation

Regarding the distribution by countries, the maximum mark (6) was granted by 60% of the Romanian subjects, by 33% of the French subjects and respectively for 23% of the Lithuanian subjects. Mark 5 was granted by 23% of Romanian subjects, by 22% of French subjects and by 10% of Lithuanian respondents (Fig. 4).

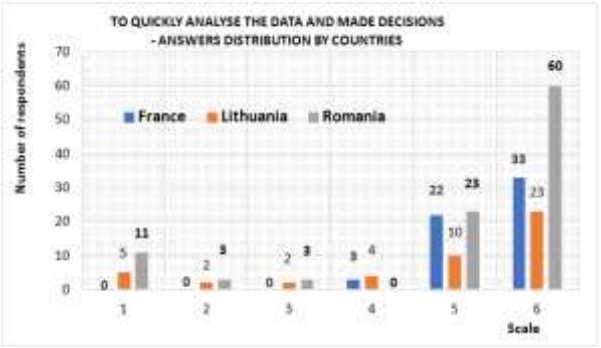

Fig. 4. The answers distribution by countries, regarding respondent's opinion of the entrepreneur's ability "To quickly analyse the data and make decisions".
Source: Own calculation.

These distributions indicated that, the skills like "seeking opportunities", "daring to take decisions", "taking calculated risks", are

recognized by respondents from Romania and France as the main entrepreneurship ability, which can play a decisive role in achieving the success in business [1, 15, 16].

(3) The answers regarding the importance of the ability "To persuade other", from the total respondents, 29% gave the maximum mark 6, and 24% gave mark 5 (Fig. 5). Regarding the distribution by countries, the maximum mark (6) was granted by 37% of the Romanian subjects, by 31% of the French subjects and respectively for 10% of the Lithuanian subjects. Mark 5 was granted by 46% of Romanian subjects, by 24% of French subjects and by 18% of Lithuanian respondents (Fig. 6). These distributions indicate the importance of this ability, and reveal that this ability can represent a model of volition, self-efficacity and entrepreneurial intentions [4, 5, 8], to achieve the business success in the countries as Romania, France, and Lithuania.

Fig. 5. The answers distribution regarding respondents' opinion of the entrepreneur's ability "To persuade other"
Source: Own calculation.

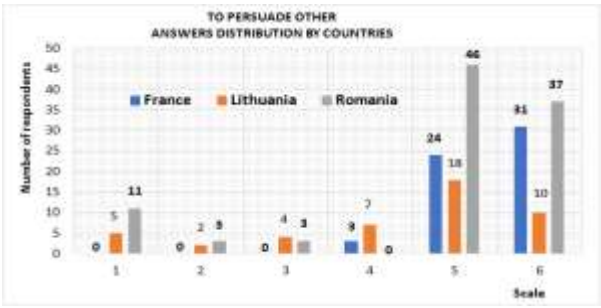

Fig. 6. The answers distribution by countries, regarding respondents' opinion of the entrepreneurs ability "To persuade others".
Source: Own calculation.

(4)The respondents' assessment regarding the importance of the ability "To be oriented to achieve", from the total respondents, 29% gave the maximum mark 6, and 24% gave mark 5 (Fig. 7).

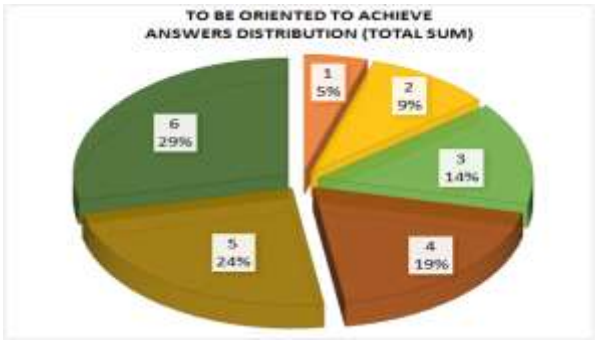

Fig. 7. The answers distribution regarding respondents' opinion of the entrepreneur's ability: "To be oriented to achieve".
Source: Own calculation.

Regarding the distribution of the answers by respondents countries, the maximum mark (6) was granted by 51% of the Romanian subjects, by 27% of the French subjects and respectively for 18% of the Lithuanian subjects. Mark 5 was granted by 31% of Romanian subjects, by 24% of French subjects and by 12% of Lithuanian respondents (Fig. 8).

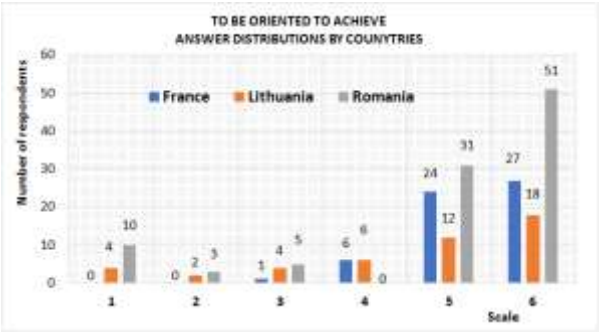

Fig. 8. The answers distributions by countries, regarding respondents' opinion of the entrepreneurs ability: ''To be oriented to achieve''
Source: Own calculation.

These results show once again that in countries such as Romania, France, and Lithuania, the desire to do entrepreneurship (to start a business) is closely linked to the will and the capacity of the future entrepreneurs to accumulate [15,17] both in the personal interest and in the interest of their business. More of that, in the studied countries, for the entrepreneur is important "to be oriented to achieve", because for they this ability represent a way to improve their quality of life [7].

(5) The respondent's position for ability entitled "To direct and lead R&D activity'', overall the answers of the respondents have the same values (29% of the respondents gave mark 6 and 24% of them gave mark 5) (Fig. 9).

Fig. 9. The answers distribution regarding respondents' opinion of the entrepreneurs ability
Source: Own calculation.

Regarding the answer's distribution by countries, it is found that the maximum score (6) was granted by 58% of the Romanian respondents, by 31% of the French respondents and by 8% of the Lithuanian respondents (Fig. 10). Mark 5 was granted by 24% of Romanian subjects, by 17% of French subjects and by 17% of Lithuanian respondents (Fig. 10). These distributions reveal that this quality is closely linked to the entrepreneur's ability for innovation [12], a decisive quality for the success of a business [3].

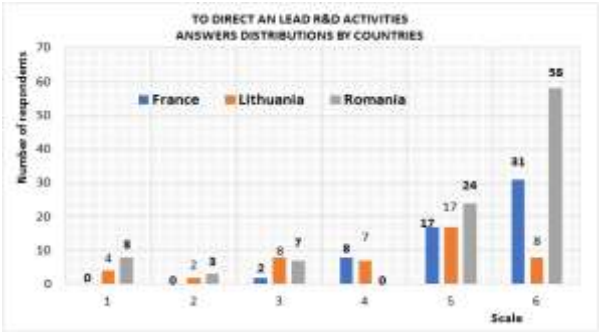

Fig. 10. The answers distribution by countries, regarding respondents opinion of the entrepreneurs ability
Source: Own calculation.

The obtained results show once again that from this point of view Romania is very close to the countries with the largest gross product in Europe because the scores obtained are close to those obtained in France, the recognized European country. The fact that in Romania higher scores were obtained than in France indicates the fact that there exists a great potential in the future for the Romanian high-tech companies, companies that can transfer the knowledge generated in the academic environment (universities, research institutes) to the industrial environment [9].

CONCLUSIONS

The study achieved regarding the importance of personal skills in the entrepreneurial process was carried out in Romania, France and Lithuania showed that for people with higher education aged between (31-40) years old, entrepreneurship represents a way by which they can improve their life quality.
Regarding the position of the respondents from the three countries regarding the conditioning of the success of a business (and implicitly of the personal success), by the existence of entrepreneurial qualities such as "To quickly analyze the data and make decisions", "To persuade others", 'To be oriented to achieve" and' 'To direct and lead R&D activity" in terms of responses received, Romania was placed first, the participants here agreeing that these qualities are the personal skills of a successful entrepreneur.
In the decreasing order of responses, Romania was followed by France and Lithuania.
This fact again demonstrated the quality of the human factor in terms of perception towards the entrepreneurial process whether respondents were from European countries with the highest gross product per inhabitant or were from European countries with the lowest gross domestic product per inhabitant. The answers obtained showed that they agreed or strongly agreed, with the fact that successful entrepreneurs must possess personal skills such as those listed above.

ACKNOWLEDGMENTS

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DETERMINATION OF ECONOMIC AND STRUCTURAL FACTORS AFFECTING ANGORA GOAT BREEDING: THE CASE OF ANKARA

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Abstract

The objective of this paper is to determine the changes on some performance of the Mohair (Ankara) goats farming system during 2017-2018. In this study, we examine production of the goats farms of Ankara province. Economic analysis is implemented by using data from 45 Turkish mohair goat farmers. The gross production value of the establishments is increased for the business groups according to the business groups, ranging from 495,148.74 Turkish Liras (TL) to 731,154.09 TL. According to the average of the establishments, the goat breeding activity is 58.28%, the vegetable production is 40.64% and the sheep breeding activity is 1.08%. In group 1, the share of the mohair in the value of animal production was 13.03%, while it was 14.37% in group 2. According to the establishment groups, the variable costs for vegetable production varying between 15,346.91 TL and 46,411.88 TL, while this value is 38,818.22 TL for the average of the establishments. According to the establishment groups, the variable costs in animal production vary between 91,127.86 TL and 263,160.36 TL. While the total gross profit per establishment in the examined establishments is between 398,915.15 TL and 560,170.95 TL. There was an employee problem with 30.00%, with feed prices with 26.67% and mohair prices with 25.00%, respectively, in the first group. 18.18% of the establishments in the first group and 12.50% of the establishments in the second group have been educated on herd management. Within the scope of the research, it was determined which supports were used by the establishments and it was determined that earrings and mohair support were used the most according to the results of the research. Within the scope of the research, 61.76% of the establishments in the 1st groups use agricultural loans and this rate is 81.82% in the 2nd group establishments.

Key words**:** *angora goat, mohair, Turkey*

INTRODUCTION

Angora is a crucial raw material of textile sector. Angora or mohair production is regarded as an industry fibre product. Angora goat was brought to the different countries around the World and reproduced there. It is known as a kind of goat that Turks took with them during their migration from Central Asia to Anatolia. Angora goats get their nourishment from shrubs and bushes effectively, as well as pastures. They are not good at climbing, they like foliage, they do not pose a threat for trees in contrast to hair goats [5]. Angora goat had been raised in Central Anatolia region until 1838, but then it was taken to the countries, such as; The US, France, South Africa and Australia and raised in these countries, as well [20]. They produced small flocks at the beginning yet later on they became the leaders of angora production in the World. Pure race of angora goat generally has a small size and it is a petite animal. Their heads and foreheads are in good order. Both males and females have horns and beards. Height at withers in angora goats is approximately 55 cm, body length is averagely 56 cm. The main purpose for farming angora goats is to obtain white mohair. This white mohair has a high fibre quality and is dyed easily with every colour. That's why it is needed by textile industry [2]. Angora goat is densely raised in Central Anatolia. The most important yield of angora goat is mohair. Throughout the World, South Africa and The US has started taking place in this market. Especially with the activation of artificial fibre, the attending behaviour toward mohair has decreased and mohair production has diminished seriously. Growers of angora goat showed tendency to make use of goat's meat due to the decrease in importance of mohair, and they interbred the mohair with various types in that period. Turkey, from time to time, gravitates to foreign

market in order to meet the increasing meat demand of domestic market. At this point, those goats which can easily adapt to several conditions, will be able to meet the increasing red meat demand. Especially depending on the changing world conditions, decision makers must take the rivalry and supremacy clauses into consideration by observing the world's current situation while making decisions on agriculture. In view of rising young population, goat farming will have a vital mission in decreasing the unemployment. It is undoubtful that by means of agricultural support which is equal to that of World countries, more agricultural enterprises will show interest. According to the ministry of agriculture legislation in 2016, 4 month old and older calf and young buffalo calf (81 cities) 350 TL/Head, herd book (81 cities) 500 TL/Head and progeny testing 50 TL/Head(additional) is supported, sheep-goat support 25 TL/Head and angora breeding 22 TL/Head is dedicated. Nowadays, moving away from the opinion that goats destroy and do serious harm to forest lands, the second sentence of 6,831 numbered Forest Law's 19th dom's first sub-article has been changed herein below: 'Only if it is appropriate for public interest and in the forest lands determined by forest administration, grazing may be allowed within the scope of procedures and principles [15]. Goat's meat has lower cholesterol, high protein and iron. Because goat's milk is more easily-digestible than cow's milk, it is an important nutrition for babies and also it is an effective nutritional source for those who is allergic to cow's milk. Goat skin has an economic value. Goat is preferred, depending upon social customs, especially for sacrificing an animal, wedding ceremonies and marking one's death. Goats which can feed in unsuitable, poor areas and has a special adaptation skill to dry conditions, minimize people's nutrition cost. The number of angora goats, milked animals, milk production (ton), sheared animals and wool angora production value have been analysed. While the number of angora goats was 346,000 heads in 2001, it was given as 207,765 heads in 2016. Whereas the milk yield was 21.35 tons/head in 2001, it was shared as 35.71 tons/head in 2016. It is obvious that the demand for goat products has been rising in parallel with healthy eating development in the world. The reason why goat milk is preferred especially in ice-cream industry is its being preferred by consumers for its taste. Since goat milk contains 13% lower lactose than cow milk and also it is the closest milk to breast milk, it covers a considerable space in people's nourishment. Moreover, its being easily-digestible and similar to breast milk makes it important for babies. 1,000 facilities were opened in Ceylanpınar business in 2013 to meet breeding goat demand and after buying 1,000 Aleppo animals for breeding, goat farming was started. Also, in order to preserve Turkey germplasm, angora goat farming is being maintained in Anadolu Tarım İşletmesi (Eskişehir). The production rates that leading countries in mohair production had between 2000 and 2010 were examined. According to this, 5,900 tons of angora wool production in the World are made in South Africa, The US, Turkey, Argentina, Lesotho, Australia and New Zealand. The rest 1,000 tons are made by other world countries. Countries' mohair production increase/decrease rates in 2010 respectively are; 46.51% decrease in South Africa, 150% increase in The US, 75% increase in Turkey, 133.33% increase in Argentina, 50% increase in Lesotho, 33.33% decrease in Australia and 75% decrease in New Zealand, in comparison to 2000. The reasons for the decrease in mohair production in countries that have significant influences in World mohair production are animal husbandry policies, support payments, increasing input costs, decreases in the presence of angora goats, the use of cheap synthetic raw materials instead of mohair, reflections of changes in consumer tastes and preferences to the textile sector [1], in order to examine the herd of Yerköy Livestock Institute, examined the characteristics of slaughtering and carcass characteristics on 9 head male shepherds with high representative power. [2] examined the current situation of the angora goat farming and mohair production in Turkey. [3] emphasized the properties and uses of mohair. [4] discussed the current state of world goat population and production. [6] is interested in the analysis of the production

system of Turkish Ankara goat farms. The aim of this study is to determine both current economic situation and the main characteristics of Angora goat farms. For this study 100 goat farms were determined in Polatlı, Güdül, Ayaş, Beypazarı and Nallıhan in Ankara [9] made evaluations of the development of goat breeding and the situation of goat breeding in Turkey. [10] made economic analysis of the Angora goat production in Ankara. In addition, in terms of evaluation groups, 1 kg mohair cost was calculated and the factors effecting the cost were tried to be determined. Besides, the problems of mohair production in the enterprises were investigated and suggestions for the solution were developed. [11] conducted surveys with 20 enterprises in 9 villages and made evaluations in order to determine the structural characteristics of dairy goats in Çanakkale region. [12], after giving a brief summary of angora goat, emphasized a general perspective of world goat breeding. Historical development of the South African goat was given, and then the current situation of the African goat was described. [13] demonstrated the effect on the survival and growth performance of angora goat x coloured mohair goat F1 crossbreeds. [14] made economic analysis of dairy farms in Kahramanmaraş province that produce milk and breed goats. [16] investigated the history and origin of angora goat and mohair industry, in the second chapter, emphasized the biology of mohair growing, properties, evaluation, usage, preparation and marketing of mohair. [17] assessed the current state of the goat in the world and the goat meat industry in the United States and also provided the framework for future situations. [18] discussed the presence and status of angora goat as a symbol of Turkey. [19] gave general information about angora goat and mohair based productions. [22] pointed the angora goats raised in Turkey and mohair production. The aim of this study is to examine the status of angora goat breeding in Ankara, to determine the size of herd in angora goat breeding and the level of competition related to sheep breeding and to investigate the effects of feed prices on production and yield. In the barren conditions of Central Anatolia, where the world's top quality mohair is grown, ways of restoring this activity are sought. In this context, it is one of the aims of this study to identify the economic problems that limit the angora goat production and to present the solutions.

MATERIALS AND METHODS

Materials

An important part of the material used in the study was the data obtained from surveys from the agricultural enterprises engaged in angora goat breeding in Ankara. Data for 2016 and 2017 production period were collected from agricultural holdings by questionnaire.

Methods

The methods applied in the research are given below.

Method of Sample Selection

In order to determine the population of agricultural enterprises engaged in angora goat, preliminary interviews were conducted with the authorities of relevant public institutions\organizations. In the preliminary study conducted within the scope of research, the districts that could represent the province in terms of their characteristics were determined purposefully. While selecting the sample districts and villages, attention was paid to the natural factors, agricultural technique and angora goat breeding to represent the research area in terms of economic situation. The angora goat breeding farms were determined for the research. After determining the research cluster, the enterprises to be surveyed were determined by random sampling method.

Ayaş, Beypazarı and Güdül have been identified as the 3 districts that will best represent the districts in the sample and 45 enterprises have been identified as a result of the data obtained. The farms were divided into 2 layers in terms of their size. Layer limits were determined as 25-150 and 151-276 angora goats (Table 1). According to the Neyman allocation method, the number of enterprises in strata was calculated.

Table 1.Number of farms

Strafied	Width of Strata	Sampling
1. group	25-150	34
2. group	151-276	11
Total		45

Source: The Author's calculation.

Allocated for strata,

$$n_h = \frac{N_h S_h}{\sum N_h S_h} * n \quad (1)$$

Sampling size is used by,

$$n = \frac{\left(\sum N_h S_h\right)^2}{N^2 * D^2 + \sum N_h S_h^2} \quad (2)$$

where:
n stands for number of examples;
N_h: number of operations in layer h;
S_h: h is the standard deviation of the first layer;
S_h^2: variance of layer h;
N: number of farms in the population;
D^2: $(d/z)^2$.
This indicates that a sample with a diameter n is distributed in proportion to N_hS_h. This means that more sample units will be taken from a large layer and a heterogeneous layer [21].

Method applied in the survey stage

The questionnaire forms were also filled in by the researcher through face to face interviews by taking the goal of research, its scope and characteristics of agricultural enterprises into consideration.

Method used in economic analysis of the enterprises examined

In the analysis and evaluation phase of the form results, agricultural enterprises were handled with integrity and SPSS statistical program was used in the analysis process. Coefficients were used to convert to male labor unit (MLU) [7]. Animal presence is expressed in BBHB [8].

RESULTS AND DISCUSSIONS

In this phase, the population structure, land assets and saving status of the agricultural holdings and annual activity results are discussed.

Annual activity results of enterprises

Gross production value

Gross production value consists of plant production value, animal production value and productive inventory value increase [8]. Although the gross production value of the enterprises varies between 495,148.74 TL and 731,154.09 TL for business groups, it is increasing according to business groups. Gross production value is 552,838.93 TL according to the average of enterprises. According to the enterprise groups, 4.24% and 58.04% of the total gross production value is composed of vegetable gross production value and 41.96% and 95.76% constitutes animal gross production value. While the share of plant production value is 40.64% in the total gross production value, the share of animal production value is 59.36%. (Table 2).

Table 2. Gross production value in enterprises (TL)

Group	Plant production value		Animal production value		Total gross production value		Gross production value for decar
	TL	%	TL	%	TL	%	TL
1	287,369.26	58.04	207,779.47	41.96	495,148.74	100.00	2,213.10
2	30,971.36	4.24	700,182.73	95.76	731,154.09	100.00	6,254.04
Mean	224,694.22	40.64	328,144.71	59.36	552,838.93	100.00	2,797.45

Source: The Author's calculation.

Plant production value varies between 30,971.36 TL and 287,369.26 TL while animal production value varies between 207,779.47 TL and 700,182.73 TL. Plant production value is 224,697.22 TL and animal production value is 328,144.71 TL on average. Animal production value in enterprises is seen more than crop production value (Table 2). Plant, sheep and goat breeding activities in the enterprises examined and gross production value (TL) is given in Table 3. According to the average of enterprises, goat breeding activity has a share of 58.28%, vegetable production has 40.64% and sheep activity has 1.08% from gross production value. Goat activity constitutes a significant proportion of all other activities (Table 3).

Table 3. Gross Production Values Related to Plant Production, Sheep Breeding and Goat breeding (TL)

Groups	Plant production value		Sheep Breeding		Goat breeding		Total gross production value
	TL	%	TL	%	TL	%	TL
1	287,369.26	58.04	4,403.79	0.89	203,375.68	41.07	495,148.74
2	30,971.36	4.24	10,795.00	1.48	689,387.73	94.29	731,154.09
Mean	224,694.22	40.64	5,966.09	1.08	322,178.62	58.28	552,838.93

Source: The Author's calculation.

Animal production value is obtained from sheep breeding and goat breeding in the enterprises that were investigated. Animal production value varies between 207,779.47 TL and 700,182.73 TL in the enterprises. In the average of enterprises, this value is 328,144.71 TL. 97.88% of the total animal production value in the group 1 within the animal production value in the enterprises is obtained from goat breeding and 2.12% from sheep breeding, in group 2 98.46% from goat breeding and 1.54% from sheep breeding (Table 3).

While the share of mohair in animal production value in group 1 is 13.03%, this ratio is 14.37% in group 2.

This rate is 13.73% according to the average of enterprises. Productive asset value increase (PAVI) is 86.97% in group 1, 85.63% in group 2 and 86.27% in enterprises (Table 4).

Table 4. Distribution of Animal Production Value

Variables	1		2		Mean	
	TL	%	TL	%	TL	%
1.Sheep breeding	4,403.79	2.12	10,795.00	1.54	5,966.09	1.82
Meat, Milk and others	4,403.79	100.00	10,795.00	100.00	5,966.09	100.00
PDKA	0.00	0.00	0.00	0.00	0.00	0.00
2.Goat breeding	203,375.68	97.88	689,387.73	98.46	322,178.62	98.18
Mohair	26,497.74	13.03	99,055.91	14.37	44,234.18	13.73
PDKA	176,877.94	86.97	590,331.82	85.63	277,944.44	86.27
Total	207,779.47	100.00	700,182.73	100.00	328,144.71	100.00

Source: The Author's calculation.

The importance of animal production and especially goat breeding in the gross production value of the investigated enterprises is high.

Table 5. Distribution of variable cost in plant production

Groups	1	2	Mean	Mean (%)
Seed cost (TL)	20,614.71	4,496.36	16,674.67	42.96
Fertilizer cost (TL)	5,360.76	3,259.09	4,847.02	12.49
Pesticide cost (TL)	1,782.65	886.36	1,563.56	4.03
Seed clarification	14.71	0.00	11.11	0.03
Water cost	0.00	0.00		0.00
Variable machine cost (fuel- oil)	11,323.53	4,754.55	9,717.78	25.03
Temporary employment	0.00	0.00	0.00	0.00
Works with money (TL)	7,139.06	1,950.55	5,870.76	15.12
Others (TL)	176.47	0.00	133.33	0.34
Total (TL)	46,411.88	15,346.91	38,818.22	100.00

Source: The Author's calculation.

Operating costs

The total amount of costs incurred by the operator so as to obtain the gross revenue excluding the interest of active capital invested in the enterprise is called operating expenses. Costs are examined in 2 groups as fixed and variable costs [7].

Changing costs in plant production

While the changing costs in plant production according to the farm groups are 15,346.91 TL

and 46,411.88 TL, this value is 38,818.22 TL for the average of enterprises. According to the average of the enterprises, 42.96% of the changing costs in plant production is seed price, 25.03% is the machine cost (fuel, oil), 15.13% is the work done with money, 12.49% is fertilizer, 4.03% is the pesticide, 0.34% is other and 0.09% is seed cleaning costs. In the examined enterprises, the highest share was obtained from seed costs while the lowest share was obtained from seed cleaning costs (Table 5).

Variable costs in animal production

According to the enterprises groups, the changes in animal production vary between 91,127.86 TL and 263,160.36 TL. This value is 133,180.25 TL according to the average of enterprises. According to the average of surveyed enterprises, the highest share of labor costs was in the first place with 32.98%, barley-wheat meal with 23.35%, fattening or milk feed with 20,25%, veterinary costs and other expenses with 6.26%. The share of labor costs by enterprises varies between 30.91% and 35.00% and shows an increasing proportion by group. Because, according to the farm groups, the number of animals is increasing and the need for labor increases in parallel. Labor costs are increasing compared to enterprises groups. Because the importance and use of family labor and foreign labor increases as enterprises groups grow (Table 6). [23], in his study in Adana, found the labor costs as 26.40%. [18] stated that 68.3% of the total variable costs are feed costs.

Table 6. Variable cost in animal production

Variables	Groups					
	1		2		Mean	
	TL	%	TL	%	TL	%
Fattening or Milk feed	17,347.89	19.04	56,727.27	21.56	26,973.96	20.25
Bran	779.41	0.86	2,227.27	0.85	1,133.33	0.85
Barley-wheat meal	21,757.35	23.88	59,950.00	22.78	31,093.33	23.35
Fodder	2,647.06	2.90	5,681.82	2.16	3,388.89	2.54
Hay	1,208.82	1.33	1,636.36	0.62	1,313.33	0.99
Water	602.94	0.66	0.00	0.00	455.56	0.34
Salt	840.35	0.92	1,409.09	0.54	979.38	0.74
Labor cost	28,170.59	30.91	92,109.09	35.00	43,800.00	32.89
Veterinary	6,756.76	7.41	13,231.82	5.03	8,339.56	6.26
Vaccine	4,364.32	4.79	9,450.00	3.59	5,607.49	4.21
Disinfection	123.53	0.14	0.00	0.00	93.33	0.07
Lightening	29.41	0.03	0.00	0.00	22.22	0.02
Shearling	3,155.06	3.46	5,029.09	1.91	3,613.16	2.71
Cost of marketing	0.00	0.00	1,090.91	0.41	266.67	0.20
Cost of meadow	758.82	0.83	5,909.09	2.25	2,017.78	1.52
Insurance	0.00	0.00	454.55	0.17	111.11	0.08
Earring	2,583.53	2.84	8,250.00	3.13	3,968.67	2.98
Total	91,127.86	100.00	263,160.36	100.00	133,180.25	100.00

Source: The Author's calculation.

Gross profit

It is one of the most important criteria for the success of a enterprises organization [7], While the total gross profit per enterprises is between 398,915.15 TL and 560,170.95 TL, this value is 438,333.24 TL according to the average of enterprises. In total gross profit, the gross profit of plant production ranges between 2.79% and 60.40%. Gross profit followed a decreasing course according to enterprises groups. While the share of animal production gross profit in the total gross profit varies between 39.60% and 97.21% in the groups, the average share of enterprises is 57.29%. While the average gross profit of crop production is 42.41%, the gross profit of animal production is 57.59% (Table 7).

Table 7. Distribution of Gross Profit

Groups	Gross Profit in Plant Production		Gross Profit in Animal Production		Total Gross Profit	
	TL	%	TL	%	TL	%
1	240,957.38	60.40	157,957.77	39.60	398,915.15	100.00
2	15,624.45	2.79	544,546.50	97.21	560,170.95	100.00
Mean	185,876.00	42.41	252,457.24	57.59	438,333.24	100.00

Source: The Author's calculation.

While the total gross profit per enterprise is between 398,915.15 TL and 560,170.95 TL, this value is 438,333.24 TL according to the average of enterprises. According to the average of enterprises, the share of sheep breeding gross profit in the total gross profit is 0.55%, while the share of goat farming gross profit is 57.05% (Table 8).

Table 8. Distribution of Gross Profit

Groups	Gross Profit in Plant Production		Gross Profit in Sheep Breeding		Gross Profit in Goat Breeding		Total Gross Profit	
	TL	%	TL	%	TL	%	TL	%
1	240,957.38	60.40	3,152.09	0.79	154,805.68	38.81	398,915.15	100.00
2	15,624.45	2.79	42.59	0.01	544,503.91	97.20	560,170.95	2.80
Mean	185,876.00	42.41	2,391.99	0.55	250,065.24	57.05	438,333.24	42.95

Source: The Author's calculation.

Reasons for the increase or decrease in the number of goats

The reasons for increase or decrease in the number of goats in investigated enterprises are given in Table 9. According to this distribution, among the reasons for decrease in number of goats, the highest rates respectively are labor problems with 30.00%, feed prices with 26.67% and mohair prices with 25.00% in the first group while the rates in the second group respectively are feed prices with 25.00%, mohair prices with 20.00% and water problem with 15.00% and pasture problem follows (Table 9).

Table 9. The reasons for increase or decrease in the number of goats

Problems	Groups				Total
	1	%	2	%	
Getting animal for breeding	1	1.67	1	5.00	2
Feed prices	16	26.67	5	25.00	21
Mohair prices	15	25.00	4	20.00	19
Labor problems	18	30.00	2	10.00	20
Water problems	1	1.67	3	15.00	4
Excess debts	1	1.67	1	5.00	2
Yeanling product	2	3.33	0	0.00	2
Death of animals	1	1.67	1	5.00	2
Support quantity	1	1.67	0	0.00	1
High lamb prices	1	1.67	0	0.00	1
Pasture problem	3	5.00	3	15.00	6
Total	60	100	20	100	80

Source: The Author's calculation.

Use of foreign labor

It was stated that while 76.47% of the enterprises in the first group and 72.73% of the enterprises in the second group use the foreign labor force, 23.53% of the enterprises in the first group and 27.27% of the enterprises in the second group do not use foreign labor.

State supports

According to the results, it was seen that earring and mohair support were mostly used. While 41.46% of the enterprises in the first group received earring support, 41.46% received the mohair support. This rate was respectively 46.15% and 42.31% in the second group. While most of the enterprises in the first

and second group do not find the support sufficient, especially 72.73% of the enterprises in the second group do not find the support sufficient.

Agricultural credit utilization status of enterprises

It was determined from the results of the research that enterprises, using agricultural loans, use loans from more than one bank. While 43.90% of the farmers in the first group use loans from Ziraat Bank, 24.39% of them used loans from Agricultural Credit Cooperatives. In the second group, these ratios are respectively 38.89% and 33.33%. Within the scope of research, 61.76% of the enterprises in the first group used agricultural loans while this rate is 81.82% in the second group.

Satisfaction with marketing opportunities of enterprises

44.12% of enterprises in the first group are satisfied with marketing opportunities while 63.64% of them in the second group are satisfied. While 35.00% of the producers in the first group market their products through mohair, 25.5% market through cooperatives and 25.00% directly market them. In the second group, 41.67% of the producers market their products directly while the rate of marketers through cooperatives is 25.00%. According to the results, 62.22% of the enterprises in the first group can't sell their products at the desired price whereas this ratio is 63.64% in the second group.

Animal diseases

Nearly half of the enterprises in the first and second group declared that they do not find the protective measures related to animal diseases sufficient.

Main factors in the decline of goat breeding in enterprises

More than one factor was found to cause the decline of goat rearing activities in the farms. 24.24% of the enterprises in the first group indicated the shepherd problem as a reason and 24.24% showed that goat activities decreased due to the pasture problem while 29.41% of the producers in the second group indicated low mohair prices as the main factor. Other important problems are shepherd supply, feed prices, animal theft.

Reasons of decrease in mohair yield in enterprises

30.43% of the farms in the first group indicated the pasture, 23.19% showed nutritional problems, 20.29% of them took the animal health as a reason for decrease in mohair yield. In the second group these rates were respectively determined as 30.43%, 26.09% and 21.74%.

Generalization of goat breeding

Whether the generalization of goat breeding is positive or not was examined and 79.41% of the enterprises in the first group and 63.64% of the enterprises in the second group think that unemployment will be reduced and migration from village to city can be prevented by spreading goat breeding.

Import of animal products

64.71% of the enterprises in the first group and 54.55% of the enterprises in the second group think that the importation of animal products may decrease the goat rearing activity.

State expectations about the goat enterprises activities

Within the scope of research, the expectations of enterprises from the government about goat activity; 22.95% of the enterprises in the first group and 21.05% of the enterprises in the second group stated that supports should be improved. Besides, finding solution for the pasture problem, (13.11% in the first group; 15.79% in the second group) and increasing the mohair purchase prices (11.48% in the first group; 15.79% in the second group) is expected.

Willingness to continue goat activity

While 91.18% of the enterprises in the first group are considering continuing the goat business, 90.91% are thinking about continuing in the second group.

Production of too fine wool and mohair

According to the production of too fine wool and mohair, 82.35% of the enterprises in the first group and 54.55% of the enterprises in the second group are producing wool and mohair.

Where mohair processing is evaluated

While 44.13% of the enterprises in the first group to Tiftikbirlik, 38.24% to cooperative, 14.71% directly and 2.94% of them evaluated via intermediary; 36.36% of the enterprises in the second group with Tiftikbirlik, 27.27%

with cooperative, 27.27% directly and 9.09% of them evaluated via intermediary.

Thoughts on mohair support purchases

50% of the enterprises in the first group says supports should be higher, 32.35% doesn't want to settle for the price determined by the mohair union, 8.82% are content with the supports, 5.88% find the prices quite good even without supports and 2.94% declare that project support criteria must be decreased, whereas 54.55% of the enterprises in the second group are happy with the supports, 36.36% says supports must be higher, 9.09% of them state that project support criteria must be decreased.

Considerations in purchases made by Tiftikbirlik

Here are the following points taken into consideration in the purchases made by Tiftikbirlik: while 36.62% of the enterprises in the first group state the color and 28.17% say cleanliness are taken into consideration, this rate is respectively 47.62% and 23.81% in the second group.

CONCLUSIONS

As a result, in this research, the districts covered are the places where angora goat farming is intense and the profitability increases especially as the enterprises grow. Considering the strong sides of Ayaş, Beypazarı and Güdül, such as; education, population and proximity to Ankara, thanks to the contribution of angora goat farming, production pattern might be diversified according to needs and market, and employment, agricultural income of the region can be increased. Also by increasing the efficiency and quality of mohair, it seems inevitable for Turkey to be a brand. This advantage should not be ignored in the region with natural conditions suitable for high quality mohair.

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ENERGY DEMAND FORECAST FOR TURKISH AGRICULTURE SECTOR: GRANGER CAUSALITY AND COINTEGRATION TEST

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Abstract

Due to the fact that, Turkey is a importing energy, we must determine the energy needs in the Turkish agricultural sector. In this study, consumed energy data in agriculture was used between 1972 and 2015 years. According to Turkish Statistical Institute's database, agriculture sector shares in GDP 6.2 percent in 2016 and percentage change compared to same period in previous year -0.1 percent. Agriculture sector shares in GDP 6.1 percent in 2017 and percentage change compared to same period in previous year 17.2 percent. Gross domestic product increased by 5.2% compared with the same quarter of the previous year in the second quarter of 2018. When the activities which constitute gross domestic product were analysed the total value added decreased by 1.5% in the agricultural sector compared with the same quarter of the previous year in the chained linked volume index. Trend model was used to energy trend in the econometric analysis of this study. Granger causality analysis results show that one-way causality relation at 5% level of significance towards GDP denoted EC was detected.

Key words: *agriculture, energy, granger causality, cointegration test*

INTRODUCTION

There is a linked with energy consumption and growth has been extensively studied in the literature. And, it is very important a debate about the direction of causality between these two variables. That is, there is no consensus on whether economic growth will lead to energy consumption or whether energy consumption is a locomotive for economic growth. The pace of economic development and the standard of living are two determinants of energy demand. The growth in total energy demand will reflect the changing energy intensity in each end use, which is a reflection of the changing nature of production and consumption in an economy. In particular, the energy elasticity of the energy demand falls while the development of the countries is moving out of the industrialization phase [12]. Turkey's energy supply is based on imports. In the last decade, three quarters of Turkey's primary energy consumption was met through imported sources. Other sectors are not taking place until the effective implementation of energy efficiency with a 6% share in Turkey's overall energy consumption [2]. There are some national and international studies about agricultural gross domestic product, agricultural credits and the energy consumed in agriculture are as follows. [14], [3], [15], [13], [1], [16], [6].

MATERIALS AND METHODS

Materials

At the first stage of the analysis, the stationarity test was performed and it was investigated whether there was time effect on the variables I examined. In order to perform the Granger causality analysis, the series belonging to the variables must be stationary. The unit root test is a valid test used to determine the degree of stationary. The most commonly used unit root tests in the analyses are Dickey Fuller test (DF), Augmented Dickey Fuller test (ADF) and Philips-Perrron test (PP). In this study, ADF was used to test the stability of the variables. In the ADF unit root test, the Akaike Information Criteria (AIC) was used to determine the optimal number of delays.

Methods

The cointegration test investigates the existence of a long-term relationship among the variables studied and this test investigates

whether two stationary time series on the same scale move together in the long run. Namely, if series are stable at the same level, there is a long term relation between the series. The Johansen Cointegration test developed by [9] and [10] was used in this study to test for the existence of a cointegration relationship between agricultural gross domestic product (fixed prices) and consumption energy in the agriculture. If a cointegration state arises between our series, it can be said that at least one of these variables is causality.

The empirical results presented in this paper are calculated within a simple Granger-causality test in order to test whether Agricultural Gross Domestic Product (GDP) (at fixed prices) "Granger cause" Energy consumption in agriculture (EC) and vice versa. Thus, the following two equations can be specified (Mahdavi and Sohrabian, 1991).

$$(GDP)_t = \propto + \sum_{i=1}^{m} \beta_i (GDP)_{t-i} + \sum_{j=1}^{n} \tau_j (EC)_{t-j} + \mu_t$$

$$(EC)_t = \theta + \sum_{i=1}^{P} \phi_i (EC)_{t-i} + \sum_{j=1}^{q} \psi_j (GDP)_{t-j} + \eta_t$$

Model estimation was done using Eviews 7.0 Econometrics package program. Unit root test analysis is estimated using Augmented Dickey Fuller and later VAR coefficients are estimated using Ordinary Least Squares (OLS) regression.

Causality

[11] emphasized that Although it is not exactly the same, causality is closely related term to the idea of cause-and-effect. In other words, if you find Granger causality in your data, there is not a causal link in the true sense of the word. When Econometricians say "cause" what they mean is "Granger-cause," although a more appropriate word might be "precedence". [8] proposed a time series data based approach in order to determine causality.

There are three different types of situation in which a Granger-causality test can be applied:

-If a simple Granger-causality test, there are two variables and their lags;

-If a multivariate Granger-causality test more than two variables are included, because it is supported that more than one variable can influence the results;

-Finally, Granger-causality can also be tested in a VAR framework, in this case the multivariate model is extended in order to test for the simultaneity of all included variables [7].

RESULTS AND DISCUSSIONS

In this study, agricultural gross domestic product (GDP) at fixed prices and energy consumption in agriculture (EC) data were used. GDP values are fixed and Turkish Liras. It has been compiled from Turkish Statistical Institute. Energy consumption in agriculture values are taken by Ministry of Energy.

In this study, constant prices of agricultural gross domestic product in Turkey were examined is whether the causality between energy consumed in agriculture. For that reason, Granger causality test is used. This test is the most preferred method because of its ease of implementation. Descriptive statistics of the variables were calculated and given in Table 1.

Table 1. Descriptive Statistics for GDP (Turkish Lira) and EC (000 tons)

Variables	Number of Observations	Mean	Median	Std. Dev.	Minimum	Maximum
GDP	18	9.81E+09	9.57E+09	1.26E+09	8.15E+09	1.25E+10
EC	18	3826.78	3728.76	984.23	2827.06	6754.65

Source: The Author's calculation.

The lag lengths for all estimated models in this study were selected by Augmented Dickey-Fuller [4] [5]. Critical levels of these models (three models: intercept and trend, intercept and none, none) 1%, 5% and 10% were used to determine whether differences were significant. Based on the results of these tests, a lag length of five years was used for all the estimations in this study. The results of the lag length determination are given below in detail:

Fixed GDP Series (GDP): It is developed by Augmented Dickey Fuller (ADF) τ_τ, τ_μ and τ unit root test and implemented for GDP series. While ADF unit root is implementing, hypothesis are given below for every three model:

$$H_0: \delta = 0$$
$$H_0: \delta < 0$$

First, model is estimated by general situation and if error term has serial correlation, lagged values for dependent variables are added the model later we overcome this serial correlation problem. In line with, we use the specific approximations to show the phase of process.
After estimating the model as general form (intercept and trend model), (we don't add any lagged values) calculated AIC results are given below (Table 3).
Lag value is p = 1. In this situation, we can start to implement the unit root test analysis. By using the lag value p = 1, OEKK estimation results for ADF unit root test are given in Table 2 and Table 3.

Table 2. Correlogram of D (GDP)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.35	-0.35	2.59	0.11
. |* . |	. | . |	2	0.13	0.01	2.96	0.23
. | . |	. | . |	3	-0.05	-0.01	3.03	0.39
. | . |	. | . |	4	0.06	0.04	3.12	0.54
. | . |	. | . |	5	-0.06	-0.03	3.23	0.67
. |* . |	. |* . |	6	0.13	0.11	3.77	0.71
. | . |	. |* . |	7	0.06	0.17	3.88	0.79
. | . |	. |* . |	8	0.04	0.11	3.92	0.86
. *| . |	. *| . |	9	-0.16	-0.14	4.88	0.85
. *| . |	.**| . |	10	-0.07	-0.23	5.08	0.89
. |* . |	. | . |	11	0.13	0.07	5.99	0.87
.**| . |	. *| . |	12	-0.21	-0.17	8.74	0.73

Source: The Author's calculation.

Developing by Dickey-Fuller (DF) tables, %1, %5 and %10 significant levels and for T=18 values and statistics values and value are compared. According to this, values and statistics values are compared, we can reject H0 hypothesis for (Intercept and none) and none level of significance. Series is stationary or not include unit root (Table 3).

Table 3. Unit root test results for first difference of GDP series

Level of significance	**Intercept and trend** $t_{\hat{\delta}}$ **=-2.61**	**Intercept and none** $t_{\hat{\delta}} = -3.53$	**None** $t_{\hat{\delta}} = -4.43$
1%	-3.92	-4.67	-2.71
5%	-3.07	-3.73	-1.96
10%	-2.67	-3.31	-1.61
DF Statistics	$t_{\hat{\delta}} > \tau_{\tau}$	$t_{\hat{\delta}} < \tau_{\mu}$	$t_{\hat{\delta}} < \tau$
Decision	H_0 Accept	H_0 Reject	H_0 Reject

Source: The Author's calculation.

As a conclusion, GDP series are not stationary for level but after taking first difference of series, this series are stationary. For that reason, we can say that GDP series are first difference integrated I (1) (Table 3).
Energy Consumption Series (EC): It is developed by Augmented Dickey Fuller (ADF) τ_{τ}, τ_{μ} and τ unit root test and implemented for EC series. While ADF unit root is implementing, hypothesis are given below for every three model:

$$H_0: \delta = 0$$
$$H_0: \delta < 0$$

First, model is estimated by general situation and if error term has serial correlation, lagged values for dependent variables are added the model later we overcome this serial correlation problem. In line with, we use the spesific approximations to show the phase of process.

Table 4. Correlogram of D (EC)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.35	-0.35	2.55	0.11
. *| . |	.**| . |	2	-0.11	-0.26	2.80	0.25
. | . |	. *| . |	3	-0.01	-0.18	2.81	0.42
. | . |	. *| . |	4	-0.02	-0.16	2.82	0.59
.**| . |	***| . |	5	-0.25	-0.46	4.59	0.47
. |* . |	.**| . |	6	0.16	-0.34	5.33	0.50
. |* . |	. *| . |	7	0.19	-0.11	6.55	0.48
. *| . |	. *| . |	8	-0.09	-0.19	6.86	0.55
. | . |	. *| . |	9	0.01	-0.19	6.87	0.65
. | . |	.**| . |	10	-0.03	-0.32	6.92	0.73
. | . |	. *| . |	11	0.03	-0.20	6.97	0.80
. | . |	. | . |	12	-0.02	-0.06	7.00	0.86

Source: The Author's calculation.

After estimating the model as general form (intercept and trend model), (we don't add any lagged values) calculated AIC results are given below (Table 5).

Table 5. Unit root test results for first difference of EC series

Level of significance	**Intercept and trend** $t_{\hat{\delta}}$ **=-4.28**	**Intercept and none** $t_{\hat{\delta}} = -4.44$	**None** $t_{\hat{\delta}}$ **=-5.28**
1%	-4.89	-4.06	-2.71
5%	-3.83	-3.12	-1.96
10%	-3.36	-2.70	-1.61
DF Statistics	$t_{\hat{\delta}} < \tau_{\tau}$	$t_{\hat{\delta}} < \tau_{\mu}$	$t_{\hat{\delta}} < \tau$
Decision	H_0 Reject	H_0 Reject	H_0 Reject

Source: The Author's calculation.

Lag value is p = 4. In this situation, we can start to implement the unit root test analysis. By using the lag value p = 1, OEKK estimation results for ADF unit root test are calculated and shown in Table 4 and Table 5.

Developing by Dickey-Fuller (DF) tables, %1, %5 and %10 significant levels and for T=18 values and τ_τ, τ_μ and τ statistics values and $t_{\hat{\delta}}$ value are compared. According to this, $t_{\hat{\delta}}$ values and τ_τ, τ_μ and τ statistics values are compared, we can reject H_0 hypothesis for (Intercept and none) and none level of significance. Series is stationary or not include unit root (Table 5).

As a conclusion, EC series are not stationary for level but after taking first difference of series, this series is stationary. For that reason, we can say that EC series is first difference integrated I(1) (Table 5).

Since the variables are at the same level of stability, the long-term relationship is to be examined. In this context, the Johansen cointegration test was used to investigate the existence of a long-running relationship between the two series. The results of this test are given in the following Table 6.

Table 6. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-425.36	Na	1.12e+24	61.05	61.14	61.04
1	**-408.87**	**25.90***	**1.91e+23**	**59.26**	**59.54***	**59.24**
2	-403.71	6.64	1.70e+23*	59.10	59.55	59.05
3	-400.04	3.67	2.04e+23	59.14	59.78	59.08
4	-396.43	2.57	2.86e+23	59.20	60.02	59.12
5	-388.67	3.32	3.10e+23	58.66*	59.67	58.57

Source: The Author's calculation.

At the 0.05 critical value, trace statistic and maximum eigenvalue statistic show that there is no cointegration rank (Table 7 and Table 8). Granger causality analysis results were given in Table 8. These results stressed that one-way causality relation at 5% level of significance towards GDP denoted EC was detected. In this manner, we can say that Turkey is dependent on the energy sector in the agricultural sector to grow.

Table 7. Johansen Integration Test Summary

Null Hypothesis (H_0)	Eigenvalue	Trace Statistic	0,05 Critical Value
r = 0	0.47	12.54	18.40
r ≤ 1	0.09	1.76	3.84
Null Hypothesis (H_0)	Eigenvalue	Maximum Eigenvalue Statistic	0.05 Critical Value
r = 0	0.47	10.78	17.15
r ≤ 1	0.09	1.16	3.84

Source: The Author's calculation.

After taking first difference of GDP series, this series are found in stationary. We can say that GDP series are first difference integrated I(1). EC series are not stationary for level but after taking first difference of series, these series are stationary and first difference integrated I(1). In this context, the Johansen cointegration test was used to investigate the existence of a long-run relationship between the two series. According to Granger causality analysis results, one-way causality relation at 5% level of significance towards GDP denoted EC was detected. In this case, it is possible to say that Turkey is dependent on the energy sector in the agricultural sector to grow.

Table 8. Pairwise Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob.	Decision
D (EC) does not Granger Cause D (GDP)	16	0.45	0.65	Accept
D (GDP) does not Granger Cause D (EC)		5.72	0.01	Reject

Source: The Author's calculation.

CONCLUSIONS

There are many objectives to implementation of national energy efficiency in Turkish agriculture sector that determined in under Action Plan 2017-2023. Some of them are using of energy-efficient tractors and harvesters, determining to effective method of irrigation methods by lands, energy efficient projects by supported, knowledgeable use of renewable energy resources in agricultural production by farmers, determining of waste potential to produce biomass and promoting its use in agriculture sector. If we implement to these measurements in agriculture sector, we can gather to success in Turkish agriculture sector.

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THE PROBLEM OF INVESTMENT ATTRACTIVENESS OF THE NATIONAL ECONOMY OF THE REPUBLIC OF MOLDOVA

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Abstract

This article addresses the issue of investment attractiveness at the macroeconomic level. Some definitions of this economic category are given. In practical aspect, the author envisages the state of the investment environment in the Republic of Moldova of two three-year periods, covering three years of implementation of the National Strategy to attract investments and promote exports for the period 2016-2020 and three previous years. The structure of investments in long-term tangible assets, in the context of terms of ownership, sources of financing, types of activity is studied in detail. Special influence is given to foreign direct investment, its dynamics for the period of the last three years and in comparison with their values described in the above-mentioned strategy. The investment quote per head of population in the Republic of Moldova and in neighbouring countries Ukraine and Romania is reported. The results of the Doing Business report are presented, showing the place of the Republic of Moldova in the international rating, which includes 190 countries. The most attractive spheres for foreign capital are considered banking system and re-employment industry, as well as the reasons for this interest are indicated. The main problems that limit the inflow of investments into the economy of our state have been identified, the elimination of which would contribute to improving the investment climate in the country and increasing investment attractiveness.

Key words**:** *assets, attractiveness, investment, strategy*

INTRODUCTION

The successful development of the economy of any State depends on a large extent on the effectiveness of investment activity. Investment has a range of positive effects on the micro and macroeconomic levels. Thus, at the microeconomic level, production is modernizing, new technologies are developing, which contribute to increasing the volume of production of goods and services, improving quality and reducing costs per unit of production. All these effects contribute to the increase of income, profit and profitability of the financial and economic activity of the enterprise.

The results of investment activity at the macroeconomic level are reflected in the growth of revenues of the national budget, the increase in employment of the population, the provision of stable incomes for citizens of the state. However, it should be mentioned that the development of investment activity is determined by the investment attractiveness of the economy of the state or its sectors.

MATERIALS AND METHODS

In order to exam the problem of attraction of investment in different forms for dynamic economic developing in Republic of Moldova, the appropriate data was used, mainly reflected in statistical reports in our country. This information was studied over the period 2013-2018. During this research the methods were used: analysis, synthesis, monographic, average values, others.

RESULTS AND DISCUSSIONS

Analysis of special economic literature has shown that there is not yet a single point of view on the definition of the term "investment attractiveness."It should be mentioned that the authors distinguish between "investment attractiveness of the region" and "investment attractiveness of the enterprise."

In the context of this article, we are going to look at the investment attractiveness of the region and give a number of its definitions.

Thus, according to [5, 8] regional investment attractiveness is represented by a system of

existing opportunities, signs and means, which determine the potentially solvent demand for the implementation of investments in a particular country (or industry). We consider this point of view to be very correct, as it is always important for the investor to know that the invested capital will receive a proper return under certain conditions [5, 8].

On the other hand, investment attractiveness is interpreted as a set of facts: geographical, economic, natural, political, social. Knowledge of these factors allows the investor to make his idea of the investing feasibility in the objects of the region, industry, country [9].

There is another position on this issue. Thus, according to Savenkova E.V. it is possible to equalize the concepts of ”investment attractiveness” with the concept of ”investment entrepreneurship.” Savenkova E.V. argues this identification by the connection of efficiency of investments and their attractiveness [6]. This is a fair assessment, but we consider this approach to be generalized, as it applies equally to investment attractiveness of the region, and to investment attractiveness of the enterprise.

The investment attractiveness at the macroeconomic level is defined by such factors as:

-a political situation in the country or the region;

-economic situation (GDP level, accumulation of the capital, volume of investment, etc.);

-a condition of the regulatory and legislative base regulating investment activities;

-tax system;

-level of investment risks [7].

In the Republic of Moldova special attention is paid to a problem of development of investment activity at the macroeconomic level. So for the last four years National strategy of investments attractiveness and promotion of export for 2016-2020 is carried out [4].

This strategy is directed to overcoming technological lag from the developed countries and building due to this export potential. The important role in the solution of these problems comes down to attraction of direct foreign investments [4]. The author conducted a research of a condition of investment activity during 2013-2018, divided into two intervals – before strategy introduction (2013-2015) and its realization (2016-2019).

Table 1. Dynamics of the main macroeconomic indicators in the Republic of Moldova

Indicators	Overall average of 3 years	
	2013-2015	2016-2018
1. Gross domestic product, bln. lei	114.7	165.4
2. Gross capital formation, bln.lei	27.2	37.2
3. Long-term investments, bln. lei	20.5	23.5
4. The proportion of long-term investments in gross domestic product, %	18.3	14.3

Source: developed by the author on the basis of statistical data [1].

Analysis of the dynamics of the main economic indicators in the Republic of Moldova makes it possible to conclude the following:

Firstly, the growth is found in all absolute indicators. The gross domestic product during the period of implementation of the Strategy grew by 48.1% compared to the previous three-year period, achieving its highest point in 2018, and amounted to 184.8 billion lei. Gross capital formation amounted to 41.4 billion lei in 2018. This indicator has increased by 37% over the last three years compared to the previous three-year period. Investments in long-term assets increased by 14.6% in 2016-2018 and amounted to 27.5 billion lei in 2018.

Secondly, a decline in relative indicators is noticed. The proportion of the second indicator in the first from table 1 decreased slightly, although the initial indicators have increased. The proportion of invested capital in total domestic product became 2 times less than previous indicator. It is necessary to note, that in 2011 the proportion of investment in general internal production had marked a maximal value, practically reaching a fifth part.

The share of long-term investments in gross capital formation was 75% in 2013-2015, while during the implementation of the Strategy - 65%, having decreased by 10 percentage points.

The analysis of investment activity involves its examination in terms of ownership forms.

Table 2. Structure of investment in long-term tangible assets by ownership forms (%)

Share of long-term assets by forms of ownership:	Overall average of 3 years	
	2013-2015	2016-2018
a) public	33.70	30.33
b) private	47.7	48.6
c) mixed – without foreign participation	0.5	0.4
d) foreign	7.6	10.7
e) common enterprises	9.5	10.0
Sum total:	100	100

Source: developed by the author based on data from the National Bureau of Statistics [1].

Table 2 shows that during the period of implementation of the National Strategy there were no significant changes in the structure of investments in long-term tangible assets.
About half of them comes from private form of ownership and about third from public ownership. Common enterprises account for 10%. Looking at the structure of investments in dynamics, it can be noted that public investments decreased by 3.4 percentage points and foreign investments increased by 3.1 percentage points. The remaining structural indicators remained unchanged. It should be noticed that the share of mixed enterprises has decreased significantly during the past decade. In 2009, they accounted for 18% of total investments in long-term tangible assets.

Table 3. Structure of investments in long -term tangible assets by source of financing in the Republic of Moldova (%)

Source of financing	Overall average of 3 years	
	2013-2015	2016-2018
Investments in long-term tangible assets - sum total	100	100
Financed from the budget of: a) the state	8.7	7.1
b) administrative territorial units	4.5	5.2
c) own funds	58.3	63.9
d) foreign funds	6.9	6.2
e) other funds	21.3	17.6

Source: developed by the author based on data from the National Bureau of Statistics [1].

The important issue in investment activity is considered the source of financing as presented in Table 3.
The information provided in Table 3 shows that more than half of investments in long-term tangible assets have been realized from the own funds of active economic agents, and during the period of implementation of the National Strategy their share has increased by 5.6 percentage points.
Financing from the State budget is less than 10%, although in 2018 it reached the point 10.5% and in 2016 it was 4.5%. The distribution of investments by type of economic activity is of interest.

Table 4. Structure of investments in long-term tangible assets by main types of activity in the Republic of Moldova (%)

Types of activity	Overall average of 3 years	
	2013-2015	2016-2018
1. Agriculture, forestry and fish industry	9.7	9.8
2. Food and pharmaceutical industries	12.7	13.0
3. Production and supply of electric power, heat, gas and hot water	4.7	5.0
4. Construction	10.3	12.4
5. Wholesale and retail trade, technical maintenance and vehicle repair	12.3	11.6
6. Information services and communication	7.2	6.5
7. Transactions with immovable property	13.8	8.6
8. Transport and storage	4.8	5.7
9. Social sphere*	24.5	27.4

Source: developed by the author based on data from the National Bureau of Statistics [1].
*The indicator "social sphere" represents investments made in health care, education, public administration and defense, etc.

The information, presented in Table 4 shows, that above 20 per sent of real capital investment were made in sphere of social development. It is important to say, that this proportion increased by 2.9 percentage point in the period of National Strategy realization. In the economic sphere can be noticed the following investments in the last three years: food and pharmaceutical industry (13%), construction

(12.4%), wholesale and retail trade, vehicle maintenance and repair - 11.6 % and almost 10% - agriculture, forestry and fish industry. There have been no significant changes in the noted sectors of our national economy. At the same time the value of investment, made in real estate decreased by above 5 percentage points, and there is a small increasing of investment in sphere of transport and storage (by 0.9 %).

This information is self-explanatory. The decline in foreign direct investment began in 2008. The economic crisis has affected the confidence of foreign investors in the ability to rebuild the economies of developing countries, including the Republic of Moldova.

The level of foreign direct investment per capita in the Republic of Moldova is US $1,052, while in the neighbouring countries Ukraine and Romania US $1,696 and US $3,899, respectively. The lag is noticeable, the level of our country is 3.8% lower than Ukrainian and 3.7 times lower than in Romania [2, 3].

The reasons for the lack of foreign direct investment are known: political and economic instability, especially in the tax policy. Tax legislation is often interpreted differently. Entrepreneurs have distrust of justice and the judiciary. There are cases of abuse by supervisory authorities. There is monopoly practice and disloyal competition [www.1new.md/economica].

Banks are the most attractive to foreign investors, accounting for about a third of investment and the processing industry - about a fifth of all foreign investment. These trends are not random, as the banking sector is exposed to less risks because of its strict schedule. And the food and pharmaceutical industry mainly works on imported subcontracting raw materials and is focused on marketing finished products on the European market [www.1new.md/economica].

It should be noted that according to the latest Report of World Bank the place of the our country in international ranking, that has covered one hundred ninety states became slightly worse, than for example two years ago. If to compare with data of 2018, the place of the Republic of Moldova has gone down and now the country is on 47th place. The evaluation was carried out according to 10 indicators. There was an improvement in the indicator "business setting up." If in 2018 the Republic of Moldova was on 7th place, in 2019 - on 14th place. But on such indicators as obtaining a building permit, access to credit resources, access to electricity, registration of property rights, payment of taxes and execution of contracts, the Republic of Moldova received worse ratings than in 2018 [10].

CONCLUSIONS

The analysis of the investment environment in the economy of the Republic of Moldova makes it possible to conclude that our state should work further to improve the investment climate and increase investment attractiveness. The analysis of the macroeconomic situation showed that the results obtained during the three years of implementation of the National Strategy to attract investments and promote exports for the period 2016-2020 did not reach the expected level. The state has problems related to tax regulation, observance of the rights of participants in the investment process, which hinders the inflow of investments into the economy of the country.

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ASSESSMENT OF INFLUENCE OF SPATIAL ORGANIZATION OF THE TERRITORY ON ECONOMIC EFFICIENCY OF AGRARIAN ENTERPRISES

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Abstract

The article substantiates the need for analysis of the mutual influence of agricultural production and spatial organization of the territory when planning economic activity. By means of correlation and regression analysis, the factors of spatial organization of the territory that have the strongest influence on the economic efficiency of agricultural production are selected, using agrarian enterprises in the Kyiv region of Ukraine as an example. As an performance indicator of the economic efficiency of agrarian enterprises, the volume of gross agricultural output (in constant prices of 2010) is proposed. For the analysis of factor signs, the following indicators were used: coefficient of ecological stability of the territory; slope coefficient; land use size; level of agricultural cultivation of the territory. As a result, economic and mathematical dependences of changes in gross agricultural output from the above factors are obtained. For a more detailed analysis of the influence of significant factors on the indicator of economic efficiency, a linear multiple regression model was constructed. The proposed equations for the dependence of indicators of economic efficiency and spatial organization of the territory make it possible to adjust environmental and economic indicators in the process of spatial planning of agrarian enterprises. In order to identify the dependence of the spatial parameters of the organization of the territory of agrarian enterprises and the effectiveness of their functioning, we have grouped the farms of the studied region according to the size and level of ecological stability of the territory.

Key words**:** *spatial, organization, territory, economic efficiency, assessment, agricultural, enterprises*

INTRODUCTION

The current state of agriculture in Ukraine is characterized by an increase in anthropogenic pressure on the environment, accompanied by disturbances in the ecological and economic balance and a decrease in the efficiency of agrarian production as a whole. These trends are largely a consequence of the development of the agricultural sector without taking into account the negative environmental consequences in recent years under the influence of market reforms during modern land and agricultural reforms. In this regard, the problem of increasing the efficiency of agricultural production through its greening, starting with the organization of the rational use of natural resources as fixed assets, is of particular relevance. The final result of agricultural production depends on many natural factors, one of the most important is the spatial nature of agroecosystems, which characterizes the environment and conditions of agricultural production, and also plays a decisive role in the development of rural areas. At the same time, an unbalanced land use structure and ecological imbalance of the land fund significantly worsen the efficiency of land use and protection, the natural ability of soil cover to self-repair, and lead to depletion of the species diversity of the flora and fauna of landscapes.

However, one can single out the positive influence of individual spatial factors on the

efficiency of agricultural production, in particular, an increase in the level of plowing (that is, a change in the landscape structure) increases the area of arable land, and hence the increase in gross output per unit of agricultural land.

A distinctive feature of the spatial organization of the territory of agrarian enterprises is the achievement of an optimal ratio between arable land, meadows, forests and water areas, an increase in the diversity of crops on the land area, the introduction of adaptive crop rotation and their differentiated placement [5; 6; 8].

In recent years, in scientific circles more and more attention has been paid to the study of the organization of the territory of agricultural enterprises on an agrolandscape basis, since agrolandscapes, as the only component of nature, work on agricultural lands. The agrolandscape approach aims to develop mechanisms for the formation of sustainable agrolandscapes by adverse natural phenomena and anthropogenic stress, as well as resource-saving technological approaches to the processing of crops. At the same time, the greatest efficiency in applying this approach can be achieved if it is implemented within the framework of an integrated scientifically based system of agricultural nature management, which allows optimizing the set of environmental elements of the territorial structure of agrolandscapes and economic conditions of agricultural production [2, 4]. Therefore, in modern economic conditions, balanced agricultural production is difficult to imagine without environmental and economic justification and rational spatial organization of land use.

In particular, Dissart J. and Vollet D. in their work [2, p. 568] investigated the influence of a number of agrolandscape factors of land use organization on the efficiency of agricultural activities. The representative of the agroecological direction of economic research Harashchenko T. [3] systematized the spatial factors of agricultural production and analyzed their influence on the formation of land use. However, despite the rather comprehensive study of these problems, the structural formation of land use and the organization of the territory of agrarian enterprises remain controversial. In this aspect, conclusions from Hutsuliak H. and Hutsuliak Yu. are "noteworthy that increasing the economic efficiency of any agrarian enterprise is impossible without solving ecological and landscape problems" [4, p. 18].

In general, the spatial organization of the territory is aimed at improving the quality of land use, which is manifested in their balance, the formation of a stable and balanced state within the agroecosystems of agrarian enterprises. However, under the current market conditions of management, the primary goal of the functioning of any enterprise is to obtain the maximum amount of profit. Therefore, there is a need to identify the influence of the spatial organization of the territory on the efficiency of managing agrarian enterprises.

MATERIALS AND METHODS

One of the most difficult tasks in the process of organizing the territory is to determine the necessary environmental measures that should be applied to improve the general ecological condition of agrolandscapes and ensure the stability of agricultural land. The existing indicators for determining the stability of the territory, in our opinion, do not give a complete picture of the implementation of these measures, but generally evaluate this or that environmental aspect. Given this, we propose to calculate indicators characterizing the potential possibilities of the effectiveness of agrolandscapes, taking into account the environmental conditions and the anthropogenic potential of the territory.

To assess the influence of spatial factors on the economic efficiency of agrarian enterprises, we propose to establish the relationship between spatial and economic indicators by evaluating various calculated and statistical data. It is recommended that economic and mathematical methods of analysis be used to identify the relationship between factor and resulting indicators, in particular, correlation and regression analysis [14, p. 127]. This analysis provides the identification of the main factors of dependence, reflecting a quantitative assessment of the degree of connection between the factors.

Studies were conducted on statistical indicators of agrarian enterprises in the Kyiv region of Ukraine and the calculated values [13]. Among the spatial parameters during the evaluation, the following indicators were considered [1, 6, 7, 10]: coefficient of ecological stability of the territory; slope coefficient; land use size; level of agricultural cultivation of the territory. These indicators, in our opinion, reflect the general spatial characteristics of land use by enterprises. The gross agricultural output per 100 ha of agricultural land was selected as the resulting indicator, which, in our opinion, most characterizes the efficiency of agrarian production.

Using correlation and regression analysis, we established a relationship between indicators characterizing the factors of spatial organization of the territory and the volume of gross agricultural output per 100 hectares of agricultural land, which are described by the linear equation:

$$y = ax + b, \quad (1)$$

y - the volume of gross agricultural output per 100 hectares of agricultural land;
x - the factors of spatial organization of the territory;
a, b - constant coefficients of a linear equation.

RESULTS AND DISCUSSIONS

Indicators of mathematical dependencies of changes in gross agricultural output from the studied spatial factors, namely, correlation and determination coefficients, constant coefficients of the linear equation (a, b) are shown in Table 1.

Table 1. The values of regression coefficients of the influence of factors of spatial organization of the territory on the gross agricultural output in agrarian enterprises of the Kyiv region, 2008-2018

Index	Constant coefficients of the linear equation		Correlation coefficient	Determination coefficient
	a	b		
Coefficient of ecological stability of the territory	-942.6	748.58	-0.75	0.56
Slope coefficient	-213.11	592.46	-0.81	0.66
Land use size	0.368	73.6	0.83	0.69
Level of agricultural cultivation of the territory	8.817	-306.0	0.84	0.71

Source: formed by the author according to The Main Department of Statistics in Kyiv region.

The closest relationship for analyzed factors is observed between volume of gross agricultural output and level of agricultural cultivation of the territory. According to linear regression, the Pearson correlation coefficient (0.84) shows strong and direct relationship between them. The determination coefficient (0.71) indicates that 71% of cases of all changes in volumes of gross agricultural output are due to changes in level of agricultural cultivation of the territory, that is, the selection accuracy in the regression equation is sufficient. Linear regression demonstrates (with a 71% probability) that an increase in level of agricultural cultivation of the territory per 1% corresponds to an increase in gross agricultural output by 8.817 thousand UAH per 100 hectares of agricultural land.

The close relationship between the indicators of development of the territory and the volume of gross agricultural output is explained by the extensiveness of agricultural production due to an increase in arable land and as a result of increased crop yields. Indeed, as a result of the increase in arable land and sown areas, the efficiency of agricultural activity increases, however, domestic and foreign practice shows [5, 10, 15] that extensive production not only leads to excessive depletion of soils and loss of their fertility, but also leads to a decrease in productivity or even loss in the future.

For a more detailed analysis of the influence of these factors (with the exception of less influential ones) on the gross agricultural output, a linear multiple regression model was constructed. The results showed the existence

of a close relationship between factor and effective traits (correlation coefficient R = 0.83). The resulting regression equation has the form:

$$y = 141.9 – 106.2x_1 + 0.192x_2 + 2.89x_3, \quad (2)$$

y - volume of gross agricultural output per 100 hectares of agricultural land;
x_1 - slope coefficient;
x_2 - land use size;
x_3 - level of agricultural cultivation of the territory.

The value of the coefficient of determination (0.69) indicates that 69.0% of the variation of the dependent variable is due to the factors introduced into the correlation model and the rest to other factors that are not taken into account.

In the process of organizing agricultural land use, it is important to improve and rationalize the management model – a specific algorithm for implementing methods and methods for ensuring each specific land use. The indicated model in the system of objective management assessment using a clear distinction between the effects of objective and subjective factors on the productivity of agricultural production allows us to identify promising areas for increasing production efficiency and to provide comparisons of certain economic indicators.

It is also worth noting that the high rate of development of labor tools and technologies in agriculture, along with an increase in the anthropogenic pressure on the environment, makes it difficult to identify an objective correlation between extended and economic indicators. This is due to the expansion of innovative agricultural technologies, crop varieties, the use of the latest organic and mineral fertilizers, the improvement of tillage methods, agricultural equipment, the use of chemical pest control agents, the organization of land conservation activities, etc.

This is of particular importance for agriculture, since this sector of social production, like no other, is closely linked to living and non-living objects of the environment. Therefore, in modern conditions, the state of the environment depends to a large extent on ensuring the greening of agricultural production, during which the introduction of environmental and legal requirements in all stages of agricultural activity [11, 15].

Features of the rational spatial organization of the territory are caused by established norms on the interdependence of agricultural activity and a particular territory, the formation of the best ratios of the production structure and the corresponding territorial distribution, and improvement of production conditions, which in turn affect the economic efficiency of agro-granting [9, 12].

Table 2. The impact of farm size on the performance indicators of agrarian enterprises of the Kyiv region, 2018

Indicator	Groups of agrarian enterprises by area of land, ha			
	less than 100	101-1,000	1,001-2,000	more than 2,000
Number of enterprises	1,328	418	234	142
including farming	1,036	114	69	2
The average area of agricultural land, ha	38	627	1,518	3,554
The concentration of agricultural land in the group, %	4.3	22.4	30.3	43
Coefficient of ecological stability of the territory	0.15	0.18	0.23	0.22
Plowed territory, %	96.1	92.7	72.5	73.2
The proportion of eroded land, %	31.1	29.2	25.4	25.1
Yields of cereals and legumes, c/ha	51.2	58.1	68.3	70.2
The proportion in the structure of commodity agricultural products,%:				
crop products	81	93	69	63
livestock products	19	7	27	37
The volume of gross agricultural output (in constant prices of 2010)	1,180.7	1,343.1	1,581.3	2,069.3
including crop products	754.4	956	1,182.8	1,347.5
including livestock products	426.3	387.2	398.6	721.8
Profitability of production	38.5	42.7	44.3	47.2
Profitability of enterprise	23.5	21.6	18.6	18.3

Source: formed by the author according to The Main Department of Statistics in Kyiv region.

The analysis of the influence of farm size on the performance indicators of agrarian enterprises on the example of the Kiev region showed that, despite the significant fragmentation of agricultural land, there is a concentration of these lands in groups of enterprises with an area of more than 1,000 hectares, as well as an increase in farm size (Table 2).

This situation, in turn, was formed due to the existence of the so-called law of the predominance of a larger farm over a smaller one, which is displayed in the real plane due to an increase in the level of economic efficiency

of the functioning of an agrarian enterprise with an increase in its area.

In order to identify the dependence of the spatial parameters of the organization of the territory of agrarian enterprises and the effectiveness of their functioning, we carried out groupings of farms in the Kiev region by the coefficient of ecological stability of the territory.

Table 3. The impact of spatial parameters of the organization of the territory on the performance indicators of agrarian enterprises of the Kyiv region, 2018

Indicator	Groups of agrarian enterprises by coefficient of ecological stability of the territory			
	less than 0.15	0.16-0.25	0.26-0.35	more than 0.35
Number of enterprises	1,426	398	191	107
including farming	1,103	91	27	-
The average area of agricultural land, ha	196	863	1,129	2,869
The concentration of agricultural land in the group, %	24.4	30.0	18.8	26.8
Coefficient of ecological stability of the territory	0.14	0.19	0.27	0.36
Plowed territory, %	95.4	89.7	74.4	68.2
The proportion of eroded land, %	33.2	28.7	23.4	18.7
Yields of cereals and legumes, c/ha	48.2	64.1	71.3	66.2
The proportion in the structure of commodity agricultural products,%:				
crop products	76	95	65	62
livestock products	34	5	35	38
The volume of gross agricultural output (in constant prices of 2010)	1,380.7	1,643.8	1,490.5	2,109.3
including crop products	954.4	1,056.6	1,082.3	1,347.5
including livestock products	426.3	587.2	408.2	761.8
Profitability of production	30.4	48.7	40.3	46.2
Profitability of enterprise	21.5	18.6	21.7	23.3

Source: formed by the author according to The Main Department of Statistics in Kyiv region.

Systematization of agrarian enterprises in the Kiev region in the context of four groups are presented in Table 3.

Determination of the influence of spatial factors on the economic efficiency of agrarian enterprises gives an opportunity to adequately respond to the system of management of agrarian nature management in order to ensure the solution of environmental problems.

The effectiveness of capital investments in the formation of rational land use is determined, given the differentiation of the economic effect of land management measures.

For example, in the process of land transformation, the invested funds are returned in the form of an increase in net income from the developed land or more intensive land use, and when arranging the territory, crop rotation, investing in the construction of field mills, expanding the transport infrastructure due to the reduction of production or fixed costs.

CONCLUSIONS

In general, the organization of the territory of agrarian enterprises using spatial parameters is required to reproduce the practical implementation of design decisions on land management of agrarian enterprises, taking into account environmental requirements that should be declared in on-farm land management projects. Given the data obtained as a result of the analysis of the influence of the organization of the territory on the economic efficiency of agrarian enterprises, it was determined that the development of directions for their sustainable development should be based on priority tasks, taking into account the relationship between agrolandscape parameters and economic indicators.

It was determined that the role of these spatial parameters in the formation of indicators of economic efficiency of agrarian production of enterprises is different. Therefore, it is very important to determine the degree of influence of individual factors on the efficiency of enterprises in agrosector using scientifically based methods and approaches.

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TRENDS IN HUMAN CAPITAL FORMATION AND EVALUATION OF THE INTERCONNECTION OF SOCIO-DEMOGRAPHIC PROCESSES IN RURAL AREA: A CASE STUDY OF VOLYN REGION, UKRAINE

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Abstract

A comprehensive analysis is relevant for present realities for Volyn and Ukraine as a whole, the problem - the demographic situation in rural areas, including reducing the number of a rural population due to natural processes of reproduction. The features of the rural settlement network. Democratic reproduction processes for the rural population for 1989 – 2018, its regional features and patterns of the settlement are analyzed. Based on the study of this phenomenon, methods of studying the influence of various demographic factors on the dynamics of rural demographic reproduction have been proposed. The article proved that the demographic situation and the possible appearance of threats to demographic processes in the future depending on the formulation and implementation of effective population policies today. Found that targeted regulatory impact on the demographic situation should be based on a comprehensive understanding of the nature of demographic processes reproduction.

Key words**:** *rural population, rural area, average rural population, human capital, correlation ratio*

INTRODUCTION

One of the key roles in ensuring sufficient impact social and economic transformation, the implementation of labor potential play-purpose social and demographic features of the population, particularly the trends that dominate in the development of quantitative and qualitative characteristics of the rural population as an integral component. After all realities prospects for economic development largely depends on the effective solution of social and demographic issues, including optimizing the structure of the population and creating favorable conditions for full implementation of human potential in the countryside.

The results of specialized studies conducted in the most developed countries on econometric models show that the internal demographic situation, the mode of reproduction of the population, its quantitative and qualitative composition can either stimulate or hinder the social and economic development of the country, affect the prospects of labor security and implementation of economic and social transformations [4].

Development of applied scientific, theoretical and methodological aspects of solving the multifaceted problems of effective functioning and sustainable development of rural communities in Ukraine dedicated to scientific work A. Alymov and V. Mykytenko cites by [7], V. Bakumenko [1], A. Boiar [3], E. Libanova cited by [6], O. Borodina and A. Popova [2], I. Tofan and O. Ahres cited by [12] and others. However, despite previous achievements and scientific and organizational achievements on the study abovementioned issues, the task of taking into account socio-demographic aspects of rural communities in Ukraine on the principles of sustainable development and ensure human capital

formation require further economic and statistical analysis.

All of the foregoing causes particular relevance study modern trends in social and demographic processes in rural areas and ways of scientific research of their mutual interdependence, which is the purpose and the objectives of the article.

MATERIALS AND METHODS

We think that the methodological prerequisite for development and implementation of measures for the progressive development of the reproductive capacity demographically-village is especially meaningful definition features of the current demographic situation and outlining the cause-effect factors of its formation. Research objectives abovementioned problems seen in materials Ukraine Volyn region.

Grouping by factors whose impact is studied. allows to spread the total variation resultant variable dispersion into two, one of which is determined by the variation of influence factors underlying grouping, and the second – a variation, due to the influence of all other factors also being studied. Therefore, according to the rule of adding the variances for the quantitative measurement of density communications used overall, intergroup and intragroup (residual) variance. Intra-dispersion (σ_i^2) Is calculated using the formula:

$$\sigma_i^2 = \frac{\sum (y - \overline{y_i})^2}{n},$$

where $\overline{y_i}$ - the average effective signs of the group; n - the total number of units together; i - serial number of the group, $i \in [1; 3]$.

Thus, the average intragroup variance which determines the variation caused by the influence of all other factors except the grouping is calculated by the formula:

$$\overline{\sigma^2} = \frac{\sum \sigma_i^2 \cdot f_i}{\sum f_i},$$

where f_i - the frequency inherent in each of the groups factor variable [13].

Inter-group variance (δ^2), which measures the variation caused by the influence of factors underlying grouping – the average population of villages is calculated by the formula:

$$\delta^2 = \frac{\sum (\overline{y_i} - \overline{y})^2 \cdot f_i}{\sum f_i},$$

where $\overline{y}$ – the average value of resultant variable across the population.

By dividing each of the terms of the rules dispersions adding to the total variance (σ_{tot}^2), Transform it into the following expression: $1 = \frac{\overline{\sigma_i^2}}{\sigma_{tot}^2} + \frac{\delta^2}{\sigma_{tot}^2}$, The first term $\frac{\overline{\sigma_i^2}}{\sigma_{tot}^2}$ - shows what proportion of the total variation is due to the effect of non-grouping features; a second term $\frac{\delta^2}{\sigma_{tot}^2}$ called the coefficient of determination ($\eta^2 \in [0, 1]$) – shows the degree of variation resultant variable under the influence of factors underlying the grouping.

The criterion of materiality and the coupling between the factor and efficient characteristics serves correlation ratio (η), ie the relationship between attributes considered quite significant:

$$\eta = \sqrt{\frac{\delta^2}{\sigma_{tot}^2}}, \ |\eta| \in [0, 1].$$

Note that if the correlation ratio different from zero ($\eta > 0$), then this may not be sufficient evidence of the correlation between signs. To assess the reliability criterion used correlation characteristics Fisher (F-criterion):

$$F = \frac{\delta^2}{\overline{\sigma^2}} \cdot \frac{k_2}{k_1},$$

where k_1 k_2 - degrees of freedom.

The work is based on the analysis and evaluation of the results of the analysis of statistics State Statistics Service of Ukraine and Volyn contained in statistical databases [8, 10, 11].

RESULTS AND DISCUSSIONS

Note that the largest population in the Volyn region seen in 1994 - 1,081.8 ths. people. And

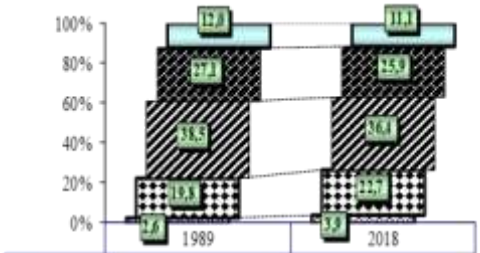
the proportion of the rural population in the total population was 49.0% [10].

It should be noted that in the absence of further guidance to the source, all the evidence presented and calculated by the author based sources [10, 11]. 1989- 2018 except for minor increases in 1994 and in 2014 there is a systematic reduction of farmers on average annually by 1.6 thousands people. As a result, the test period permanent rural population decreased by 27.9 thousand people or by 5.1% and at the beginning of the 2018 year amounted to 516.5 thousand people. (49.8% of the resident population of Volyn), among which 52.4% were women (1,000 men accounted for 1,100 women). In terms of areas for 1989-2018 the most intensive continuous decrease observed in rural Turiyskskyi - 14.0% Starovyzhivskyi - 11.5% and Lokachynskyi areas - by 8.5%.

The average population size of the village in Volyn in 1989 was 520 people, and in 2018 - decreased by 6.5% and amounted to 487 people - lower than the national average (527 pers.) - 7.6%. Density 100 villages km^2 area is 5.2 while the national average - 3.6. The average distance between villages - 2.5 km. However, in high enough diversity there defined indicators, including rural density ranges from 9.0 to 100 km^2 in Ivanychivskyi area to 3.0 per 100 km^2 – in Manevytskiy. This diversity is evident and the average rural populations from 789 people. (799 pers. in 1989.) - Kamin-Kashyrskyi in an area up to 255 people (301 pers. in 1989) – in Turiiskyi area. For 1989-2018 a decrease in the average population in villages 1.3-15.3% in all areas except Lutsk, where it increased by 7.3%.

The largest rural populations of 1,000 or more persons, where at the beginning of 2017. home to 33.4% of the existing rural Volyn located mainly in Kamin-Kashyrskyi - 15.4% of the total number of villages Lutskyi - 11.1% Ratnivskyi - 11.1% and Liubeshivskyi areas – 10.3%. Villages with populations 500-999 people, which lives mainly peasants 36.4% are located in Horokhivskyi, Lutskyi, Manevytskyi regions - 10.3% in the total number of villages and Kamin-Kashyrskyi district - 8.4%. Small settlements rural areas (SDAs) with populations up to 199 people, which has 5.9% of the rural population, located mainly in Turiiskyi - 12.2% of the total number of villages Ratnivskyi - 9.7%, Kovelskyi and Volodymyr-Volynskyi areas - by 11.2% [8].

In general, over the period 1989-2006, the share of rural settlements with a population of more than 1,000 people in total their number decreased by 0.9% (Fig. 1). The number of rural populations 500-999 people over the period fell by 1.2%. However, on small villages with populations up to 199 people is worth noting that their share in the total SDA grew by 4.2% [8], which is due, in our opinion, the accelerated decrease in the number of rural residents on average for rural populations and caused by the rearrangement of villages in favour of increasing group of small villages and reduce the group averages for populations of villages. Keeping such dangerous trends in the future will result in a high probability of the rapid disappearance of small villages.



	1989	2018
1000 or less	125	117
500-999	283	273
200-499	402	384
50-199	207	239
49 and more	27	41

Fig. 1. Distribution villages of Volyn region of Ukraine for populations in 1989 – 2018,%
Source: own research.

At the beginning of 2018, the average density of existing rural Volyn is 26 people per 1 km^2, and it is the highest in Lutskyi – 54 people per 1 km^2 and Ivanychivskyi areas – 43 people per 1 km^2, and the lowest – in Turiiskyi and Shatskyi – 16 people per 1 km^2

Generally describing the settlement system that characterized rural settlement, Volyn region, as the process of distribution of the population in certain places geographical area (distribution of settlements on territory and settlements of people, resulting in the formation of a network of settlements, part of which serve rural areas

[9] clearly distinguishes certain groups of districts.

Therefore, the small settlement system of rural settlement with a high density of rural settlements placement can be attributed: - 2.3 miles at relatively low population. Kamin-Kashyrskyi and Liubeshivskyi districts belong to a large settlement system with a low density of settlements - 3.2-3.7 per 100 km^2 with an average distance between the rural settlements - 2.9-3.2 km. and their relatively high population (Table 1).

Table 1. Indicators of resettlement and dynamics of the rural population of Volyn region of Ukraine in 1989 – 2018

Areas region	Number of villages in 2018, Ed.	The area* km^2	The average area of 1 village km^2	The average distance between villages, km.	Existing rural population, thousand people		The average population size of the village in 2018, people	The dynamics of the rural population (2018 to 1989), %
					1989	2018		
Volodymyr-Volynskyi	77	1,038	13.5	2.1	26.5	24.5	318	92.5
Horokhivskyi	90	1,122	12.5	2.0	44.3	40.6	451	91.6
Ivanychivskyi	58	645	11.1	1.9	29.4	27.8	479	94.6
Kamin-Kashyrskyi	64	1,747	27.3	2.9	50.3	50.5	789	100.4
Kivetsivskyi	72	1,414	19.6	2.5	41.6	40.3	560	96.9
Kovelskyi	91	1,723	18.9	2.5	36.3	33.2	365	91.5
Lokachynskyi	53	712	13.4	2.1	22.1	20.3	383	91.9
Lutskyi	83	973	11.7	1.9	48.6	52.1	628	107.2
Liubeshivskyi	46	1,450	31.5	3.2	32.0	30.4	661	95.0
Liubomlskyi	68	1,481	21.8	2.6	44.3	28.2	415	91.0
Manevytskyi	69	2,265	32.8	3.2	45.1	42.0	609	93.1
Ratnivskyi	67	1,437	21.4	2.6	40.3	38.4	573	95.3
Rozhyshchenskyi	66	928	14.1	2.1	29.0	26.5	402	91.4
Starovyzhivskyi	46	1,121	24.4	2.8	31.2	27.4	596	87.8
Turiiskyi	74	1,205	16.3	2.3	22.0	18.9	255	85.9
Shatskyi	30	759	25.3	2.8	-	12.1	403	X
Total	1,054	20,140	19.0	2.5	543.0	513.2	487	94.5

*The area specified excluding areas located in these cities
Source: own research.

It should be noted that the process includes settlement under a historical, economic and socio-cultural background and is in constant dynamic development.

It is worth mentioning separately the Lutskyi district as a rural urbanized area, which resulted from the interaction of urbanization and ruralization (the process of penetration of rural lifestyle elements in urban settlements). Rural settlements of this territory by administrative-territorial division belong to the rural administrative district, and functionally and spatially are in the area of influence of the regional center and are characterized by a relatively high average population - 628 people and village density - 8.5 per 100 km^2 Rural habitats can be considered as places of concentration of suburban villages around regional centers and large cities. And links suburban villages to the city level than within the district settlement system [9]. The population of these villages all social services, in addition to administrative and managerial, gets in, resulting in a significant burden on the municipal agencies of social and cultural direction and purpose.

We offer to explore the relationship between the populations of villages and population dynamics of the existing rural population on the basis of the analytical group, which will partially identify the causes deformations and negative demographic processes change the demographic situation in the country. It should be noted that the number of actual population is determined by summing temporary residents and permanent population of less temporarily absent (from among the resident population of the rural settlement). Having formed a group of

Volyn regions the average population of villages, it should be noted that the areas with the lowest populations (255-433 people). Occupy a continuous area, located in the central-western region (Fig. 2). Areas with average populations 433-611 people crowded area in two units and occupy part of northern, southern and eastern parts of the region Quantitatively, the smallest group of large settlements is located in the northern and southeastern parts of the oblast and covers Kamin-Kashyrskyi, Liubeshivskyi and Lutskyi districts.

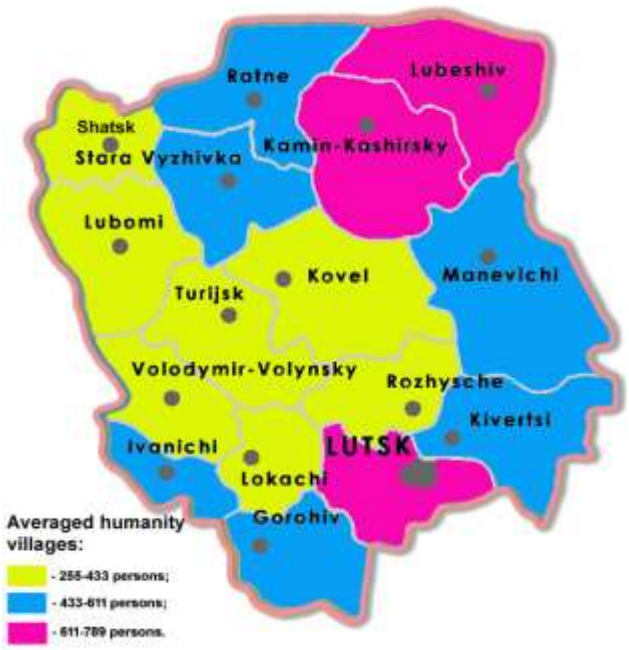


Fig. 2. Cartogram grouping districts of Volyn region of Ukraine the average rural populations in 2018
Source: Built by the Authors.

Note that in the process of analytical grouping all the elements of the original aggregate sale by factor variable (x), which is the average population size of the village in terms of districts, then each group calculated the average values of resultant variable (y), which is the dynamics of rural population for 1989-2018. As a result, it was found that in the group with the lowest average rural population, the rural population decreased by 9.3% in the study period. In the group with an average population of villages 433- 611 people. - by 6.8%, and in the group with the highest average population of villages (611-789 people), the number of peasants increased by 0.9%.

Thus, there is a clear dependence according to which, in large villages, the number of inhabitants is increasing, in smaller villages, it is gradually decreasing, and in small villages it is declining at an accelerated rate.

However, analytical grouping characterizes only the general lines of communication, which studied its trend, however, does not provide a quantitative assessment of the density of communication. We offer to solve this problem on the basis of the analytical group, using the empirical correlation ratio.

Moreover, we note that in the process of calculating the number of districts in Volyn limited to 15, that is an unaccounted Shatskyi area because it was geographically separated from Liubomlskyi only in 1994. Therefore, changing the number of rural population 1989 – 2018. Liubomlskyi in the area was determined taking into account the number of farmers figures Shatskyi district in 2018. (Table 1 and 2). Such conditional summing the number of farmers these areas can significantly offset the impact of external factors (administrative and territorial separation and formation of a new Shatskyi area in the middle of the study period) the results obtained by calculations.

Thus, the average intragroup variance which determines the variation caused by the influence of all other factors except the grouping is 10.37.

Inter-group variance (δ^2), which measures the variation caused by the influence of factors underlying grouping – the average population of villages is 13.96. By dividing each of the terms of the rules dispersions adding to the total variance (σ_{tot}^2), The first term $\frac{\overline{\sigma_i^2}}{\sigma_{tot}^2}$ - shows what proportion of the total variation is due to the effect of non-grouping features and is 0.43; a second term $\frac{\delta^2}{\sigma_{tot}^2}$ called the coefficient of determination - is 0.57. Thus, the survey results revealed that the variation in the dynamics of the rural population in 1989-2018 57% due to a change in the average population of villages 2018, and 43% - the influence of other factors.

Table 2. Grouping of districts of Volyn region of Ukraine by the average population of villages in 2018 and determining its relationship with the dynamics of the existing rural population from 1989 to 2018

Groups regions the average rural populations, persons	The number of districts in the group units.	The dynamics of the existing rural population, %	$(y-\overline{y}_i)^2$	Intra-group variance $\frac{\sum(y-\overline{y}_i)^2}{n}$	$(\overline{y}_i-\overline{y})$	$(\overline{y}_i-\overline{y})^2$	$(\overline{y}_i-\overline{y})^2 \cdot f_i$
And the group (255-433)	6	90.7	3.24; 0.64; 1.44; 0.09; 0.49; 23.04	4.82	-3.04	9.24	55.44
group II (433-611)	6	93.2	2.61; 1.91; 13.57; 0.01; 4.34; 29.34	8.63	-0.52	0.27	1.62
group III (611-789)	3	100.9	0.22; 40.11; 34.42	24.92	7.13	50.79	152.37
Total or average	15	93.7	X	X	X	X	209.43

Source: own research.

The criterion of materiality and the coupling between the factor and efficient characteristics serves correlation ratio (η) is 0.76.

Found that F-criterion$_{(fact)}$ = 8.08, F-criterion$_{(tabl)}$ = 3.89. $F_{fact} > F_{0.95}$ [2; 12] is a ninety-five percent probability level that can assert the existence of a significant link between the change in the average population of villages and population dynamics of the rural population.

According to the results of our special studies, the location of the rural settlements (in accordance with the dynamics of the rural population) is significantly influenced by the remoteness of their location from the district center. Thus, it was found that in the villages of Volyn region, located at a distance of up to 3 km. from the district center for 2013 – 2017 the average population increased by 16.8 %; in villages 3 to 5 km away. from the district center – by 11.1 %; and in villages within 5 to 10 km of the district center. – decreased by 2.4% [8]. Thus, as a result of the conducted researches the tendency is established: at the decrease of the average population of villages as a whole on area, in a suburban area it on the contrary - grows. The pattern is that according to the increasing distance of rural settlements from the district center, the rate of decrease of the average population of villages increases.

In particular, we suggest, using an analytical grouping and correlation analysis based on it, to quantify the density of the relationship between the variation in the proportion of rural settlements located at a distance of 10 km. to the district center and the dynamics of the average population of villages for 1989-2018 by sections of Volyn region (Table 3).

All districts are divided into four groups, with a significant emphasis on the second and third groups (more than 66% of the total). Consequently, in the areas with the lowest proportion of villages located at a distance of 10 km. to the district center the average population in the studied period increased by 0.5 %, and with the highest specific gravity of such villages – decreased by 10.2 %. Thus, according to the obtained dependence, with the growth of the proportion of rural settlements located at a distance of 10 km. to the district center, the dynamics of the average population of villages in the context of districts decreases.

Table 3. Grouping of districts of Volyn region of Ukraine by the proportion of villages located at a distance of 10 km to the district center and to determine its relation with the dynamics of the average population of rural settlements for 1989 – 2018

Groups regions the ratio villages located at a distance of 10 km to the district center, %	The number of districts in the group units.	Dynamics of average population of villages (2018 to 1989), %	Intra-group dispersions, $\frac{\sum(y-\overline{y_i})^2}{n}$	The average intra-group variance	$(\overline{y_i}-\overline{y})^2 \cdot f_i$	Inter-group variance	The total variance	The coefficient of determination	correlation ratio
Group I- 67.92-74.85	2	100.5	46.44	15.62	116.39	10.16	25.78	0.39	-0.63
Group II - 74.85-81.78	5	91.5	10.44		8.51				
Group III - 81.78-88.71	5	92.9	10.22		0.02				
Group IV - 88.71-95.65	3	89.8	12.71		27.52				
Together	15	92.8	X		152.45				

Source: own research.

According to the results of the correlation analysis, the dynamics of the average population of the villages for the years 1989-2018 39 % due to the variation of specific villages located at a distance of 10 km to the district center, and by 61% - the effect of all other factors.

Moreover, since the value of the resultant sign changes in the opposite direction with respect to the change in the factor, the relation is considered inverse. The empirical correlation is quite high (-0.63), so the correlation between the studied traits is considered significant.

CONCLUSIONS

Obviously, the negative trends in rural development, the threatening demographic outlook in the future, require the development and implementation of effective social policies that can stop destructive processes and provide the necessary conditions to form a rational structure of reproduction.

We agree with the opinion of [5] and some other demographers, who consider demographic policy as an element, component of socio-economic policy as a whole, since it is through socio-economic processes that, through a series of indirect mechanisms, the different intensity of population development, rates and proportions of its changes.

We believe that scientifically substantiated conceptual directions of demographic development should be directed first of all to overcoming negative tendencies and ensuring rational reproduction of aggregate human potential with its best qualitative and structural characteristics. It is advisable to have an objective combination of self-regulation inherent in socio-demographic processes and purposeful influence on their course. Socio-demographic policy should be aimed at achieving a sufficient level of quality characteristics of the population, which, combined with the use of innovative models of rural development, would provide a significant increase in the living standards of rural residents because one of the main reasons for the current destructive demographic situation is recognized as low living standards. As socio-economic development in the leading countries of the world is based largely on self-renewed autonomous resources, the strategic orientations of the new paradigm of social and demographic development in the Ukrainian village should be based on the formation of a similar resource base, which is possible primarily through the proper reproduction of human capital.

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THE PROBLEMS OF IMPLEMENTATION AND REGULATION OF LAND MARKET IN THE AGRICULTURAL SECTOR OF UKRAINE

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Abstract

In the article it is proved that the current situation in conducting agrarian reform in Ukraine is characterized by the formal completion of the restructuring of collective farms and the conclusion of the final stage of privatization of agricultural land. However, the main feature of this period is that the initiative in the development of reform has shifted from the state to agribusiness. So, if in the process of reform the state initiated the restructuring of collective agricultural enterprises, offered their organizational and legal forms, then in the pre-reform period, this initiative went to agribusiness, the manifestation of which was the emergence of agroholdings. Also the article analyses preventive measures during proceedings of land market in the countries of Europe, Argentine and the existing state of land relations in Ukraine. The study substantiates that in Ukraine emergence of agroholdings it is connected with imperfection and failures in functioning of economy, the lack of necessary institutional and legal conditions for conducting effective business inadequate the policy of the state, in particular lack of the full market of the farmland. In the article we have proved that consolidation of the agricultural land by agroholdings by replacement from the market of land lease of a certain number of the agrarian enterprises and farmers creates a certain negative social and economic situation in the village. It is proved that the introduction of the land market should not be an end in itself, but must obey the purpose of successful development of the agricultural sector on the basis of national SME based on organic farming and will revive the Ukrainian agriculture, to create appropriate social living conditions in rural areas to make the country prosperous.

Key words**:** *economy, agricultural sector, land market, consolidation of lands, agroholdings*

INTRODUCTION

The current state of development of the Ukrainian economy and its development require the adoption of new management decisions the sphere of land use and protection. A significant role in this process lies in the formation of an effective ecologically-economically balanced model of land use, which can be formed on the basis of a purposeful land consolidation policy.
The scientific perspective of regulation of the market land relations in Ukraine is considered in the works by scientists: A. Popescu [8-14], M. Popescu [15], A. G. Martyn [6], O. M. Zagursky [21], L. Ya. Novakovskii [7], R. I. Sodoma [16], I. N. Tofan [18], M. M. Fedorov [9], V. Yakubiv [20], M. Dziamulych and T. Shmatkovska [2] M. A. Khvesik and V. A. Golyan [4] and others.
The role of land in the economy is not always obvious. There cannot be a sustainable development of economy without the protected land rights as there are few investors who wish to make long-term investments.

MATERIALS AND METHODS

The study of the features of sustainable economic development based on foreign experience of agrarian reform, their in-depth analysis is necessary in order to implement in the course of reform the development of mechanisms for regulation of market land

relations and the creation of the necessary conditions for the successful development of social production in the interests of citizens and society as a whole. Therefore, this process requires detailed research and analysis to work out recommendations for increasing the efficiency of agribusiness and preventing the emergence of negative phenomena and trends.
Conducting of the research is based on the use of such methods and methodological approaches: analysis and synthesis, structural analysis, grouping methods, graphical and tabular methods - to display visually the results of the research. Figures were drawn using Microsoft Excel, 2013 version.
The work is based on the analysis and evaluation of the results of the analysis of statistics State Statistics Service of Ukraine and Volyn region contained in statistical databases.

RESULTS AND DISCUSSIONS

Ukraine has to choose between a large-scale agricultural sector (Argentina) or a «social» village (Poland, France, Germany, Denmark, Slovakia, Romania, Hungary) when introducing the land market. In each of these countries, private property and the land market have been formed for a certain purpose - either to provide a high level of agricultural production, or to develop a mechanism for social protection of the population living in rural areas. Unfortunately, these two goals are very difficult to combine. Let's consider this in the example of the above-mentioned countries.
Argentina is an industrial and agrarian country with well-developed agriculture. Agricultural lands account for a little more than a half of the land fund of the country - 54.5% of which 26.6% (or 14.5% of the total land fund) is arable land.In the countryside, a small part of the population lives - only 8.4%**.** A characteristic feature of the country's agriculture is the high productivity of labor. Thus, agriculture occupies only 0.5% of the labor force, and it accounts for 8.3% of GDP.
By 2011, there were no laws in Argentina that would regulate the ownership of foreigners. Among the factors that were attractive to investors , we can name rich and fertile natural resources, low prices and compassionate legislation, which led to a large concentration of land and the arrival of large international investors.
According to the Law No. 26.737 «National Security Regime for Ownership, Acquisition and Use of Agricultural Land» on December 27, 2011, foreign natural and legal persons are not entitled to purchase a plot of more than 1,000 hectares. It is also not allowed to buy land within the «national security zone», established by Resolution No. 15.385/44.The rules do not apply only to those foreigners who:
- have been living in the country for more than 10 years;
- have children born in Argentina and reside in the country for more than 5 years;
- have been married to a citizen of Argentina for more than 5 years.
For buyers who are Argentinean citizens, no restrictions are set. The minimum area of agricultural land is set by separate regions. For the citizens of Argentina, the limit for the purchase of a plot is not established. There is no special land sales tax, however, when a property is transferred to any real estate, a stamp duty (up to 3%, set by separate areas) and a property transfer tax (1.5%) are paid. At present, Argentina is concerned about raising the number of farms, which is actively promoted by the Ministry of Agriculture.
In comparison, let's consider the functioning of the free market of land in the countries of the European Union and the legislative restrictions that exist there.
Poland. On April 30, 2016, a law on land inventory introducing certain restrictions on the sale of agricultural land came into force, according to which agricultural land can only be bought by the state (Polish Agricultural Real Estate Agency - ANR, religious associations and farmers with up to 300 hectares agricultural land.Those who want to buy land must own not only agricultural skills, but also to live in the area in which they want to buy land. Besides, not less than 10 years the buyer agrees to do on this earth economic activity, without permission of the court can not sell the land or lease.These legal provisions do not

apply to land plots of agricultural land up to 0.3 hectares.

France. All operations in the market of the agricultural land control of local government, within the Union Sociétés d'Aménagement Foncier et d'Etablissement Rural (SAFER) and watch to prevent a sharp decline in the number of family farms. SAFER Union enjoy the right championship to purchase land, and in addition, it can prevent the signing I agreements for sale, if it considers that it is speculative trades occurring at a discounted price, or the transaction may result in the disintegration of the household or preclude activities for farmers-beginners in a particular area.There is a right to win the purchase for owners of neighboring lands and a commitment to personal use of land acquired for 15 years with a prohibition of lease. The country is so protecting its land against a foreign buyer, which in practice can only be purchased by a indigenous French farmer.

Germany. Precepts of law concerning land turnover in Germany engaged in union Bodenverwertungs – und – verwaltungs GmbH (BVVG), which oversees the Federal Ministry of Finance.The authorities may not consent to the sale of land, if the deal is speculative, trades are at a reduced price, the new owner does not intend to use the land for agricultural purposes or as a result of which excessive concentration of land in the hands of one owner may occur. The buyer must submit a plan for business development .

Denmark. In 2015, legislation was adopted that significantly simplifies the purchase of land in this country.The main requirement is to reside on the acquired land. Norms on the area of economy and the requirement of the introduction of agricultural qualification were cancelled.

Slovakia. Since 2014, new laws on the circulation of land are in force, according to which the owner of agricultural land may be an individual who has been running his business in the field of agriculture or has worked there for at least three years. Legal persons and individuals must have a three-year seniority in doing business in agriculture. Persons who live on a constant basis in the country of at least 10 years or legal entities that registered the business at least 10 years ago can be buyers of grounds. First of all, they have the right to buy land from individuals who live in the community where they want to buy land.These legal provisions do not apply to gifts, when the land is transferred to close relatives. This also does not apply to land in the urban area and agricultural land outside the city zone up to 0.2 hectares.

Romania. In 2014, a law entered into force that allows the sale of agricultural land for citizens of the European Union, as well as Iceland, Liechtenstein and Norway. Most of them are entitled to buy land from co-owners, tenants, landowners adjacent to the land plot sold, as well as the Romanian Public Property Agency.When none of the parties having a preemptive right to purchase has a willingness to buy land, the buyer's choice may be exercised by the seller.

Bulgaria.Only natural and legal entities which legally live can buy farmlands and own them or those who are registered in the country of at least 5 years.The right to purchase and own agricultural land does not apply to legal persons whose share has partners or shareholders registered in free economic zones.

Hungary. The right to purchase land is natural persons, churches, financial institutions and the state. In order to buy land, one must have skills in the field of agriculture or to do business in agriculture for at least 3 years. Those who do not fulfill these conditions may purchase no more than 1 hectare of agricultural land. The maximum area of land that can be owned is 300 hectares.Within 5 years the buyer must personally conduct agricultural activity and use the land for the intended purpose and not transfer it to sublease.

The current situation in conducting agrarian reform in Ukraine is characterized by the formal completion of the restructuring of collective farms and the conclusion of the final stage of privatization of agricultural land. However, the main feature of this period is that the initiative in the development of reform has shifted from the state to agribusiness. So, if in the process of reform the state initiated the restructuring of collective agricultural enterprises, offered their organizational and

legal forms, then in the pre-reform period, this initiative went to agribusiness, the manifestation of which was the emergence of agroholdings [20]. In general, in agriculture of Ukraine there take place the following processes which characterize development of agroholdings:

- capitalization of agricultural production on the basis of consolidation of agricultural land;
- horizontally and vertically integrated, export-oriented structures (sometimes in the form of land latifundia) are formed;
- an increase in the volume of agricultural production due to the scale effect;
- concentration of capital that is not suitable for small and medium-sized companies;
- integration of production with the subsequent processing of agricultural products;
- investment attractiveness for foreign companies through placement of securities in stock markets and attraction of loans from international financial organizations.

In Ukraine emergence of agroholdings it is connected with imperfection and failures in functioning of economy, the lack of necessary institutional and legal conditions for conducting effective business inadequate the policy of the state, in particular lack of the full market of the farmland.

However, the main stimulus for the emergence of agroholdings is the desire of capital owners to multiply it in the long run. The dynamics of agroholdings development and their average area is shown in the Table 1 and Fig. 2. The impact of agroholdings on the land lease market is indisputable (Fig. 1).

Table 1. Dynamics of the number of agroholdings in Ukraine for 2007-2017

Indexes	2007	2012	2017	Deviation					
				2017/2007		2012/2007		2017/2012	
				+/-	%	+/-	%	+/-	%
Number of holdings	18	17	14	-4	-22.2	-1	-5.56	-3	-17.7
Total area in use, million hectares	1.8	3.73	3.42	1.62	90.0	1.93	107.2	-0.31	-8.31
Average area of one holding, thousand hectares	100	220	244	144	144.0	120	120.0	24	10.91

Source: Own calculations based on the data from [1, 19].

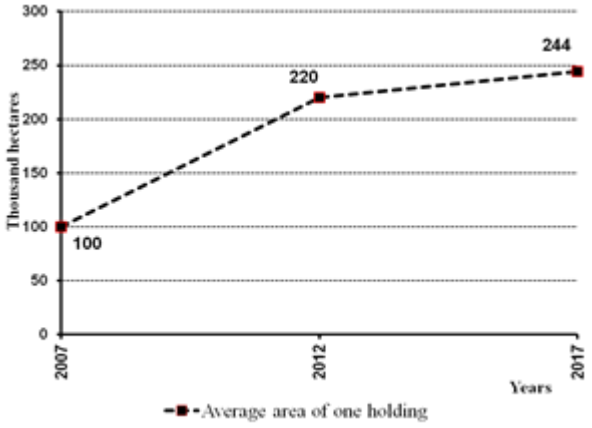

Fig. 1. Dynamics of the average area of one holding in Ukraine, 2007-2017
Source: Own design based on the data from [1, 19].

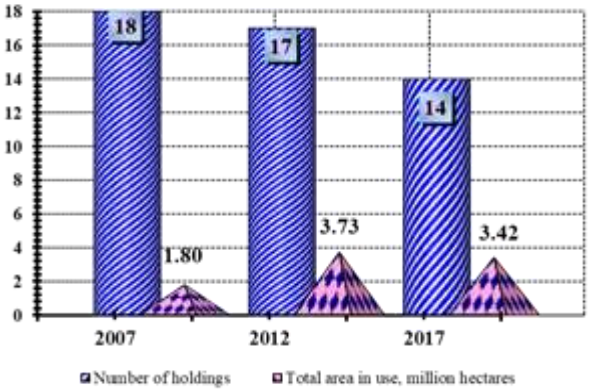

Fig. 2. Dynamics of the number of agroholdings in Ukraine for 2007-2017
Source: Own design based on the data from [1, 19].

In general, this has a certain positive effect, because agroholdings, displacing farmers from the market of lease of agricultural land, make them change their specialization, switch from growing low-yielding grains and technical crops to growing vegetables, fruits and berries. They also take land from inefficient agrarian enterprises, forcing them to come from agrarian business.

The result is an increase in the overall efficiency of agricultural production, because agroholdings, thanks to the use of the best

technologies on large land areas, receive more cheaper products, while farmers fill the market niche of labor-intensive products, the production of which in modern conditions they provide more efficiently. Increasing competition in the market for lease of agricultural land is a positive factor and leads to an increase in the level of land rent.

The cost of capital that agroholdings invest in agribusiness can grow in the long run at the expense of:

- low labor cost;
- low rent for land;
- low cost of agricultural products, which leads to increased profits from activities through cheap raw materials through the integration of agriculture and processing industry products;
- minimizing tax payments;
- receiving subsidies and subsidies from the state budget for the development of the agrarian sector;
- Growth in the world of agricultural products and food products;
- the possibility of accumulation of large land masses through their lease;
- functioning of the agricultural land market, purchase of it into a property with the possibility of resale;
- possibilities of resale of business which cost taking into account all above the specified factors can increase considerably in several years.

The listed main factors contributing to the creation and development of agroholdings and other agro-industrial formations in Ukraine are not exhaustive. They can be much more depending on the nature of the capital invested in agribusiness, from which sources it comes, what intermediate, tactical and strategic goals are put by the owners of capital.

At the same time, the existence of agroholdings can be considered as the main threat to economic competition in the agrarian sector. Under economic competition, as a rule, is competition between economic entities, as a result of which consumers, business entities have the opportunity to choose between several sellers, buyers, and a separate entity can not determine the conditions of the turnover of goods on the market. Competition is an important attribute of a market economy, without which its normal self-regulation is impossible [5].

The process of creation and development of agroholdings should also be considered through the prism of their impact on the social development of rural areas, the peasants' property rights, the preservation and increase of the fertility of the land, environmental safety and the creation of new jobs; since 31% of the population of Ukraine live in rural areas and produces 43% of agricultural products, including crop production (38.7%), livestock (54.3%)[3].

However, consolidation of the agricultural land by agroholdings by replacement from the market of land lease of a certain number of the agrarian enterprises and farmers creates a certain negative social and economic situation in the village. Its main negative elements are the following:

- termination of the existence of agricultural enterprises as legal entities;
- loss for a certain number of rural residents of the place of work;
- non-receipt of tax and other payments by local councils from enterprises that have ceased to exist;
- the lack of funding for the creation and support of rural infrastructure, which was carried out by agricultural enterprises (roads, kindergartens and schools, cultural buildings, paramedic and obstetric centers, etc.).

The main condition of an effective land policy is that it must propose a practical and consistent set of rules, institutions and instruments that are considered to be fair, legitimate, and acceptable to various interest groups [3].

The formation of the agricultural land market in Ukraine is one of the most controversial and politicized issues of the country's political life. Due to political manipulations and insufficient professional skills of some media professionals, there is a perception that there is no land market in Ukraine, because of the moratorium, almost all commercial transactions with land in our country are prohibited, but this is far from the truth. Of all the existing 25 million land plots, less than 7 million are subject to a moratorium. And others can be sold and purchased, entered into the authorized fund and serve as a pledge in the

bank, taking into account the restrictions established by the current legislation.

At present, the mechanism of emphyteusis, that is, the use of a foreign land plot of agricultural purpose for agricultural production, which differs from the long-term lease by the fact that, when concluding an agreement on the emphyteum, they simultaneously receive the whole amount of funds for its transfer to use, becomes increasingly demanded .And the land will be enough for a long time to use emphyteusis.

In our country, at the legislative level, the main problem is the creation of a market for means of production, labor, securities, financial resources, information, technologies, etc. With the adoption of the new Land Code of Ukraine, a legal basis was laid down for the creation of the land market [17].

At present, the country is developing a law «On the circulation of agricultural land», where it is necessary to prescribe existing norms and using foreign experience to record the main provisions concerning the priority of buying agricultural land, acquiring the right to purchase land, maximize ownership and use.Most of these issues have long been regulated. Everyone is afraid of the fact that foreigners will be able to hypothetically acquire land indirectly through the mechanism of acquiring corporate rights for Ukrainian companies. But Ukrainian legislation clearly states that foreign legal entities can not buy agricultural land in principle. Problems in excessive concentration are resolved by the law «On Protection of Economic Competition», which contains the criteria for an economic assessment of concentration – if one person has concentrated more than 35% of an asset on a territorially expressed market, it is considered to be a violator of the legislation on the protection of economic competition.

To regulate the land market by economic (market) methods, the state is capable of acting as an independent «player» in this market.That is, in this situation, the state, due to its own financial and land resources, must participate in the market turnover of land, thus affecting the volume of demand and supply, and consequently – on market pricing, while not restricting the rights and freedoms of other sub–market objects [6].

Any farmer and even their most powerful cooperative in the Ukrainian realities is not capable to implement large-scale infrastructure projects. But the farmer can provide the work and salary of the inhabitants of his village, create a local brand in cooperation with the same fellow villagers and even to come for export with some unique but labor-intensive products.

Agrarian reform requires a global transformation that will work for those 86.9% of agricultural producers who process up to 1,000 hectares of land and provide them with assistance, support, cheap loans, to make forwards purchases through agrarian funds, to tame them on the transition to more labor-intensive products.This will be called agrarian state policy.

CONCLUSIONS

The introduction of the land market should not be an end in itself, but must obey the purpose of successful development of the agricultural sector on the basis of national SME based on organic farming and will revive the Ukrainian agriculture, to create appropriate social living conditions in rural areas to make the country rich.

Thus, according to the law, 6.9 million citizens of Ukraine received land shares, can not dispose of their own land, of which 1.6 million - people who are 70 years old or older. First of all, the answer to this question must be found before the market is opened up and reflected in the law «The circulation of agricultural land» where precautionary measures will be clearly defined:

- agricultural land can be bought by Ukrainian citizens who will personally conduct economic activity, reside at the location of land, have the appropriate qualification or experience in agricultural production, and use land for their intended purpose and not transfer it to sublease;
- the co-owners, tenants, owners of the neighboring sites, citizens living in this area have the primary right of purchase of land and have the corresponding education, or

experience in agriculture, local governments or executive power;
- maximum land tenure and land use has to be determined by the law «About Land Turnover of Agricultural Purpose» depending on climatic zones where the agricultural land is placed;
- these legal statuses should not concern lands which are provided for maintaining private peasant farm and gardening.

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RESEARCH ON THE WHEAT MARKET IN THE SOUTH-MUNTENIA REGION, ROMANIA

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Abstract

The research on the wheat market in the South-Muntenia Region of Romania highlights the dynamics of the main specific indicators for the period 2014-2018. Currently, Romania is an important player on the wheat market in the European Union, because it ranks fourth in terms of wheat production. In 2018, Romania achieved 7.3% of wheat production obtained in the European Union. Also in 2018, the contribution of the South-Muntenia Region to the production made in Romania was of 28.46%. In Romania, significant wheat productions are made due to several factors. Favorable conditions for wheat cultivation are a key factor, which offers the possibility of spreading this crop throughout the country. In the present research, the following indicators were analyzed: the area cultivated with wheat; wheat production achieved, average production per hectare and average purchase price. The analysis of these indicators was performed at the level of the South-Muntenia Region, as well as at the level of the counties that are part of this region. The statistical data that was used in this research was taken from the National Institute of Statistics.

Key words*: average purchase price, production, South-Muntenia Region, Romania, wheat*

INTRODUCTION

Wheat is grown on all continents, between the parallels 30-600 North latitude and 25-400 South latitude. This determines the following situation, namely: every month of the year, in a certain region of the world wheat production will be obtained wheat production. Wheat is included in the genus *Triticum*, family Gramineae. The genus *Triticum* consists of a significant number of wheat species, cultivated and wild forms. In time, there was no unitary classification, being classified differently, according to various criteria [5, 6]. The Middle East is the place where wheat culture was first identified, being considered a cereal plant cultivated since ancient times [10, 12,13, 14]. Wheat is a cereal with a number of uses, but of these it is necessary to specify the most representatives:

- it is a key component for feeding the population, because by grinding it, flour is obtained, which is the basic raw material for obtaining bread. Today, bread is the staple food for more than 40% of the world's population;
- provides some of the animal feed;
- raw material for certain sectors of activity etc.

Another important aspect is represented by the advantages offered by the wheat culture:

-wheat grains have a richer content in protein substances, compared to other cereals;
-grains have a high content of vitamins (B1; B6; K etc.);
-wheat is transported quite easily, even over long distances;
-it is a good precursor for many cultures;
-the cost of obtaining wheat is lower compared to other crops;
-a strong point for wheat cultivation is represented by the fact that the cultivation technology is completely mechanized etc., [5, 13].

Wheat is cultivated in Romania on significant areas and on various types of soil. The main soil types recommended for wheat cultivation are: medium, loam-clayey and loamy. The oldest wheat crops in our country have been dated for over 2500 years. Two species of wheat are important for Romania, namely: *Triticum durum* Desf. and *Triticum aestivum* L [5, 14].

In our country, both organic and mineral fertilizers are applied to autumn wheat. A low specific consumption of nutrients was found.

Nitrogen and phosphorus fertilizers applied to winter wheat in Romania directly contribute to increasing production [1, 5].
The South-Muntenia Region presents good conditions for the wheat production, and three of the component counties (Teleorman; Giurgiu and Călărași) were included in the first class with a high degree of favourability for this crop [5, 15].

MATERIALS AND METHODS

In the present research were analyzed the most representative indicators specific to the wheat market, related to the South-Muntenia Region, but also to the counties that are part of this region. It is necessary to mention these indicators: the area cultivated with wheat; the wheat production; the average production per hectare for the wheat culture and the average purchase price. The interval for which the research was performed is 2014-2018. The indicators that were analyzed in the specified range recorded oscillations that were due to several factors. The main results of the research were presented in own graphics, so that their dynamics can be easily noticed. The data underlying this research were provided by the National Institute of Statistics. In order to carry out this research, a series of specialized materials were consulted, which are also cited at the end of this paper.

RESULTS AND DISCUSSIONS

From the data provided by the National Institute of Statistics it can be observed that the area cultivated with wheat in the South-Muntenia Region, registered changes in the period 2014-2018 (see Fig.1). In 2014, the area cultivated with wheat from the South-Muntenia Region represented 27.95% of the cultivated area with wheat at national level, and in 2018, this region held a share of 27.83% of the total. The most significant area cultivated with wheat in this region was registered in 2014 (590,583 ha). Following some calculations, it was found that the area cultivated with wheat in the South-Muntenia region increased by 28.57% in 2014, compared to 1990. This increase was due to a combination of factors, but one of these factors was decisive, namely: subsidies granted for cereal crops. It is necessary to specify that the smallest area cultivated with wheat in the analyzed region was 582,361 ha (2017). It was observed that the area cultivated with wheat in the South-Muntenia region decreased by 1.40%, compared to 2014. In 2018, the area destined for this crop increased by 1.16%, compared to 2017, when the minimum point for the area cultivated with wheat in the studied region was registered. From the data presented and analyzed it is observed that the area cultivated with wheat in 2018 is lower than the area cultivated in 2014. In 2018, there was a decrease of the cultivated area by 0.25%, compared to 2014 [2].
This decrease of the registered area in 2018, compared to 2014, does not represent a significant decrease, but it can highlight the fact that agricultural producers base their decisions on the structure of crops, differently from one year to another.
An aspect that needs to be emphasized is the fact that, in the conditions of the market economy, the farmers have to adapt their crops according to the requirements of the internal market and the external market.
In Romania there are several forms of support for wheat cultivation, such as: direct payment schemes; transitional national aid 1 (ANT1); state aid for the diesel used in agriculture [7].

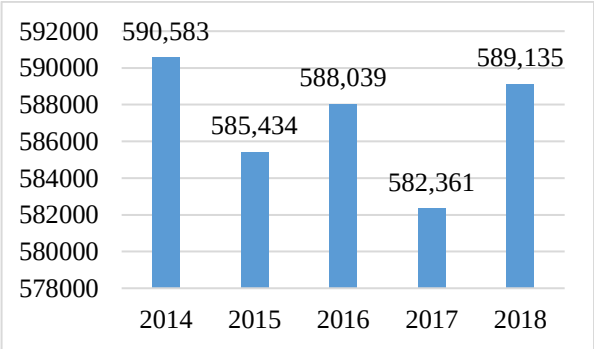

Fig. 1. Dynamics of the area cultivated with wheat, in the South-Muntenia Region, Romania (hectares)
Source: [8].

Regarding the areas that were destined for wheat cultivation in the counties from the South-Muntenia Region during the analysed period, it was observed that they registered variations from one year to another (Fig. 2).

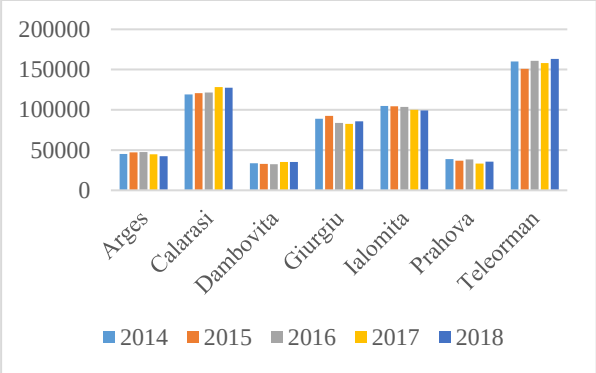

Fig. 2. The evolution of the wheat area in the counties from the South-Muntenia Region, in the period 2014-2018 (hectares)
Source: [8].

The first three positions in the ranking of the counties that have the most significant areas cultivated with wheat in the South-Muntenia Region are occupied as follows: Teleorman; Calarasi; Ialomita. From the presented data it can be observed that, in 2018, Teleorman county registered the largest cultivated area with wheat of 163,385 ha. In the analyzed year, this county cultivated 27.73% of the cultivated area with wheat at the level of the entire region and 7.72% of the surface destined for this crop at national level. In 2018, the area cultivated with wheat in Teleorman County increased by 2.03%, compared to 2014. In the situation in which the reporting is made comparative with the year 1990, it is found that, in 2018, the area cultivated with wheat increased by 51.67% in Teleorman county. The second place is occupied by Călărași county. Here, the largest area cultivated with wheat was recorded in 2017 (128,280 hectares). This county had a share of 22.02% of the area cultivated with wheat in the South-Muntenia Region and 6.24% of the area cultivated with wheat at national level, in 2017. In 2018, there was a decrease by 0.79%, compared to 2017, of the area destined for wheat cultivation. Ialomița County ranks third in the top. The largest area cultivated with wheat in this county was 104,771 hectares (2014). In this county, in 2014, was cultivated 17.74% of the area cultivated with wheat at the level of the South-Muntenia region and 4.95% of the area cultivated with wheat in Romania. In 2018, in Ialomița County, it was easily found a decrease of 5.27% of the area destined for wheat cultivation, compared to 2014, when the largest area with wheat was registered. Smaller areas cultivated with wheat, in 2018, were registered in the counties: Giurgiu (85,861 hectares); Argeș (42,367 hectares); Prahova (35,688 hectares) and Dâmbovița (35,302 hectares).

The total wheat production from the South-Muntenia Region registered changes in the interval subjected to analysis (see fig.3). In this region the lowest wheat production was recorded in 2014 (2,212,388 tons), and the highest wheat production was of 2,985,541 tons in 2017. It is easy to see that in 2017, the wheat production realized in the South-Muntenia Region represented 29.75% of the production realized in Romania.

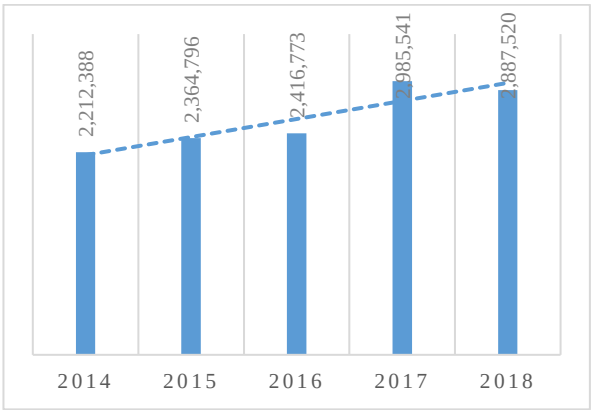

Fig. 3. Dynamics of wheat production in the South-Muntenia Region, in the period 2014-2018 (tons)
Source: [8].

In 2017, there was an increase of 34.94% in wheat production, compared to 2014. In this region in 2018, the wheat production decreased by 3.29% compared to 2017. In 2018, at the national level was achieved a significant wheat production, which placed Romania on the fourth place in the ranking of the wheat producing countries in the European Union. Romania, in 2018, held a share of 7.3% of the wheat production achieved in the European Union. According to the statistics published in 2018, 75.8% of the wheat production in the European Union was obtained in the following countries: France; Germany; United Kingdom; Romania; Poland; Spain and Italy [9, 11].

Wheat production in the counties of the South-Muntenia Region fluctuated from one year to another (Fig. 4). The production differences that were registered were due, on the one hand,

to the yields registered per hectare, and on the other hand, to the areas that were destined in each county for wheat cultivation. It is necessary to mention, in addition to the factors specified above, the lack of drought that directly contributed to the achievement of increased production [15].

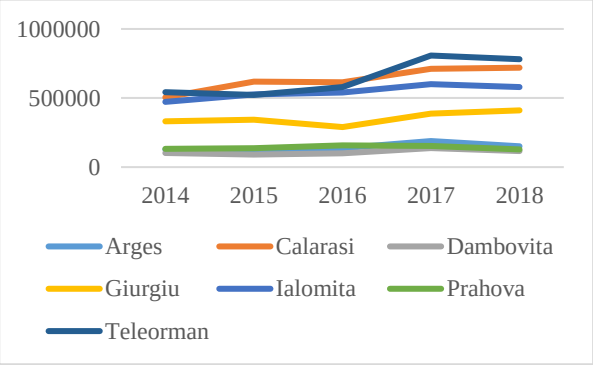

Fig. 4. Dynamics of wheat production in the counties of the South-Muntenia Region, in the period 2014-2018 (tons)
Source: [8].

The largest wheat production was registered in Teleorman County, in 2017 (807,624 tons). This production places this county on the first place in the ranking of wheat producing counties in the South-Muntenia Region. Teleorman County, in 2017, achieved 27.05% of the production achieved in the South-Muntenia Region and 8.04% of the total production registered in Romania. At the level of 2018, the whole Teleorman county occupied the first position in terms of wheat production achieved with 781,749 tons. In 2018, in this county the wheat production increased by 44.09%, compared to 2014 and decreased by 3.21%, compared to 2017. Călărași County, in 2018, was ranked second in terms of wheat production, with 719,600 tons. The production obtained in Călărași County in the year subjected to analysis represented 24.92% of the total production registered in the South-Muntenia Region and 7.09% of the wheat production achieved at national level. The third position in this ranking for 2018 is occupied by Ialomița County, with 580,541 tons. This county achieved in 2018, 20.10% of the production in the South-Muntenia Region, respectively, 5.72% of the production of Romania. At the opposite pole, the lowest wheat production for 2018 was registered in Dâmbovița County (117,118 tons). This county obtained in 2018, only 4.05% of the production made in the South-Muntenia region [3].

In the interval subjected to analysis in the South-Muntenia Region, the average production per hectare for wheat registered oscillations (Fig. 5).

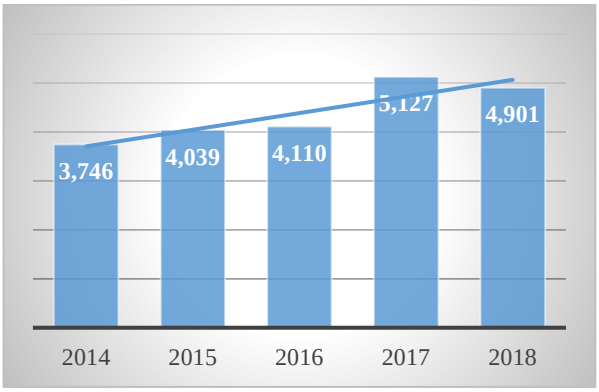

Fig. 5. Dynamics of average production per hectare of wheat in the South-Muntenia Region, in the period 2014-2018 (kg/hectare)
Source: [8].

The lowest average production per hectare for wheat was achieved in 2014 (3,746 kg/ha), and the highest was of 5,127 kg/ha (2017). The average productivity per hectare for the wheat culture in 2017, registered in the South-Muntenia Region exceeded the national average, which was of 4,888 kg/ha. In 2017, the average productivity per hectare for wheat increased by 36.86%, compared to 2014. This representative increase related to the average productivity per hectare for wheat cultivation was based on several factors such as: favourable weather conditions for wheat production; the use in culture of selected varieties; efficient pest control etc. In 2018, there was an increase of 30.83% of the average productivity per hectare for wheat, compared to 2014, but also, a decrease of yield of 4.41%, compared to 2017. In the South-Muntenia Region, in 2018, the average productivity per hectare for wheat exceeded the average registered in Romania, 2.25%. This aspect highlights on the one hand, the fact that the South-Muntenia Region is a favorable region for wheat culture, and on the other hand, that farmers are interested in this culture.

In the period 2014-2018, at the level of the counties from the South-Muntenia Region, the

change of the average production per hectare for wheat crop was observed.

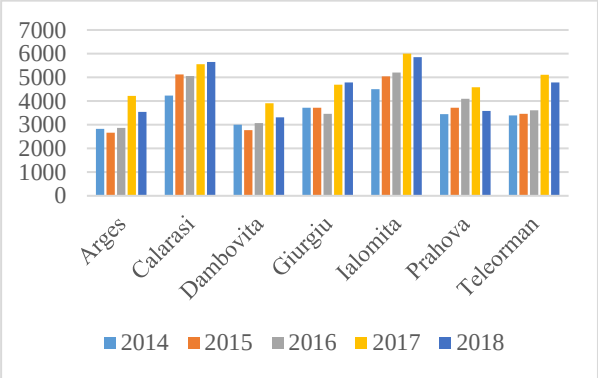

Fig.6 Dynamics of average production per hectare of wheat in the counties of the South-Muntenia Region, in the period 2014-2018 (kg/hectare)
Source: [8].

The lowest average productivity per hectare was achieved in Argeș County, in 2014 (2,832 kg/ha). On the other hand, the highest average productivity per hectare for wheat cultivation was registered in Ialomița County, in 2017 (5,995 kg / ha). This county maintains its first position in the ranking of counties in the South-Muntenia Region in terms of average production per hectare in 2018 (5.849 kg/ha). At the level of Ialomița county, in 2018, there is an increase in productivity by 29.77%, compared to 2014. Călărași County was ranked second in the ranking of counties with high productivity, in 2018, registering 5,654 kg/ha. In this county in 2018, the average productivity increased by 33.74%, compared to 2014. Teleorman County ranks third in this ranking, with 4,785 kg/ha (2018). Here, productivity increased by 41.23%, compared to 2014. After the first three ranked, the following positions for 2018 are occupied as follows: Giurgiu (4,782 kg/ha); Prahova (3,589 kg/ha); Argeș (3,536 kg/ha) and Dâmbovița (3,318 kg/ha). The average yields per hectare registered for wheat in the Romanian regions are below the European average. This fact is mainly due, according to the specialists in our country, to the arid climate, with quite high temperatures, especially for June [BSAF].
In the South-Muntenia Region, the average purchase price for wheat varied from one year to another. In 2014, the highest average purchase price was observed, of 0.79 lei/kg. This average purchase price registered in this region was higher, compared to the one registered at national level, in 2018 (0.76 lei/ kg). The lowest average purchase price in the South-Muntenia Region was achieved in 2016 (0.65 lei/kg). This price registered a decrease of 17.73%, in 2016, compared to 2014. In 2018, there was an increase of 1.53%, compared to 2016, of the average purchase price for wheat. Also, in 2018, there was a decrease of 16.46%, compared to 2014, for the average purchase price. In general, this price is determined by market conditions [4].
In the South-Muntenia Region, in the medium and long term there is, on the one hand, the possibility of attracting new arable land to the crop, and on the other hand, the productivity of this crop can increase if the farmers opt for those wheat varieties that require less water in the soil.

CONCLUSIONS

The analysis of the indicators related to the wheat market in the South-Muntenia Region of Romania highlighted the following representative aspects:
-In 2018, this region cultivated with wheat 27.83% of the total cultivated area at national level;
-In 2014, the largest area cultivated with wheat in the region was registered, of 590,583 ha;
-Teleorman County stood out within the South-Muntenia Region through the area destined for wheat cultivation. In 2018, in this county was cultivated 7.72% of the cultivated area with wheat at national level;
-In 2017, the highest wheat production in this region was registered, of 2,985,541 tons;
-Teleorman County registered, in 2017, the largest wheat production, of 807,624 tons;
-The highest average production per hectare obtained at regional level was of 5.127 kg/ha (2017);
-In 2017, Ialomița County stood out with the highest average production per hectare, of 5.995 kg/ha;
-In 2014, the highest average purchase price at regional level was registered, namely 0.79 lei / kg.

In the future, in the South-Muntenia Region there are increased chances in terms of increasing the productivity of wheat crops if farmers, on the one hand, will increase irrigation capacity and, on the other hand, will use the organic and mineral fertilizers compatible with the soil requirements.

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THE CONCENTRATION AND SPECIALIZATION OF EUROPEAN FUNDS FOR AGRICULTURE IN THE COUNTRIES OF CENTRAL AND EASTERN EUROPE

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Abstract

The current European policies for agriculture are characterized by efficiency and economic performance. Their main objective is the stability of the environment. For any European country, European integration represent or must represent stability and economic growth, this two elements being essential to adapt to the current macroeconomic changes. The main objective of this paper is to analyse the evolution of the situation of the countries of Central and Eastern Europe regarding the influence of European funds for agriculture. Being members of the European Union, the countries of Central and Eastern Europe had to adopt the acquis communautaire regarding European agricultural policy and must use EU funds for rural development. The aspect that individualizes this paper is the analysis of regional specialization and concentration of European funds for agriculture using the Herfindahl-Hirschman index. The analysis will be based on data from international institutions.

Key words**:** *regional development, rural areas, European funds, Herfindahl-Hirschman index*

INTRODUCTION

The Common Agricultural Policy is financed by two funds, part of the EU's general budget: the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). The first fund finances direct payments and market measures to stabilize agricultural markets (public or private storage and export refunds). The second fund finances the rural development programs of the Member States.
Within the multiannual financial framework 2007-2013, the EU contributed with 96 million euro to Rural Development Policy, focusing on the competitiveness improvement of farming and forestry, the environment protection of countryside, the improvement of the quality of life and the diversification of the rural economy. For agriculture and rural development the funds allocated were around 312 million.
For the period 2014-2020, the multiannual financial framework sustained CAP with 412 million euro [4].

Fig. 1. European budget 2014-2020
Source: European Commission, 2019 [2].

The EAGF pillar support farmers' incomes provided in the form of direct payments and market-support measures [3].
The European Agricultural Fund for Rural Development (EAFRD) has around 100 million euro and the implementation programmes will run until the end of 2023 [3].
This paper develop a methodological framework, trying to analyze and measure the relation between European funds for agriculture and specialization and

concentration of countries using statistical formulas, in particular index.

The specialized literature considers that economic development has a strong connection and has influenced regional specialization and concentration.

In 1991, specialization of countries in certain sectors and concentration of industries in regions have been considered identical by Krugman [10]. He used the data about American and European specialization regions and countries to analyze regional concentration.

Molle [12] in 1996, developed a study for EU15, considered the most extended about regional situation. His study process and analyze information about all 15 European countries.

In 2000, Hallet [9] which considered Molle's study one of the best, developed a system of indicators to measure concentration of clusters by using an index of income based on gross value added and gross domestic product.

Halle was followed by Mora and Carlos [13] in 2001, which developed a study about the evolution of regional specialization and concentration in Spain regarding agriculture regions. They have analyzed the Common Agricultural Policy implementation effect as result of joining the European Union.

Starting from Krugman's model, Rossi-Hansberg in 2003 developed their own model and proved that specialization and concentration go in opposite directions when transport cost change. The specialization is higher and the concentration is lower when transport costs are lower [14].

Cepraz in 2008 [1] used in his analyse Herfindahl index for an absolute measurement and Gini index and the Krugman index for a relative measurement. He considered that specialization and the regional concentration constitute major constraints for the competitiveness and the European integration.

According him, specialization of a region is defined by the grouping of the activities of this zone in one or several industries, while geographical concentration measures the geographical distribution of a sector in a territory.

Geographic concentration of economic activity represent, according to Goschin [7] in 2009, its geographical distribution, while regional specialization represent territorial perspective showing the map of distribution of economic activities at national level.

Regional specialisation expresses the territorial perspective (the distribution of the shares of the economic activities in a certain region), while geographic concentration of a specific economic activity reflects the distribution of its regional shares [8].

According Tluczak [15] in 2015 there is a concentration of agricultural production in the EU and there are the countries specializing in a particular types of agricultural production.

In the Central and Eastern European countries expands specialization in some domain, while in the same areas, the concentration increases in other West European Countries [15].

MATERIALS AND METHODS

The main objective of this paper is to analyse regional specialization and concentration of European fund for agriculture in ten countries of Central and Eastern Europe: Romania, Poland, Bulgaria, Hungary, Czech Republic, Estonia, Latvia, Lithuania, Slovenia and Slovakia. The data were collected using officials European sites, such as European Commission website and EUROSTAT statistics. The period considered was 2007-2018, a period that cover almost two multiannual financial frameworks for central and eastern European countries.

The level of absorbtion of European Common Agricultural Policy funds is different in each Central and Eastern European countries.

In all the Central and Eastern countries there is an increase in the concentration of production, although the pace of this process is different [13].

In our paper, concentration and specialization have the following meanings.

Concentration means that the funds from a particular pillar are concentrated in few countries. It means that the funds are used or not by all countries equally or not.

The specialization refers to the fact that some countries focuses on the use of certain pillar of the funds.

Herfindahl-Hirschman index has absolute values and 1 is the maximum value that can be achieved.

"The Herfindahl-Hirschman index value is increasing when the level of concentration and specialization is increasing.

When the maximum value of the index is 1, that means country is specialized in a single economic activity and the economic activity is concentrated in country j.

The concentration is minimum when 1/j has the same value for all funds. In this case the fund j have the same share in all countries.

The specialization is minimum when 1/i has the same value for all countries. In this case the funds have equal percentages in country i" [11].

Herfindahl-Hirschman index measures Regional specialization (H_i^S) and regional concentration (H_i^C).

HHI for regional specialization

$$H_i^S = \sum_{j=1}^{m} (g_{ij}^S)^2$$

where:

i represent country;

j represent fund;

g^s_{ij} represent the percentage of fund j on total amount allocated for country i.

HHI for regional concentration:

$$H_j^C = \sum_{i=1}^{n} (g_{ij}^C)^2$$

$$g_{ij}^C = \frac{X_{ij}}{\sum_{i=1}^{n} X_{ij}} = \frac{X_{ij}}{X_j}$$

$$g_{ij}^S = \frac{X_{ij}}{\sum_{j=1}^{m} X_{ij}} = \frac{X_{ij}}{X_i}$$

where:

i represent country;

j represent fund;

g^c_{ij} represent the percentage of country i on total amount allocated for fund j.

RESULTS AND DISCUSSIONS

The Common Agricultural Policy is part of Sustainable growth and natural resources, which represent 420 billion euro, almost 38,7% of European budget. The share of the expenditure of the Common Agricultural Policy (CAP) over the years in EU budget has decreased, from 73% in 1985 to 37.2% in 2018. The reason is represented by the EU enlargements, CAP reforms and the growing share of other EU policies [5].

Table 1. CAP Absorbtion rate (% of EAFDR payments) 2007-2013 and 2014-2028

	CAP Absorption rate 2004-2018 (%)	CAP Absorption rate 2007-2013 (%)
Poland PL	31	99,9
Romania RO	48	95
Latvia LV	60	99,9
Estonia EE	48	99,9
Bulgaria BG	28	90
Lithuania LT	49	99.9
Hungary HU	31	97.6
Czech Rep. CZ	47	99.9
Slovenia SI	43	97
Slovakia SK	41	99.3
UE	42	97.6

Source: European Commission, 2019 [6].

For the period 2007-2013 the funds for market related expenditure and direct aids are at a higher level, which shows that these activities have a higher level of concentration, compared to the other categories of expenditure included in the study.

We can be observe from Fig. 2 that the degree of concentration is accentuated in 2007, especially for market related expenditure and direct aids, because this kind of funds were drawn in particular by two countries Germany and Poland.

Romania, which had just entered the EU in 2007, was not prepared for the specific regulations and methodologies for attracting these funds, which led to the attracting of very few CAP funds.

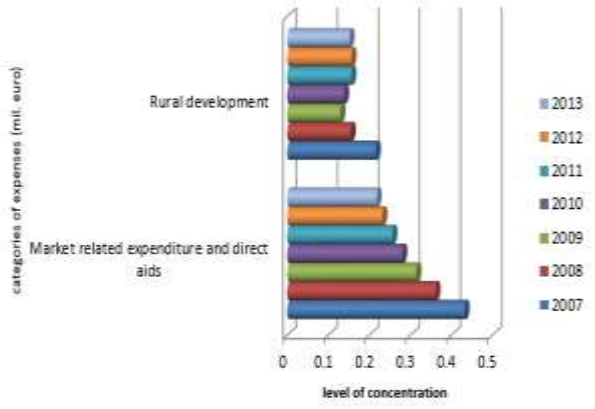

Fig. 2. Herfindal-Hirchman concentration index - category of expenses calculated for Central and Eastern European countries (CEE 12)
Source: Own calculation.

According to the results, Germany has the largest concentration of 0.37729 for market related expenditure and direct aids and 0.180 for rural development.
In 2013, the concentration decreased compared to 2007 because the discrepancies between the volume of funds attracted by each country narrowed.
The results from Table 2 show that in 2007 Romania has a high specialization on a certain category of expenses, the values of the indicator being very close to the maximum limit - 0.99972, followed by Bulgaria and Germany.

Table 2. Concentration for the period 2007-2013

HCj country (concentration)	2007	2008	2009	2010	2011	2012	2013
Market related expenditure and direct aids	0.431994	0.360979	0.314584	0.280174	0.256135	0.231618	0.217869568
Rural development	0.215779	0.154689	0.129446	0.138582	0.156128	0.156606	0.151803419

Source: Own calculation.

Table 3. Herfindal-Hirchman specialization index of countries calculated for Central and Eastern European countries (CEE 12)

HSi countries (specialization)	2007	2008	2009	2010	2011	2012	2013
Bulgaria	0.99785	0.51100	0.54027	0.50044	0.59579	0.513754	0.51251932
Czech Republic	0.50003	0.52948	0.51172	0.51359	0.51906	0.543743	0.574930121
Germany	0.71357	0.76996	0.75875	0.71821	0.69503	0.687772	0.6930334
Estonia	0.54048	0.50450	0.53515	0.51844	0.51232	0.511704	0.508069072
Latvia	0.55621	0.54811	0.50878	0.53703	0.51782	0.528874	0.504216387
Lithuania	0.54240	0.58321	0.50261	0.50004	0.50197	0.515176	0.515889625
Hungary	0.50000	0.63808	0.51518	0.56346	0.58733	0.599022	0.598687856
Austria	0.55820	0.52551	0.51201	0.50707	0.50980	0.513462	0.512969257
Poland	0.52393	0.51094	0.53088	0.50946	0.51006	0.515496	0.53806191
Romania	0.99972	0.50304	0.50044	0.50181	0.50171	0.500635	0.500033245
Slovenia	0.59778	0.55137	0.52045	0.50509	0.50007	0.50009	0.557207803
Slovakia	0.51262	0.50184	0.50914	0.51629	0.50270	0.503612	0.545887002

Source: Own calculation.

The first two are highly specialized, absorbing funds especially in market related expenditure and direct aids and almost zero funds on rural development.
We can say, however, that the other countries have started to attract more and more funds.
For the second period of multiannual financial framework 2014-2018, concentration of funds for market related expenditure and direct aids is decreasing, compared to the period 2007-2013, although Germany and Poland remain leaders in attracting these funds.
According to the data in Table 2, Germany, Hungary and Poland have a high degree of specialization, preferring to attract funds from Market related expenditure and direct payments, while Romania does not specialize in a particular fund, preferring to draw approximately equally from both sources.

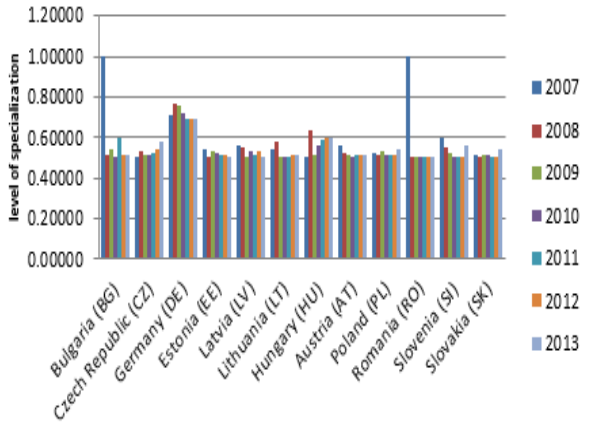

Fig. 3. Herfindal-Hirchman specialization index of countries calculated for Central and Eastern European countries (CEE 12)
Source: Own calculations.

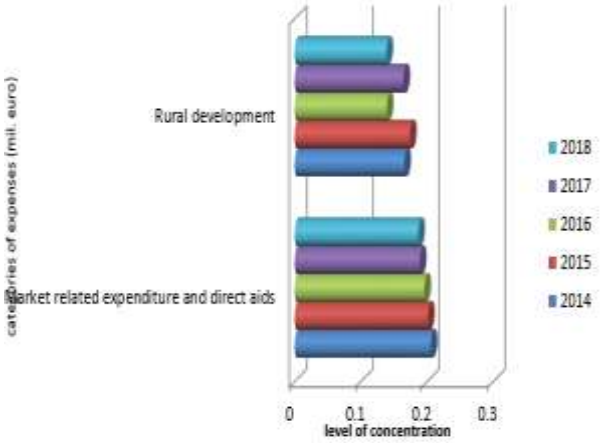

Fig. 4. Herfindal-Hirchman concentration index - category of expenses calculated for Central and Eastern European countries (CEE 12)
Source: Own calculation.

Table 4. Herfindal-Hirchman specialization index of countries calculated for Central and Eastern European countries (CEE 12)

HSi countries (specialization)	2014	2015	2016	2017	2018
Bulgaria	0.52194	0.52829	0.61752	0,68825	0.67865
Czech Republic	0.63441	0.67207	0.59203	0.64509	0.60050
Germany	0.74133	0.78708	0.70179	0.73330	0.70113
Estonia	0.52789	0.59323	0.50063	0.50628	0.50003
Latvia	0.59302	0.57336	0.50113	0.51093	0.50536
Lithuania	0.53033	0.67411	0.52630	0.53843	0.57340
Hungary	0.58650	0.62237	0.67260	0.77344	0.64999
Austria	0.59240	0.53259	0.50186	0.52028	0.51334
Poland	0.54694	0.59891	0.64157	0.75717	0.66165
Romania	0.52816	0.50009	0.51248	0.50532	0.52538
Slovenia	0.50280	0.62231	0.50233	0.54096	0.51029
Slovakia	0.59638	0.65917	0.64984	0.60184	0.57318

Source: own calculation.

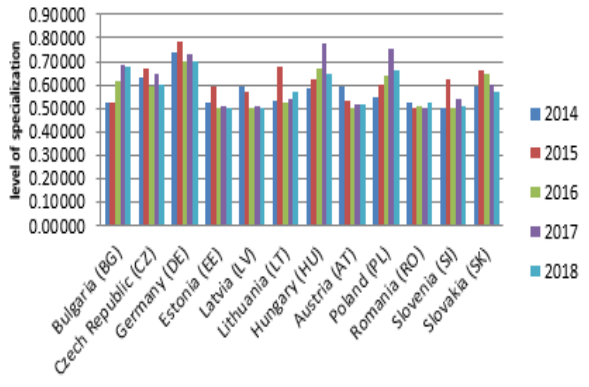

Fig. 5. Herfindal-Hirchman specialization index of countries calculated for Central and Eastern European countries (CEE 12)
Source: Own calculation.

CONCLUSIONS

Countries have to specialize in certain domains, and should attracts and uses EU funds in areas that offer the greatest advantages.
The Common Agricultural Policy will continue to be an important element in supporting the countries of Central and Eastern Europe, taking into account the fact that some of them, such as Romania and Bulgaria, have large agricultural areas. More than that the percentage of population working in agriculture is higher than the European average.
The real problem is that in some countries the productivity is lower than the European average. Therefore, those countries could specialize in attracting direct aids funds, being able to increase the ability of farmers to produce more, using modern techniques.
Regarding rural development, Romania and Bulgaria are far behind the other 10 European countries. They should specialize in attracting

rural development funds to support sustainable development.

The decision of some less developed countries to specialize on all funds is understandable, but for the future, they must choose those directions that will bring them competitive advantages, at national and international level.

Despite the large heterogeneity, it is found that the new member states of the European Union are becoming closer to the economic profile of the old European states.

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FOOD SECURITY MAINTENANCE BASED ON THE DEVELOPMENT OF THE MILK AND DAIRY MARKET IN FOREIGN COUNTRIES AND RUSSIA

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Abstract

The aim of the article is to identify the most important areas of ensuring food security in foreign countries and Russia based on the development of the milk and dairy products market. The main organization performing the task of providing the population with high-quality products is the Food and Agriculture Organization United Nations - FAO. The authors analyze the production and processing of milk, the productivity and number of cows, and the condition of the feed base. An analysis of the development of the feed base indicates that the specific feed intake in Russia is 1.4-1.5 times higher than in developed countries. This problem can be solved through the intensification of field fodder production and the radical improvement of natural forage lands. To increase the efficiency of the industry and develop the market for milk and dairy products, the authors consider it appropriate to implement a set of measures, such as state interest, development of feed production, re-equipment of processing enterprises and the creation of new high-quality products, equalization of per capita incomes.

Key words**:** *import and export, food security, milk and dairy products market, agriculture*

INTRODUCTION

An important role in the food security system of any country is played by livestock production. To make management decisions aimed at eliminating the problems facing agriculture and the processing industry, a comprehensive analysis of the relevant markets is needed. Social-economic development and transformations of the last decades in many countries of the world economy demonstrated the potential developments in the ways of conducted reforms and strategies of transformations [5].

The main objective of ensuring food safety is the production and sale of high-quality and competitive dairy products both on the world market and within a single country. In the modern world, milk is no longer just a food product. First of all, milk is considered as a unique and most valuable source of protein, the deficiency of which is experienced by most countries of the world. Moreover, the need for this protein is growing every year with the growth of the world's population and its well-being.

The quality of raw materials and food products must meet established requirements and guarantee safe consumption. A person should receive with food the whole complex of substances necessary for the normal development of the body and at the same time be sure of its safety, i.e. in the absence of substances harmful to health and the environment [8].

MATERIALS AND METHODS

The period analyzed in this research was 2010-2018. The main data was obtained on the official website of the Food and Agriculture Organization of the United Nations, the Federal State Statistics Service of the Russian Federation, the Ministry of Agriculture of the Russian Federation and other sources. Research methods - monographic, economic-statistical, abstract-logical, balance, analysis method.

RESULTS AND DISCUSSIONS

The issue of food security in the world is addressed by the Food and Agriculture

Organization United Nations - FAO [1]. Each state should strive to ensure the consumption of food products in the country at the level of 70-80% due to domestic food production. Vital food products, such as milk, meat, grain, butter and others, are produced in the agricultural industry. Economic development of countries results in a decreasing share of agricultural production in the Gross Domestic Product (GDP) structure. On the one hand, this is conditioned by a low elasticity of agricultural products demand, on the other hand by low efficiency of production factors in the agriculture in relation to other economic sectors, whereas an improvement in agriculture productivity is a prerequisite for the stable economic development [3].

Table 1 presents the GDP of some countries for 2017-2018.

Table 1.Gross domestic product, USD bln.

Country	2017	2018	2018 in comparison with 2017, %
European Union	17,345	18,749	108.1
Eurozone	12,635	13,670	108.2
Great Britain	2,609	2,808	107.6
Germany	3,618	4,029	111.4
Spain	1,302	1,437	110.4
Italy	1,895	2,087	110.1
Netherlands	799	821	102.8
Russia	1,442	1,576	109.3
Romania	197	206	104.6
Turkey	769	833	108.3
Ukraine	95	121	127.4
France	2,570	2,795	108.8

Source: [7].

So in 2018, GDP in Germany amounted to 4,029 USD billion, which is 11.3% higher than in 2017. In Russia, this indicator for the year 2018 increased by 9.3%, in Romania by 4.6%. In the USA, in 2018 GDP amounted to 20,494 USD billion. The share of agriculture in Russia's GDP in 2018 was 4.1%, Romania - 10%, USA - 1.9%, Germany - 1.5%, etc.

Models and methods of ensuring food safety in different countries differ from each other. Singapore is the leader this year in the world food safety rating compiled by The Economist, a British magazine. The main emphasis should be directed to the sustainable development of the domestic production of the main types of agricultural raw materials and prepared food, sufficient for both ourselves and for export supplies. Then the income from trade abroad will help close the domestic demand for goods that are not produced in the country - the so-called critical imports.

From the point of view of ensuring food security, the current state and development of agriculture cause some concern. The main reasons for this state of affairs are the lack of a single mechanism for the development of agribusiness, the use of outdated production technologies, poorly developed agricultural infrastructure, underestimation of the role of farmers in the development of agribusiness, low support from the state, while at the same time high lending level [2].

Increase in efficiency of functioning of branch of dairy cattle breeding requires introduction of the mechanism of food communications at which agricultural producers would have a possibility of reliable sale of milk and receiving have arrived [9].

Often in some countries, the market for milk and dairy products is formed through domestic production and imported supplies of inadequate quality. It is difficult to achieve a high level of self-reliance within the country and to prevent the supply of milk and dairy products with a high content of palm oil. At the same time, each state seeks to increase the volume of exported products and establish distribution channels. The policy of import substitution is possible only under the condition of expanded reproduction.

The volumes of export and import of dairy products primarily depend on the volumes of production and processing of milk, the number of cows and their productivity.

In 2018, India became the leader in the number of milk cows - 58.5 million heads. The European Union contains 23.3 million animals, Brazil - 16.21 million animals, the United States - 9.38 million animals, China - 7.2 million animals, Russia - 7 million animals, Ukraine - 2.7 million goals, Belarus - 1.51 million goals, etc.

According to preliminary data from the Organization for Economic Cooperation and

Development (hereinafter referred to as the OECD-FAO), world production of all types of milk in 2018 amounted to 844 million tons, which is 2.5% more than in 2017.Total for the period 2014-2018, milk production increased by 6% [4] (Fig 1).

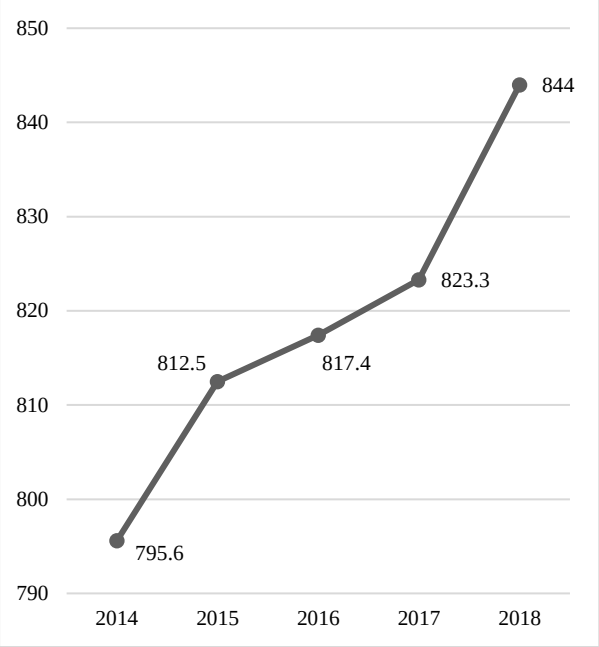

Fig. 1. World milk production in 2014-2018, mln tons
Source: Own design based on the data from [4].

In 2018, the EU countries became the leaders in the production of cow milk in the world - 141.2 million tons, the USA - 97.9 million tons, India - 83.6 million tons. These countries produce 64.3% of the total volume of cow's milk (501.6 million tons). In 2018, Russia produced 30.6 million tons of cow's milk, which amounted to 6.1% of total world production.

The production of the main types of dairy products throughout the EAEU over the past five years has a positive trend. In 2017, it was produced: liquid processed milk - 7,236.2 thousand tons or 3.5% more than in 2013, cheese - 870.1 thousand tons or more by 46.7%, butter - 455.2 thousand tons or more by 32.7%. In Russia, the production of whole milk products, which includes drinking milk, kefir, sour cream, cottage cheese, cream, yoghurts, etc., in 2018 amounted to 11.7 million tons (in terms of milk), which is 1% higher than last year.

In 2018, Russia produced 970 thousand tons of cheese, and by 2021 it will retain these volumes, but the EU countries with the production of almost 10.3 million tons in 2018 and 10.35 million tons in the next in the second, the United States with 5.95 million tons and 6.1 million tons, respectively. At the end of 2019, Brazil - 780 thousand tons and Canada - 519 thousand tons will also enter the top 5 world cheese producers.

The European Union produces more than 30 million tons of liquid dairy products per year, 9.8 million tons of fermented dairy products, 2.3 million tons of butter and milk fats, 9.2 million tons of cheeses.

The main problem today is the low level of consumption of milk and dairy products. So in Russia in 2018, per capita milk consumption amounted to 225.2 kg, with a recommended consumption rate of 325 kg per person. The low level of consumption is explained by the continuing decline in real disposable incomes of the population, an increase in low-quality goods from abroad, as well as an increase in prices for dairy products.

The consumption level for each country is different, for example, according to IDF in the Netherlands, the consumption of liquid milk per capita is 42 kg, butter - 4 kg, cheese - 21.7 kg per year, in Denmark consumption liquid milk per capita - 87.6 kg, oil - 6.2 kg, cheese - 27.5 kg per year, in France the consumption of liquid dairy products - 47.4 kg, butter - 8 kg, cheese - 26.4 kg, in Germany the consumption of liquid dairy products in Germany is per capita - 53.4 kg, oil - 5.9 kg, cheese - 24.3 kg per year.

The development of dairy cattle breeding in all countries depends on the state of the feed base and the balanced diet of cow feeding. The need for feed in agricultural organizations in Russia is satisfied mainly due to field feed production. The main direction of providing dairy cattle with fodder is to improve the structure of sown areas of fodder crops, increase the proportion of perennial grasses; increase in the level of feed production intensity [6]. In Russian farms, specific feed consumption is not only 1.3-1.5 times higher than in developed countries, but also 50-60% higher than zootechnical standards.

In our opinion, the main characteristics reflecting the development of the market for

milk and dairy products are: the availability of a high-quality domestic product in sufficient volume to satisfy the needs of the population, control over the pricing policy for finished products and an equitable distribution of income for each participant the technological chain, the use of milk interventions at the international level, etc.

Also, one of the characteristics of the development of the world market for milk and dairy products is the presence of sanctions (Russian food embargo) against Russia. Since 2014, the export of dairy products from the EU to the Russian Federation is prohibited. On the part of Russia, mutual bans will last until December 31, 2020.

Immediately after the imposition of sanctions, as well as after the first round of ruble devaluation that took place against their background (at the end of 2014-2015), a decrease in imports occurred for all types of dairy products. Since 2014, the import of powdered and condensed milk has more than halved, they began to buy cream butter, cheese and cottage cheese abroad by 1.6 times less. In general, the import of dairy products since 2014 decreased 1.7 times from 4 to 2.3 billion dollars, which became the main driver of growth in domestic production. Another factor restricting the import of dairy products is the import restrictions.

Under the influence of sanctions, the share of imports of dairy products (kefir and yogurt) increased, for example, in 2014 its share in foreign purchases of dairy products was 7%, and today, due to a decrease in the total volume of imports of other dairy products, already amounted to 12%.

At present, Belarus and the EAEU countries are the main partner of Russia in the import of milk and dairy products, so in 2018 almost 82% of imports were covered by Belarusian products. The main suppliers of dairy products to the territory of the EAEU in 2018 were:

- non-condensed milk and cream - Poland - 54% of the EAEU import volumes;
- condensed and dried milk and cream - Uruguay - 15.7%, the Ukraine - 14.5%, Argentina - 12.5% (5%), respectively, as well as New Zealand and Turkey - 13.3% and 12.7%, respectively;
- buttermilk, yogurt, kefir - Ukraine - 38%, Serbia - 18.3%, Switzerland - 13.5%, and Germany - 13.9%;
- milk whey - Argentina - 43.4%;
- butter - New Zealand - 63%;
- cheese and cottage cheese - Serbia and Argentina - 25.5% and 22.4%, as well as the Ukraine - 10.3% and Uruguay - 8.2%.

As for the export of milk and dairy, the main export market for Russia is represented by the countries of the EAEU and the CIS. In 2018, milk exports amounted to 284 USD billion, which is 1.2% lower than the level of the previous year. The decline in exports is associated with a decrease in supplies from Belarus, since domestic producers had to fill in the missing volumes of milk and dairy products in the domestic market, another point is fierce competition in the world market for the cost of production, which entails a decrease in milk prices and loss of profit.

A positive thing to note is Russia's entry into the dairy market of China, since the conflict between the USA and China in 2018 led to a reduction in US exports of whey by 36%, skimmed milk powder - by 54%, whole milk products - by 97%, cheese - by 56%. On the day, the United States lost 26% in dairy exports. China has limited the duration of old import tariffs on American goods. China’s actions open up new stable sales channels for Russia, which in the future will give another impetus to increase production of milk and dairy products.

In 2018, a decrease in the EU intervention fund was observed on the world market of milk and dairy products. After the food embargo was introduced in 2014, the EU authorities bought milk powder from the market for several years in order to support producers. In 2018, the situation changed and the authorities began to sell stocks of dried skimmed milk powder. These actions led to a sharp increase in prices for milk powder, and, consequently, for other dairy products.

The demand for it depends on the price of a product, since most of the population does not have a sufficient level of income. Food security must be stable due to the fact that people have daily needs that should not suffer from sudden changes. Food should be affordable both in

terms of their physical availability and in relation to the purchasing power of the population. There are also two conceptual approaches to food security.

According to the first approach, the required level of security is achieved through the import of food products from several leading world producing countries, while at the same time either tariff barriers and non-tariff barriers for moving food and reducing state support for their agricultural producers are significantly reduced [8]. Another approach characterizes the direct subsidization of agricultural producers and the protection of the domestic food market, carried out by quoting food imports, customs duties to achieve the necessary level of self-sufficiency in basic food products.

CONCLUSIONS

The analysis showed that the global market for milk and dairy products for 2014-2018. unstable and changes under the influence of many factors (the introduction of the Russian food embargo, a reduction in the global intervention fund, rising prices for dairy products, changes in the structure of imports and exports of milk and others).

In order to achieve the goal of increasing milk production, increasing its economic efficiency of production and solving the problem of food security in all countries, more decisive and well-developed actions are needed. Namely:

•improve the regulatory legal framework for the functioning of the agro-industrial complex;
•monitor, forecast and control the state of food security;
•assess the sustainability of the country's economy to changes in world food markets and changes in the natural and climatic nature;
•assess the sustainability of the food supply of cities and regions depending on the external supply of food products;
•create state information resources in the field of ensuring food security.

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STUDY REGARDING THE EFFICIENCY OF THE TRAINING ACTIVITY IN THE TEACHING STAFF RESOURCE CENTERS FROM ROMANIA

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Abstract

Training market has a huge impact on the Romanian educational system. Due to this impact, the training courses must have a high quality as the competencies that are gained after participating at these courses are used in the educational process. The Romanian training market has a simple structure, with several types of providers offering training courses to people coming from various professional categories. Based on the intervention of the authority in the training process, we can differentiate between state providers, such as Teaching Staff Resource Centres (TSRC – Casa Corpului Didactic, CCD, in Romanian), private providers that depend on the central authorities and own private providers. Teacher training is mainly made by the Teaching Staff Resource Centres and private providers that run courses with the approval of the Education and Research Ministry. Due to the importance of the quality of this process, we are presenting in this paper several pre-requisites for a research whose aim is to show the correlation between the leadership style of the TSRC managers and the training offer of their TSRC, with an example on the agricultural educational environment.

***Key words*:** *leadership, training, questionnaire, traits*

INTRODUCTION

As every educational process, teacher training has to generate a great deal of efficiency, as the teachers are key factors of the national educational system. The courses offer has to comply with the needs of the trainees and to align with the external influential factors, such as technology and social phenomena, as well with the internal ones, such as the vision of the manager of the provider unit.

The particular characteristic of the structure of the Romanian training system in the educational area leads to the need of the existence of a great deal of efficiency, especially on the qualitative aspect of training. Thus, the offer must reflect the managerial competencies of the Teaching Staff Resource Centers (TSRC) administrators and their personal influence on the professional activity. The local and personal aspects include the educational background and the professional activity of the administrator and they indirectly influence the training dynamics of the institution and of the local training environment.

In this paper, we present a research which studies the link between these personal elements of the manager and the training courses offer of the managed institution. Thus, section Materials and methods contains details referring to the descriptions of the instruments used in the research and the steps followed to implement this research. Section Research and discussions refers to the steps of the methodology that have been completed during the research process.

MATERIALS AND METHODS

We will describe in this section the mathematical model of the research, formed from the parameters of the model and the methodology used to obtain the desired results. The purpose of the research is established on two results:

R1. The emphasis of the influence of the leadership styles on the training courses offer of the TSRC for the teachers
R2. The determination of the training needs based on the analyses resulted from the study of the TSRC training offers

In order to materialize the research on the leadership styles of the directors of the Teaching Staff Resource Centres and their influences on the continuous training offers for pre-university education, the methodology used is based on the existing specialized literature (Goleman et al., 2006) [7], adapted and completed for the research undertaken.

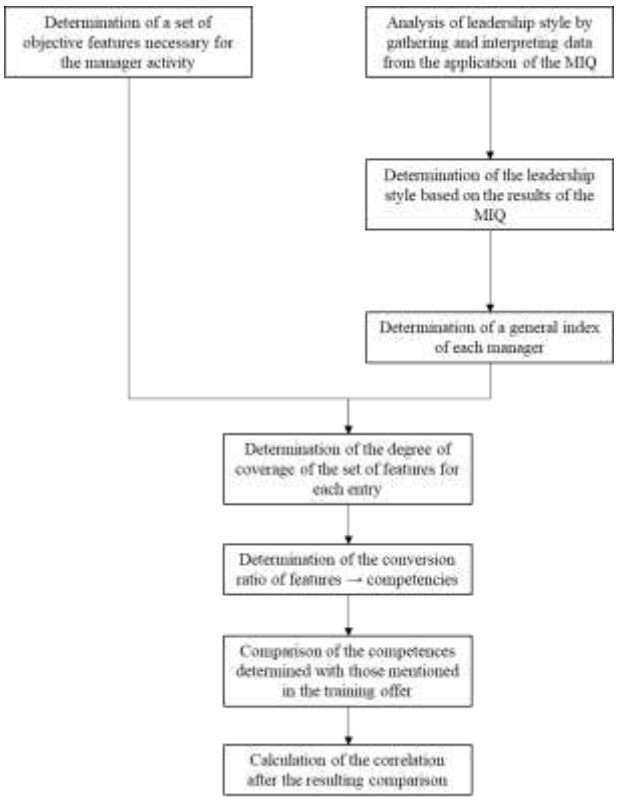

Fig. 1. The methodology used for the determination of the purpose
Source: Own determination.

Thus, it will be proceeded to:
(1)Determination of a set of objective features necessary for the manager activity;
(2)Analysis of leadership style by gathering and interpreting data from the application of the Manager Influence Questionnaire (MIQ);
(3)Determination of the leadership style based on the results of the MIQ;
(4)Determination of a general index of each manager by corroborating the data obtained from the MIQ with other data from the analysis of the educational activity (level of education, experience in education, etc.) and of adjacent data regarding the managerial activity;
(5)Determination of the degree of coverage of the set of features for each entry;
(6)Determination of the conversion ratio of features → competencies;
(7)Comparison of the competences determined with those mentioned in the training offer;
(8)Calculation of the correlation after the resulting comparison (Fig. 1).

Step 1 will take into account various research studies from the literature regarding the features that a leader is recommended to have and use in its managerial and professional activity. The specificity of this step is considered to be the existence of the features needed in an educational process.
The set will be compiled from the results obtained in the literature.
The second step consists in the determination of the leadership style of the manager by applying a Manager Influence Questionnaire (MIQ) formed of three main parts:
-The Multi-form Leadership Management Questionnaire MLQ-6S, adapted from the literature (Bass et al., 1990; Bass et al., 2004) and used for the determination of the leader type. The structure consists in the existence of 21 items in the form of Likert scale.
-The Big Five Inventory (BFI / BFIQ / OCEAN) Questionnaire, also adapted from the literature (Goldberg, 1993; Costa et al., 1992; Rothmann et al., 2004; John et al., 1991; John et al., 2008; Benet-Martinez et al., 1998) [3, 4, 5, 8, 9, 11] and used for the determination of the personality type. It is formed from 44 items in the form of a Likert scale.
-The Training Activity Questionnaire (TAQ), built from own structures and which refers to the perception on the training activity. It is formed from 5 multiple-question type items.
As observed, the MIQ instrument combines the traditional well-known instruments from the literature with the particular statistical instruments used in assessing the training activity and in the pre- and post-analysis of the courses efficiency.
The MLQ-6S is supposed to link the leadership style with the qualitative characteristics of the training courses offer. Thus, this instrument

must offer indications to the connection between the type of the leader and the nature of the courses, as in topics and delivered competencies. The final result will be the MLQ index (MLQI).

The BFIQ is designed to suggest a connection of the personality type with the numerical facts of the training offer, on one hand, and the indicators of the courses development, on the other hand. Thus, the openness of the manager to training market is studied using this instrument by relating the number of training programs and the training activity indicators (number of groups, number of trainees). The final result will be the BFIQ index (BFIQI).

The TAQ studies the direct opinion of the managers on the matter of training activity and its results. It is designed to validate the connections from the other two questionnaires, being based on several aspects involved in the formal analysis of the training programs. The final result will be the TAQ index (TAQI).

The results from the MIQ leads to the completion of the step 3. The results from the MLQ-6S questionnaire consist in numerical scores from 0 to 12, based on the chosen degree on the scale for each question, also creating seven categories of transformational leaders. The results from the BFI questionnaire are also obtained as a score that groups the respondents in five categories. As for the TAQ results, they are also categorizable and numerical scores are derived and obtained from the responses.

$$MIQI = \frac{MLQI + BFIQI + TAQI}{3}$$

The scores obtained from the MIQ will be grouped in the MIQ index (MIQI), the result of the step 3, that will be part of the Training Management General Index (TMGI), obtained based on the activity made in step 4.

The TMGI is obtained as a result of corroborating:

- the MIQ index, described in the previous rows;
- the International Standard Classification of Education (ISCED) level coefficient, denoted by ISCEDL;
- the educational background coefficient (depending on the number of years of educational activities, denoted by EBI);
- the coefficient of the score obtained at the submission within The National Body of Educational Management Experts (known as CNEME) and registered in the National Register of Educational Management Experts, which we will denote as EMEI;
- the number of professional credits of the training programs in the offer accredited in the period of management, denoted by ECI;
- the coefficient of the number of trainees formed in the institution in the period of management, denoted by ETI.

$$TMGI = \frac{MIQI + ISCEDL + EBI + EMEI + ECI + ETI}{6}$$

The parameters of this mathematical model are those described above and their mathematical description is as follows:

- MIQI ($0 < MIQI \leq 1$) is obtained as a mean from the values of the coefficients from the three sections of the questionnaire (MLQ-6S, BFIQ and TAQ), as follows:

$$MIQI = \frac{MLQI + BFIQI + MIQI}{3}$$

- ISCED level has values from 1 to 8, thus ISCEDL ($0 < ISCEDL \leq 1$) will be obtained as:

$$ISCEDL = \frac{ISCED}{8}$$

- EBI ($0 < EBI \leq 1$) is obtained as the ratio between the number of years of experience in the educational field (and the maximum possible number of years that can be used as experience, calculated as difference between the retirement age (RA = 68) and the major age (MA = 18), as follows:

$$EBI = \frac{EB}{RA - MA}$$

- EMEI ($0 < EMEI \leq 1$) is obtained as the ratio between the score obtained at the submission within the CNEME

(CNEMES) and the maximum score (100), as follows:

$$EMEI = \frac{CNEMES}{100}$$

- ECI ($0 < ECI \leq 1$) is obtained as a ratio between the average number of credits per course (calculated as the sum of credits of all accredited courses – SC – per number of courses – NC) and the maximum number of credits per course (CPT), as follows:

$$ECI = \frac{SC/NC}{CPT}$$

- ETI ($0 < ETI \leq 1$) is obtained as a ratio between the number of trainees formed in the institution on the period of management (T_T) and the number of teachers in Romania (T), as follows:

$$ETI = \frac{T_T}{T}$$

The TMGI will be used thereafter as an indicator of the training activity efficiency based on the results of the research and will be part of the determination made at step 5 and will also be a validation point for the correlations that will be obtained in the next steps.

Step 5 will then consist in the creation of a comparison chart that will match the obtained features for each entry with the ones established previously at step 1. This step prepares the research for the determination of the correlation between the features established at the previous step and the corresponding competencies that are linked to those features. Then, these competencies are compared to those trained in the courses and the correlations are made. The final results are registered as a final coefficient which will determine the correlation between the leadership type and the training offer characteristics.

In this paper, we will analyse the literature regarding the pre-operational phase of the research, based on the selection from the literature of the features that a manager has to have and we will present the profiles of the six leaders taken into consideration, as well as the configuration of the training offers in the managed institution.

RESULTS AND DISCUSSIONS

The first part of this sections is related to the determination and selection of the features that a leader needs in order to properly run the training activities within the institution.

Some studies (Khoshhal et al., 2016) [10] categorize these features in two classes: innate traits and learnable features. Examples of the ones related to personality are charisma, vision, energy, caring and empathy. On the other side, leaders can learn skills related to dealing with people, concepts regarding finance, policies and negotiation skills, networking, planning skills and organizational properties.

Regarding the traits based on the leadership styles (Salvaggio et al., 2007; van Eeden et al., 2008) [12, 13], in the literature there were established key features as consciousness, agreeableness, emotional stability, extraversion, openness and quality orientation.

One of the most comprehensive study regarding the features of a leader at a workplace from the emotional point of view (Goleman, 1998) [6] categorizes these features in five groups:

-Self-awareness: faith, self-confidence, realistic self-assessment and self-deprecating sense of humor;

-Self-regulation: trustworthiness, integrity, comfort with ambiguity, openness to change;

-Motivation: strong drive to achieve, optimism, organizational commitment;

-Empathy: expertise in building and retaining talent, cross-cultural sensitivity, service to clients and customers;

-Social skills: effectiveness in leading change, persuasiveness, expertise in building and leading teams.

In the final form, the traits taken into consideration are shown in Table 1.

Table 1. The determination of the personality traits of a manager from the literature

Criterium	Traits
based on achievement	charisma, vision, energy, caring, skills related to dealing with people, concepts regarding finance, policies and negotiation skills, networking, planning skills and organizational properties
based on leadership style	consciousness, agreeableness, emotional stability, extraversion, openness and quality orientation
based on emotional intelligence	self-awareness: faith, self-confidence, realistic self-assessment and self-deprecating sense of humor; self-regulation: trustworthiness, integrity, comfort with ambiguity, openness to change; motivation: strong drive to achieve, optimism, organizational commitment; empathy: expertise in building and retaining talent, cross-cultural sensitivity, service to clients and customers; social skills: effectiveness in leading change, persuasiveness, expertise in building and leading teams

Source: Khoshhal et al, 2016, Salvaggio et al, 2007; van Eeden et al, 2008, Goleman, 1998 [6, 10, 12, 13].

Table 2. Raw data for the considered indexes

	AB	BT	DB	HD	PH	TR
ISCED level	8	7	7	7	7	7
Number of work years (EBI)	22	25	21	33	22	25
Score at CNEME submission (EMEI)	96	93	93	95	95	100
Number of accredited courses (NC)	1	14	0	16	19	15
Sum of the number of credits (SC)	30	250	0	261	315	261
Year of manager of TSRC	2019	2012	2020	2012	2009	2016

Source: TSRC websites.

The second part of this section is dedicated to the presentation of the information for the TSRCs taken into consideration.

The selected centres are those from the counties Alba, Botoșani, Dâmbovița, Hunedoara, Prahova and Teleorman. The information comprises the values needed for the indexes described in the section Materials and Methods and metadata regarding the courses offer. This data in a raw format is presented in Table 2.

After applying the formulas in the coefficient calculation form, the data is presented in Table 3.

Table 3. The value of indexes for the raw data in Table 2

	AB	BT	DB	HD	PH	TR
ISCEDL	1,00	0,88	0,88	0,88	0,88	0,88
EBI	0,44	0,50	0,42	0,66	0,44	0,50
EMEI	0,96	0,93	0,93	0,95	0,95	1,00
ECI	1,00	0,59	0,00	0,54	0,55	0,58

Source: Own calculation.

Regarding the courses related to management and rural development for the TSRCs taken into consideration, a large part of the courses in the offers refers to the domain of management and leadership, either general or for specific branches (HR, risk management, project management, educational management etc.), taking into account the development of teachers from agricultural-type establishments either by various agricultural-related topics or institutional management or funding projects management. Several topics are shown as follows, categorized by institutions:

-educational management, quality management, funding projects, ecology education, inclusive education, the development of specific personnel for physics, chemistry and biology labs, science teaching;

-project management, environment education, educational marketing, didactics of nature science, biology curricula, health management, financial management;

-financial education, sciences education, project and quality management, organizational concepts;

-curricular abilities for physics, chemistry, biology, technical domains, support for teachers from rural areas, entrepreneurship education;

-methodology for sciences, curricular ability for physics, chemistry, quality management, financial and nutritional education, human resources management, crisis management, acquisition management;

-strategies management, educational management, ethics.

CONCLUSIONS

The research is of a qualitative type, pursuing through it, in the long term, the development of the continuous training offer at the level of the current education system. In short, the research consists in establishing and studying the leadership styles at the level of the management of the Teaching Staff Resource Centers, in parallel with the analysis of the training offer provided by them, in relation to how to manage and generate these offers of the decision makers, following the results of the documentation and the analyzes should be correlated in order to provide relevant conclusions for the quantitative and qualitative development of the training process at the level of the state providers of continuous training within the pre-university education system. The documentations and analyzes will use general, traditional scientific instruments, offered by the specialized, innovative literature, which are being explored in similar researches, but also specific tools, generated especially for obtaining results extracted from particular situations. Future work consists in the determination of the rest of the steps of the methodology, which will be presented in a future paper, after applying the questionnaire to the selected target group.

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THE RISK MANAGEMENT IN THE TOURISM, RURAL TOURISM AND AGRITOURISM

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Abstract

When we think of tourism, one of the economic sectors with the greatest prospects for development, it is inevitable that we do not consider the multitude of risks related to this type of activity. This is why, in order to prevent the catastrophic effects that these risks could generate for both large operators and tourists, it is important to give special importance to risk management. Risk management in this field refers to a complex strategy, aimed at preventing and managing the causes and effects that could generate various crises or imbalances. The aim of this paper is to analyse the main elements that can generate crises or disasters, as well as their effects on the tourist destinations and provide information on the risk management processes for a tourism focused on quality and sustainability

Key words**:** *tourism, risk management, sustainability, catastrophic effects, strategy*

INTRODUCTION

In modern society, characterized by profound economic transformation, tourism is a key factor for economic and social growth and development. Over time, tourism has been on the rise and became according to the World Tourism Organization (UNWTO) ”one of the world's fastest-growing economic sectors”. The same Organisation asserted that in our days, the volume of tourism business is equal to or even exceeds the business of oil, food or car exports. ”Tourism is a branch of the national economy with complex functions that brings together a set of goods and services offered for consumption to people who travel outside their usual environment for less than a year and whose main reason is other than the exercise of paid activities within the visited site” [5, 13, 17].

Tourism and its most important forms (rural tourism and agritourism) provides one of the main sources of income for many developing countries, bringing them hope and prosperity [15]. “Tourists create additional demand for consumer goods and services, stimulating the tertiary sector (services, trade, craft industries, etc.)” [3].

Given the vulnerability and multiple influences which could affect tourism, risk assessment in this area is crucial. It is obvious that the number of tourist trips depends on the variety of the tourist offer, but also on the economic power of a country. Statistics have shown that during periods of economic recession, the number of foreign tourist decreases, but domestic tourism is not affected. When it comes to risk, we need to keep in mind that both foreign and domestic tourists can be affected. “Considering what Robin S. Sharma, a Canadian writer and leadership lecturer, said “when we stop taking risks we stop living life”, we can agree that risk is a concept we meet on a daily basis in all our actions, no matter if it implies personal matters, elements of an investment project or any other type of decision we should make in our personal life or as part of an organization” [10].

It is important to make a distinction between hazard, risk and risk assessment. The meaning of the word hazard can be confusing. Often dictionaries do not give specific definitions or combine it with the term "risk". For example, one dictionary defines hazard as "a danger or risk" which helps explain why many people use the terms interchangeably. Basically, a hazard is the potential for harm or an adverse effect (for example, to people as health effects, to organizations as property or equipment losses,

or to the environment) (Canadian Center for Occupational Health and Safety, www.ccohs.ca). On the other side, risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment loss, or harmful effects on the environment. Risk assessment is the process in which:

-hazards and risk factors that have the potential to cause harm (hazard identification) are identified;

-the risk associated with that danger is analysed and evaluated (risk analysis and risk assessment);

-the appropriate ways to eliminate the hazard or control the risk are determined when the risk cannot be eliminated (risk control).

The influence of environmental conditions (hazards, catastrophes, disasters) is the subject of numerous studies and analyses due to the difficulty of identifying the causes underlying their production, but also because of the effects that spread in the chain, affecting many countries around the globe. In recent years, most countries are facing a wide range of disasters and crises caused by natural, technological, biological or civil and political (military) hazards [8].

This is why, the most important objective of this paper is to analyse the main elements that can generate crises or disasters, as well as their effects on the tourist destinations and also to provide information on the risk management processes for a tourism, rural tourism or agritourism focused on quality and sustainability.

MATERIALS AND METHODS

The starting point in the elaboration of this study was the research and analysis of the documentation related to this topic and the extraction of conclusive information. It was necessary to compare several sources in order to acknowledge the accuracy and feasibility of the information. The research methods used were the documentation, analysis and processing of data obtained from various sources which included legislation, scientific papers on tourism, statistical data but also by other specialized websites.

RESULTS AND DISCUSSIONS

During the 21th century, the losses from disasters/catastrophes have expanded dramatically in many developed and developing countries. The trend towards increasing losses is on the rise, making active risk management more essential than ever. Disasters are often labelled low-frequency (probability)/high-severity events [16]. Unfortunately, disasters affect tourism and its forms but also the development of a country, in the medium and long term. No matter how much science and technology would develop, it is impossible to fully predict disasters. However, losses on individuals, industry and the economy as a whole can be mitigated by developing and adopting a disaster risk management strategy.

Any unforeseen events, every hazard always has a negative impact on tourism, which is first reflected through the number of tourists and later through the economic effects. If we analyses the hazards for tourism destinations, we observe 4 types of hazards (Table 1).

Table 1. Types of hazards in tourism

Atmospheric	Geological	Biologic	Human
Cyclones	Earthquakes	Human epidemics	Industrial accidents
Tornadoes	Tsunamis	Plant epidemics	Traffic accidents
Storms	Landslides	Animal epidemics	Crime, Terrorism
Floods	Volcanoes	Plagues	Economic
Frosts	Erosion	Fires	Political conflict

Source: adapted from [6].

When we talk about risks, we can identify a number of possible risks for tourists. In Fig. 1 there are presented some more important ones. According to the World Tourism Organization, there are four main sources of risks in tourism (UNWTO, 2015) [17]:

(1)Tourism sector and the related commercial sources (disrespect of contracts, frauds, insufficient level of hygiene and sanitary protection, fire, earthquake);

(2)Human and institutional environment outside the tourism sector (social conflicts,

wars, terrorism, organized crime, delinquency and human traffic);
(3)Personal risk - individual travellers (poor health, crime, causing conflict with local residents, visiting dangerous places, loss of money and documents, etc.);
(4)Physical risks from the environment - natural, climatic, epidemics (vaccination, visits to dangerous areas, exposing to dangers during natural disasters and epidemics).
Data on the effects of natural disasters show that, since the 21st century, over one million people have been killed and over 2 billion have been directly affected by natural disasters. Furthermore, natural disasters have themselves a tremendous impact on poverty [7]. These types of events can cause various effects on tourism in general and rural tourism in particular, being different in duration or area of spread. We can discuss about short-term or long-term effects, about the impact of the whole society or just a category of population, about the influences that propagate only in a certain community, region, country or continent.

Fig. 1. Risks for tourist
Source: [4].

If we were to analyse the main events that have had a major impact on tourism activity in the last decades, we could draw up the following list:
• Terrorist attacks in the USA on September 9, 2001.
• SARS virus outbreaks on February 26, 2003.
• Indian Ocean Tsunami on December 26, 2004.
•Tropical Cyclones Hurricane Katrina on August 23, 2005.
•Sichuan Earthquake in China on May 12, 2008.
• Haiti Earthquake on January 12, 2010.
•Japan Earthquake and Tsunami on March 11, 2011.
•Typhoon Haiyan in Philippines on November 8, 2013.
•The hurricanes Harvey, Irma and Maria in SUA, August-September 2017.
• Mexican Earthquake in September 2017.
•Vegetation fires in Greece (2018) and California (2019).
• Pandemic Covid 19, 2019-2020 [2].
The natural catastrophe balance for 2018 is high even though it is well below the average of the deaths recorded between 2000 and 2017.

Table 2. Natural catastrophes worldwide, 2003-2012 (2012, USD Billion)

Catastrophe type	**Number of events**	**Fatalities**	**Overall losses**	**Total Insured losses**
Earthquake/ tsunami	657	678,400	489	77.0
Tropical cyclone	424	65,500	539	234.0
Severe thunderstorm	2,375	6,310	206	126.0
Heat wave/ drought	207	132,600	118	22.0
Wildfire	524	1,270	27	11.0
Winter events	401	13,000	101	44.0
River flood/flash flood	2,458	54,600	274	48.0

Source: adapted from [16] .

The figures have been published by the UN Office for Disaster Risk Reduction (UNISDR) together with the Centre for Epidemiological Research on Disasters of the Belgian University of Louvain (local population does not know how to deal with major disasters and calamities) [1].
The tourism sector faces certain challenges, including those related to pricing difficulties, earnings and capital volatility, concentrations, limits of insurability, capacity constraints, and contagion effects. Catastrophes generally results in a large number of individual losses involving many insurance policies as summarized in Table 2. [16].

Tourism is extremely sensitive to all negative phenomena, both those related to the natural environment and to the social or political ones. Therefore, when considering a certain tourist destination, it is necessary to analyse all the weaknesses that are related to safety and security [14]:

-insufficiently developed network security in a destination;
-poor training of the local population;
-the desire for foreign currency inflows without proper control (money laundering);
-inadequate involvement of local people in tourism development;
-the difference between economic development of local community and countries of tourist demand;
-developing illegal forms of tourism (poaching, sex tourism, etc.);
-inappropriate behaviour of tourists (opposite to customs and religion of the local community);
-infiltration of terrorists in the local economy;
-inability to control mass tourist movements and seasonal labour in the tourist destination;
-tourism has become a "cover" for terrorist operations infiltration of terrorists in the local economy;
-inability to control mass tourist movements and seasonal labour in the tourist destination;
-tourism has become a "cover" for terrorist operations.

Due to recent discoveries in medicine and bioengineering, health risks (pandemics and chronic diseases) have had a lower impact, whereas since 2011, environmental risks have become more important. Descending sort of environmental risks are climate changes, natural catastrophes, extreme weather events, water crises, biodiversity loss and ecosystem and man-made environmental catastrophes. This is why, the risk management (the organizational process) and disaster risk management (the multi-agency, community-based process) in the tourism context refers to the planning and implementation of processes directed towards managing the adverse effects of crises and disasters on tourism destinations [12].

Tourism risk process management regards four aspects: risk environment, risk identification, risk analysis and risk treatment.

The evaluation and application of a risk management strategy in tourist destinations requires a lot of work and information. For a tourist to feel safe in a tourist destination, precise and well-defined measures are needed. The presence of the specialized personnel in security and protection, well trained it is mandatory. The space of a tourist destination is extremely vulnerable (especially when we speak about rural tourism or agritourism), this is why the protection of a tourist destination requires an exceptional insight about the space and possible devastations. Environmental protection of the area is a special part of tourism destination protection (ecological, historical, cultural and economic).

In the field of risk management strategy, after establishing the plans, procedures and systems for disaster coordination and management, partnerships between governments and civil society, the essential role of the personnel employed in tourist units should not be overlooked. It should always be informed, prepared and evaluated to deal with any risks that may arise [11].

Tourism destinations should consider for mainstreaming risk reduction in post-disaster recovery including the use of hazard scenarios to anticipate long term recovery issues. The desired result is a tourism destination that delivers on its promise consistently and has an established reputation for protecting its residents, businesses, and visitors against the effects of natural hazards [16].

Worldwide tourism and related industry are very badly affected by pandemics, because of the nature of the business. History had shown that epidemics and pandemics have an immediate impact especially on the accommodation units and restaurants, due to the international travel restrictions and all that major measures intended to prevent the spread of viruses. In March 2020, The World Health Organization decided that the situation generated by the new coronavirus is a pandemic, in the context in which there have been cases of infections in almost all countries of the world.

"As a result of the coronavirus, many countries and regions have imposed quarantines, entry bans, or other restrictions for citizens of or recent travellers to the most affected areas" [2]. Other regions and countries have imposed global restrictions that apply to all foreign countries and territories, or prevent their own citizens from travelling abroad. As a preventative measure, all the tourist attractions around the world, such as museums, amusement parks and sports venues, were closed.

According to the United Nations World Tourism Organization (UNWTO), "Tourism is currently one of the most affected sectors". Also, the Organization estimated that "global international tourist arrivals might decrease by 20–30% in 2020, leading to a potential loss of US$30–50 billion", and The World Travel and Tourism Council (WTTC) estimated that "up to 50 million jobs could be lost because of the pandemic". [17].

CONCLUSIONS

"Benjamin Franklin said that in the world we live in there are only two sure things: death and taxes, but that they also involve a certain degree of risk, in the sense that no one knows when he will die and how high the taxes will be" [9].

It is obvious that we live in an uncertain world and that any action we take now does not have a perfectly secure future outcome. In every corner of the globe, it is impossible not to find a tourist destination (regardless it takes place in a rural area or not) that has faced a certain type of natural disaster, at some point in history. Over time, unfortunate events have occurred, which in one way or another have affected tourism, both from the point of view of the visitor and the tourist service provider.

In order to manage the risks better in the tourism, rural tourism or agritourism context, careful and elaborate planning is required. It also requires the implementation of processes dedicated to preventing and mitigating the unfortunate effects of crises and disasters on tourism. Due to the several incidents that have occurred in recent years, security of stay and safety of a tourist destination have become basic elements in the selection of a tourist destination

Tourism risk management is an on-going process, with periodic monitoring and review of hazards, risk elements and progress, the results and effectiveness of risk management measures. Each tourist destination is unique, being exposed to different risks. However, some elementary aspects related to risk management, as well as the common concerns that these risks raise among all those involved in a tourist activity are common in all corners of the world.

By its character of mass and its complex content, tourism (inclusive rural tourism and agritourism) has a vast material and human potential, with important implications on society and economic evolution, on international relations. That is why is so important, in the conditions of today's society to analyse the different types of risk and the necessary measures to mitigate the negative effects that could affect this economic field in the future.

Currently, the effects of the pandemic are felt with a different intensity globally, depending on the number of victims and the economic and social measures imposed by the government of each country. However, economic estimates are bleak and those related to the Tourism are catastrophic. Today, it is not possible to estimate a period of relaunch of this sector, although the countries with a strong tourist activity have in projects plans to reopen and resume the tourist activity.

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SHORT FOOD SUPPLY CHAINS AS DRIVERS OF SUSTAINABILITY IN RURAL AREAS

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Abstract

Current food systems face major challenges in terms of sustainable development in social, economic and environmental dimensions. These challenges are related to the long-standing industrialization of agricultural production processes, the food industry and the associated longer and more transparent supply chains. The article was written in response to the question of the existence of short food supply chains (SFSC) in Bulgaria and their contribution to sustainable rural development.Cases and interviews were conducted with farm owners as representatives of the SFSCs in the country. A description of the case of SFSC in an organic farm in Bulgaria - Sofina farm is presented. Various survey methods have been applied, including primary data collection, case study approaches, interviews with farm managers, as well as desktop research. The conclusions we draw from the study relate to future policies that need to be followed to improve the sustainability of rural areas, which must undoubtedly take into account regional differences between actors in supply chains, different types and organizational forms of SFSCs, as well as the requirements of consumers regarding the delivered food.

Key words**:** *Short Food Supply Chains (SFSCs), organic farms, rural area, sustainable development, Bulgaria*

INTRODUCTION

Rural areas have always been the focus of researchers, agricultural experts and other sectors of the national economy, related to food supply chains, politicians and various international organizations. According to the regional typology of urban and rural areas, half of the territory of the European Union (EU-28) is covered mainly by rural areas and approximately 20% of the population is concentrated in them. Mostly rural regions are characterized by extreme diversity in terms of economic and social status, history, traditions, natural and cultural resources. The role of rural areas as producers of food and other important tangible and intangible goods is well understood. Rural areas provide traditional agricultural resources, but increasingly they also provide new vital functions that are used as a resource base for various activities, ways to implement various processes in agriculture, its technology and organization, impact management of the rural landscape, socio-economic development of the population living and working in them, as well as its income and quality of life.

The objectives of sustainable rural development is logically linked to the concept of multifunctionality of agriculture. The development of the multifunctionality of the regions themselves contributes in different ways to their sustainability. For example, direct marketing systems are one of the good practices that is developing more and more and on the basis of the increased interest in the existing rural tourism and the developing agricultural markets.

The aim of the study is to show examples of success that work well, enjoy the interest of users of these services and their developing farmers would contribute to the improvement of a common European policy that ensures the long-term maintenance of family farms outside the support of income. The EU's rural development policy aims at facing the economic, environmental and social challenges of the 21st century. It is known that the so-called "second pillar" of the Common Agricultural Policy deals with direct payments to farmers, and as regards measures to manage agricultural markets and support rural areas, they belong to the "first pillar" of this policy.

MATERIALS AND METHODS

The article aims to describe the Local Food System (LFSs) and Short Food Supply Chains (SFSCs) within the EU and in particular Bulgaria, considering them as one of the domains of multifunctional agriculture contributing to the better and sustainable development of rural areas. In this article, the author considers the multifunctionality of the agricultural sector as a continuously developing direction in agriculture, which began with the transition from industrial agriculture, based on a large volume of production to quality one that strives to achieve a comprehensive sustainability with economic, environmental and social components. The main types of LFSs /SFSCs are considered as a manifestation of one of the domains of multifunctional agriculture. The author further examines the types of SFSCs and their impact on sustainable development in social, economic and environmental aspects. One organic family farm in Bulgaria as a representative of the LFS has been described using the case study method. The case study approach is using as a means of collecting data and testing theory. A mixed survey method was applied including primary data collection, case study, in-depth interviews, as well as desktop research.

Concept of multifunctionality

Multifunctional agriculture is an umbrella term used to indicate companies that combine their agricultural production and environment with services to society: care farming, farm education, farm shops/short supply chains, agricultural day care, agricultural nature management and agrotourism. Key to these services is the relationship between farms and civilians/consumers. In other words, multifunctional agriculture is the reconnection of agriculture to society. The stages of multifunctionality in agriculture: United Nations Conference on Environment and Development (1992, Rio de Janeiro - Brazil) [36]: the concept of multifunctionality first appears. European Conference on Rural Development (1996, Cork -Ireland) [16]. For the first time, the role of rural areas has been officially recognized and legitimized as a privileged place to meet the needs of farmers and citizens. Moreover, rural areas have been linked to improving the quality of life.

1998 - The OECD closely links the concept to two specific requirements: 1) production capacity of secondary, tangible and/or intangible goods and services; 2) recognition of certain intangible assets and their external nature as public goods [26].

1999 - Berlin (Germany), Berlin European Council, Program 2000. Agricultural structural policy agreements and related regulations are already in place. The latter becomes a real part of Community policy [6].

The concept of multifunctionality from the Cork Conference (1996) to the Cork Conference (2016) [16]. The new moments we are meeting here are extremely important for the further development of rural areas and their multifunctional sound: promoting the prosperity of rural areas; strengthening rural value chains; investing in the profitability and vitality of rural areas; preservation of rural environment; natural resources management; promoting climate change interventions; stimulating knowledge and innovation; strengthening rural governance. In Bulgaria this potential is limited by multiple factors. The most important factor is that the concept of multifunctional agriculture is not well-known in the country and there is no common, purposeful and consistent policy to popularize and develop this type of activities (Todorova, 2013) [34]. The government of the country does not implement the concept of multifunctionality in the National Plan for Rural development but use relative concepts such as “economic diversification”, “rural development” or “alternative activities”. The examples existing in the practice are realized as a private initiative on a free principle and with financial support by European projects without any assistance and coordination from the government (Todorova, 2013).

Short Food Supply Chains

The location of production and the length of the food supply chain have been and continue to be of interest to many researchers and they have been well studied. Most researchers define "Local Food Systems" as those in which the production, processing, marketing and

consumption of food takes place in a limited geographical area with a source radius of about 20 to 100 km. A key feature of short food supply chains is that these are places where the number of intermediaries is kept to a minimum. The ideal case is direct contact between producer and the consumer. Building on seminal papers of Marsden et al. (2000) [20] and Renting et al. (2003) [29], as well as on definitions proposed by the French authorities or the European Commission, the following definition of SFSC has been adopted: "The foods involved are identified by, and traceable to a farmer. The number of intermediaries between farmer and consumer should be "minimal" or ideally "nil". The marketing of food through a short supply chain, which business is organized mainly by small and medium-sized organizations without a special marketing unit, is constantly growing. It can be said that the definition of SFSCs introduced by Marsden et al. (2000) [20] and commonly used by others, covers LFS within the face-to-face and spatially proximate SFSCs categories.

There are different short food supply chains in terms of number of intermediaries.

Category of "sales in proximity" - most of them can be grouped following Aubry and Chiffoleau (2009) [5]. They are also local farming systems, in the sense that locally grown or produced foods are served to local consumers. So-called Community-supported agriculture (CSA) and similar schemes are known by different names in the Member States (AMAP, GAS, etc.). and are based on a long-term partnership between one or more producers and their consumers. In them, consumers are more connected with the decisions and work of producers. Types of on-farm schemes are numerous, where consumers transport themselves to the place of production to purchase the products of a farmer (farm shops, farm based hospitality, roadside sales, pick-your-own schemes, etc.).

Farmers sell off-farm their products to consumers - in the neighbouring places of consumption, in farmers' markets, shops owned by farmers, food festivals and fairs.

Impacts of LFS/SFSCs

Social impacts of SFSCs

The SFSCs support and facilitate the connection and interaction between farmers and consumers. All this leads to building trust between the participants in the chain and encouraging the development of social capital (Table 1). These short food supply chains can create the conditions for the development of a sense of community and 'living together'. When based in rural areas, SFSCs can also affect the quality of life in the areas concerned. In urban areas, SFSCs focus more on promoting social change through education and ethics for sustainability.

Table 1. Social impacts of LFS/SFSCs

Social impacts	Studies
Connection between producer & consumer *Notions of trust and relationships*; Relations of regard; Wider concept of social capital.	Abatekassa and Peterson (2011); Canavan et al., (2007); Chiffoleau (2009); Mount (2011); Murphy (2011); Sage (2003); Smithers et al. (2008). [1, 7, 8, 24, 25, 30, 32].
Sense of community	Abatekassa and Peterson (2011); Chiffoleau (2009); DeLind (2011); Hayden and Bucks (2012); Lawson et al. (2008). [1, 8, 12, 17, 19].
Increased knowledge / behavioural change	Cox et al. (2008); Hayden and Buck (2012); Torjusten et al. (2008). [11, 17, 35].

Source: own research.

Economic impacts of LFS/SFSCs

There are records that local farming systems and short chains have a higher multiplier effect on local economies than long chains, with impacts also on maintaining local employment, especially in rural areas, the synergies with the tourism sectors are also well acknowledged, as a producer at farm level, they seem to allow a higher share of value added to be retained locally (Table 2).

Environmental effects

Usually the environmental benefits that are cited in the literature and we support are: food miles and carbon footprint for local food, positive impact on (agro) biodiversity and reduce the use of agrochemicals for organic farms (Table 3). Re-localization of production can lead to a drastic reduction in GHG emissions. The production and processing methods that are applied in modern conditions are extremely important for mitigating the impact on the environment.

Table 2. Economic impacts of LFS/SFSCs

Economic benefits of LFS/SFSCs	Studies
LFS/SFSCs contribute towards rural development and economic regeneration	Du Puis and Goodman (2005) state that SFSCs can be "seen as new sources of value added which can be retained locally and can act as a catalyst for rural economic regeneration and dynamism." SFSCs create "new economic spaces" (quoting Van der Ploeg et al. 2000; Marsden et al. 2002; Renting et al. 2003) [13, 28, 20, 29].
Farm level economic impacts: increased income for the producer	Producers are able to add a price premium when selling through SFSCs (Pearson et al., 2011), that the elimination of the "middleman" enables farmers to receive a greater share of the profits (Sage, 2003) and that SFSCs provide growers with an opportunity to diversify and add value to their produce (Alonso, 2011). [27, 30, 4].
Synergies with the tourism sectors	Pearson et al. (2011) have suggested that LFS offer opportunities for tourism and further positive associated economic impacts: "An additional economic benefit of LFS is the potential from increased tourism due to local branding and recreational shopping opportunities" [27].

Source: own research.

Table 3. Environmental impacts of LFS/SFSCs

Environmental impacts	Studies
Energy use and carbon footprint - reduction in "food miles"associated with LFS and SFSCs as an environmental benefit.	Tim Lang (1992) created the concept of food miles. A number of new studies show that this concept does not give a true picture of the total greenhouse gas (GHG) emissions involved in the whole food supply system. There are GHG emissions associated with production, processing and storage which these comparisons do not take into account (AEA Technology 2005; Edwards-Jones et al. 2008). Recently environment by using life cycle analysis (LCA) (Cowell& Parkinson 2003;Williams et al. 2006; Milà i Canals et al. 2007; Edwards-Jones et al. 2008; Edwards-Jones 2010). [2, 14, 10, 38, 22, 15].
Sustainability and SFSCs	Intensive agriculture has a serious negative impact on the environment. Intensive farming practices are based on "simple, artificial agro-ecosystems that rely on human resources to regulate them" (Hole et al. 2006; Stuart 2008). For any type of SFSCs with an organic component, it can be assumed that there are benefits to biodiversity associated with the lack of agrochemicals in the system (Hole et al. 2006; Seyfang 2008). This could be said for a number of organic SFSCs, including cash schemes, direct sales and markets for farmers. [18, 33, 31].

Source: own research.

Rural development

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas (Moseley M., 2003) [23]. Rural development actions are intended to further the social and economic development of rural communities (Chigbu, 2012; World Bank, 1975) [9, 37]. Rural development can be seen as a process that is associated with social change in the rural community and sustainable economic progress of this community. The aim of this process is to improve the quality of life in rural areas and to protect the environment.

Rather, the following objectives are pursued:

1.Improving the well-being of people living in rural areas (nearly half of the world's population), eradicating poverty and preventing urban migration.

2.Preservation of natural, landscape and cultural resources.

3.Ensuring access to food as a result of the development of sustainable agricultural production.

Farmers are those who daily supervise and manage rural areas, but still their collaborations with those institutions entitled to decide the transformation of these territories are not managed properly (Menconi, Grohmann & Mancinelli, 2017) [21]. The rural development is the core of the development policies because rural areas are a growing source of manufacturing and service-sector production and provide employment and have quality of life attributes that are increasingly valued by citizens.

Local context

For any type of SFSC with an organic component, it can be assumed that there are benefits for biodiversity associated with the lack of agrochemicals in the system (Hole et al. 2003; Seyfang 2008) [18, 31]. This could apply to a range of organic SFSCs including box schemes, direct sales and farmers markets.

As of the end of 2013 (Table 4), the total number of bio-operators in Bulgaria registered in the MAFF is 3, 123 (this figure does not include the number of subcontractors), which is about 1,000 more than the previous 2012 (Table 4).

According to MAFF, according to data from the annual reports of the controllers of organic production, in 2015 they increased to 6,173 and in 2016 to 7,262 (Agrarian Report, MAFF, 2017) [3]. Of these, in 2016, 6,961 were producers, 3 were aquaculture producers, 177 were organic processors and 121 were traders (importers, exporters, wholesalers and retailers).

Table 4. Number of operators (producers, processors, traders) in organic production

Years	Number of operators in bio-production
2006	214
2007	339
2008	311
2009	476
2010	820
2011	1,054
2012	2,016
2013	3,123
2015	6,173
2016	7,262

Source: MAFF, based on data from annual reports of controllers of organic production.

The data shows that the number of registered operators (producers, processors and traders) in the control system in 2013 increased more than 6 times compared to 2009, the year of the new European organic farming legislation. Organic farmers began receiving payments from the government; the association of organic farmers was established; the association of traders of organic food was set up; organic agriculture in Bulgaria began developing into a real economic sector. In 2016, this number has doubled compared to 2013, the main reason being the subsidies granted to registered bio-operators.

Organic farming represents real opportunities on several levels, contributing to rural economies. The environmental advantages of these farming systems can bring significant benefits for the rural economy and for development of multifunctional agriculture including Short Food Supply Chains.

Case Study

Title of the experience: Organic farm Sofina, Local leadership, adding external support from institutions and policies.

Key words: Short Food Supply Chain, Marketing competences, Entrepreneurship.

Location: village of Lesnovo near the town of Elin Pelin, just 20 km from Sofia.

Short description of the initiative:

The Sofina family farm has been in existence since the beginning of 2009 and is located in the village of Lesnovo near the town of Elin Pelin. Here, Stoyan and Teodora Simeonov take care of nearly 70 acres of bio-certified plantations. Their farm products include nuts, hazelnuts, different types of tomatoes, cucumbers, zucchini, peppers, celery, pumpkins, carrots, potatoes, beets, beans, spinach, as well as the non-standard kale and chard, which are extremely unusual for our region.

The proximity of the farm to Sofia allows the products to be picked up a few hours before delivery to be as fresh as possible when they reach customers. No couriers are used, but the products are always delivered in person less than 24 hours ago.

The farm strives to provide the widest possible range to offer to its customers. About 60-70 different products are grown, each of which during the respective season of the year.

Life in the field is not easy - it works nearly 12 hours a day, and there is often no rest time. Both daughters of the farmers, aged 7 and 19, as well as workers from the nearby villages are helping.

Most of the seeds used are theirs - each year they leave, for example, a few zucchini to ripen and the next year we sow seeds from them.

Sofina Organic Farm is certified and controlled by "Q Certification" AD, Plovdiv. After a transitional period, the farm has a certificate of production since 2014. The certificate is reissued for each subsequent year after a number of inspections have been carried out by the controlling body of "Q Certification" AD, Ministry of Agriculture, Food and Forestry, Bulgarian Food Safety Agency.

Actors involved: farmer, farm family, local municipality, Bulgarian Food Safety Agency, Bulgarian Bioproducts Association, shop.

Results and learned lessons: how food from a farm ends up on our tables, the processes include production, processing, distribution, the food production; chain includes aspects from processing, distribution, consumer purchase and consumer use.

RESULTS AND DISCUSSIONS

Many studies emphasize that trust building is a major component and important advantage of LFS/SFSC. Our case shows that building relationships between the consumer and the manufacturer is "essential" and provides a "unique experience". The product can be explained to the consumer and many people (especially those who love bio-products) prefer to talk to someone who knows something about a particular product. This trust is built through face-to-face interaction between the farmer and consumers. It is supposed that trust does not refer to the product per se, but to the idea that one can trust the farmer who produces this food in a "safe" way, since the consumer knows the farmers and can hold them "responsible". We also discuss the market in terms of "community" - building a place and improving relationships around food and neighborhood activities (DeLind, 2011; Abatekassa & Peterson, 2011) [12, 1].

A number of LFS/SFSCs seek to build communities and relationships around food production and consumption. The latter has been described in a number of studies from different countries.

SFSCs lead to changes in the behavior of the participants, which can be explained by the accumulation of knowledge. This benefit has been highlighted in many studies based in the United States, the United Kingdom, Denmark and Norway.

For example, in our case, participants in the scheme gain increased knowledge of food and agricultural systems. For example, in our case, the participants in the scheme gain increased knowledge of food and agricultural systems. Increased knowledge related to their daily routine as well as the food consumed can lead to some changes in behavior. In their research, Cox et al. (2008) [11] and Hayden & Buck (2012) [17] found a broader change in participants' behavior in CSA schemes. Cox et al., (2008) [11] called this the “graduation effect”. Consumers of vegetables from the farm under study in our case state that their cooking and eating habits have changed, which has been fueled by the use of more local, seasonal and healthy food.

Many studies suggest that LFS/SFSCs can contribute to rural development and economic recovery. Du Puis and Goodman (2005) [13] state that SFSCs can be “regarded as new sources of added value that can be locally maintained and can act as a catalyst for rural economic regeneration and dynamism”.

A number of economic benefits associated with LFS/SFSC are known. The increase in revenue for the producer as a result of the elimination of intermediaries is one of the important economic benefits. It is assumed that producers are able to add a price premium at sale by SFSC (Pearson et al., 2011) [27] that the elimination of the "middleman" allows farmers to receive a greater share of the profits (Sage, 2003) [30] and that SFSCs provide giving producers the opportunity to diversify and add value to their output (Alonso, 2011) [4].

The key to our case is to reduce the distance between farmers and consumers and to improve communication between them, thus providing more flexibility and more choice for both parties. Farmers can plan and achieve their sales goals - better pricing conditions and less dependency on intermediaries; and consumers can enjoy the taste, freshness and quality of organically produced food.

The environmental benefits of the sources cited in Table 3 include: a reduction in "food miles" and a carbon footprint for local food, the positive impact on (agro-) biodiversity and reducing the use of agrochemicals for organic farms. There is considerable research on the relative impact of organic substances in comparison with "conventional" manufacturing practices, but this evidence is not reviewed here as the focus of the study is on SFSCs, not organic production.

Earlier articles have mostly discussed the reduction in food miles associated with LFS and SFSCs as an environmental benefit. The concept of food miles, first created in 1992 by Tim Lang, is relatively straightforward to understand and comparisons between food items are easily made with respect to the carbon emitted when transporting the goods from the producer to the retailer or consumer (Edwards-Jones et al., 2008; Seyfang,. 2008).

There are GHG emissions associated with production, processing and storage which these comparisons do not take into account (AEA Technology 2005; Edwards-Jones et al., 2008) [2, 14]. In our case, the vegetables offered are not stored, processed, and hours after harvest go to the consumer.

Most recently, researchers have evaluated the environment impact of foodstuffs using LCA. A combination of "organic" and "local" indicators can usually give a better idea of the environmental significance of each SFSC, as in our case.

The condition for fulfilling the latter is that organic and local products are not stored and purchased out of season, as otherwise these products may have a larger carbon footprint than non-local goods.

Table 5. Summary of identified effects of SPSCs in the Sofina farm case on the three dimensions of sustainability

Dimensions of sustainability	**Social**	Preserving traditional agricultural production; Better satisfaction for farmers and consumers; Raising awareness of the environmental and social effects of consumption; Change in consumer behaviour; Building new relationships between different actors with different interests.
	Economic	Increasing farmers' incomes - higher selling prices; Creation of employment opportunities; Increasing regional added value; Reducing dependence on intermediaries.
	Environmental	Conserving traditional agricultural practices and landscapes; Positive impact on biodiversity and reducing the use of agrochemicals for organic farms; Encouraging environmentally friendly production methods (low input production, organic production, etc.); Reduction in „food miles"; Carbon footprint for local food.

Source: Own research.

As a result of the literature reviewed and the case study applied to Sofina farm, as well as a study of a number of other farms that directly sell their products to consumers (among other multifunctional activities they carry out - rural tourism, didactic agriculture and so on) and they have been the subject of a study on the implementation of the e-TOMATO project we have summarized the social, economic and environmental benefits of shortening the food supply chain in Table 5.

CONCLUSIONS

The Program for Rural Development 2014-2020 was identified the opportunity to expand markets and increase consumer demand for food with guaranteed quality and origin, local products as well as organic products manufactured to high environmental standards. The needs assessment also includes shortening the supply chain of food and encouraging local market.

How will develop channels for direct food supply in the future? This will largely depend on the geographical location of a country or region, its social status and its political and institutional characteristics and features. Public funding and support, plus community interest, is essential for setting up and maintaining local food networks in operation.

In many cases, the concept of local and healthy food is unclear or misleading to the average consumer. Therefore, sufficient research is needed in this direction and a clear policy on the part of European governments.

There is a possibility to use food from SFSCs in the context of healthy and sustainable rural development.

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E-LEARNING PLATFORM FOR START-UP SIMULATION IN LIFE SCIENCE AND BUSINESS FIELD - A USEFUL EDUCATIONAL TOOL

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Abstract

During an Erasmus+ KA2 project implementation, an international team has developed an e-learning platform useful as an educational tool for Start-up simulation in the field of Life Sciences A video tutorial is also available for the use of the platform; the tutorial is embedded from YouTube. The Database structure has two main data types called: Simulation Business Game and Company for The Business Model Canvas. Each of the "Simulation Business Game" has many potential "Companies for The Business Model Canvas". The platform offers centralized knowledge management in innovation and entrepreneurship containing reference documents that can be used in specific activities related to simulated enterprise and start-ups, giving also access to located resources according to the national character and specific legislation for each of the users.

Key words**:** *start-up, life sciences, education, e-learning, internet*

INTRODUCTION

Entrepreneurship simulation seminars are used as a consistent method to teach students of different disciplines about business interrelationships to entrepreneurs [7]. While numerous start-up simulation games have been developed by well-known business schools, like Wharton *School* of the University of Pennsylvania, in the field of Life sciences/ Biotechnology, such educational games are missing. Using simulation tools in Life Sciences/ Biotech education is quite new [14].
During an Erasmus+ strategic partnership (2017-1-RO01-KA203-037304) project implementation, an international team has developed an e-learning platform useful as an educational tool for Start-up simulation in the field of Life Sciences [12].
The project aimed to improve entrepreneurship through the development of key skills for entrepreneurship, by the use of an innovative tool and methodology. The tool is based on games in an online e-learning platform that allow community building of learning, which combines non-formal activities and informal to improve business skills.
These methodologies, based on a theoretical background tested and realistically, can offer practical experiences in the field of activity of new entrepreneurs [1].
The output was developed as a support tool for the activities of simulated Life Sciences enterprise and entrepreneurship in the frame of the project and can be accessed by registration on the project website [7].

MATERIALS AND METHODS

The tool development has taken into account two different approaches; an on-line version to auto-test personal skills and as a virtual class to be supported by a mentor/teacher.
(1) The autonomous online version - the e-learning platform, where entrepreneurs at the beginning of the road can test their skills and competencies by opening up and running a catering company. This version will provide automatic feedback from the user [9]. A collaborative learning platform that hosts the online version of the game for improving the attitude entrepreneurs, manuals and tools for creation by social networks. This learning environment also contains other items such as

videos, databases [10], online references as well as information about future events, etc., intended to support the study process [5].
(2) The training version to be played in a class monitored and facilitated by an experienced trainer. This version is called Classroom training Face-to-Face (F2F). The F2F version has the same scenario as the standalone one online but the main difference is that the trainer plays an active role in providing feedback and use of scenarios as part of the entrepreneurship training. A F2F version is finally an excellent tool for the trainer because:
-it allows different actions;
-the integration of game scenarios into real situations and facilitating discussions;
-to re-create classroom training as working groups, using an online game as a motivational tool;
-the integration of different training methodologies, to meet various training needs;
-the use of the user handbook as a material training;
-to test different technologies in training by trainers.
By combining F2F learning and online platform learning, you can provide a personalized learning experience for learners.
Here are some other reasons to adopt a combination of F2F learning and online platform learning in an academic or corporate training: one can use them to provide learning as a continuum; one can capitalize on other e-learning trends, including gamification and e-learning videos; it helps to simplify the content so that learners gain knowledge faster.

RESULTS AND DISCUSSIONS

The developed tool, as described above, was piloted during a Summer School event (July 2019) for 10 days.
The training was organized UASMV Bucharest, in the IT laboratory of the Faculty of Biotechnology.
In the training were involved 22 international participants (Master and Ph.D. students in Life sciences and Business) from 5 countries: Romania, Spain, Italy, Belgium, Albania. The mentorship support came from 4 teachers trained before for the Canvas Model use and an IT person. The business Model Canvas is a strategic management and lean start-up template for developing new or documenting existing business models [4].
A Business Model Canvas is created on the base of nine issues: (i) Key partners, (ii) Key activities, (iii) Value proposition, (iv) Customer relationship, (v) Customer segment, (vi) Key resource, (vii) Distribution channel, (viii) Cost structure, (ix)Revenue stream[2].
Business plans have been developed based on the Canvas model (Fig. 1) and came to motivate students to learn entrepreneurship [13].

<table>
<tr><td rowspan="2">Key Partners</td><td>Key activities</td><td rowspan="2">Value propositions</td><td>Customer relationships</td><td rowspan="2">Customers segments</td></tr>
<tr><td>Key Resources</td><td>Channels</td></tr>
<tr><td colspan="3">Cost Structure</td><td colspan="2">Revenue Streams</td></tr>
</table>

Fig. 1. A Business Model Canvas
Source: Hixson, C., Paretti, M. C., 2014, Texts as tools to support innovation: Using the business model canvas to teach engineering entrepreneurs about audiences. Professional Communication Conference (IPCC), 2014 IEEE International [6].

The Business Model Design was elaborated corroborate with Osterwalder's 9 point decomposition of a Business Model [11] as presented below (Fig. 2).
At each issue described above, every team needs to answer questions.

For Key partners, essential problems are the identification of key partners or suppliers and what base are a partnership motivated.
Key activities need to be defined as what key activities do the value proposition requires and what activities are the most important and more important in a customer relationship, distribution channels, etc.

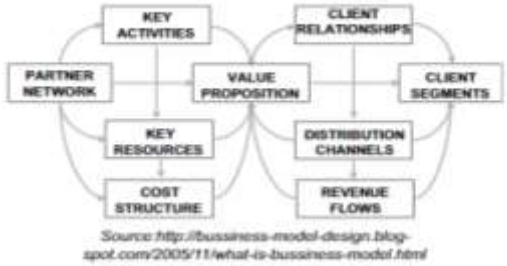

Fig. 2. Business Model Design
Source: Chesbrough, H., 2010, Business Model Innovation: Opportunities and Barriers [3].

The value proposition list is developed on essential value delivered to the customer, followed by a list of customer needs satisfied by-products or services.
What relationship is expected by customers to be established and how can be integrated in terms of cost and type are questions for the customer relationship.
The customer segment defines which customers are targeted (luxury level, middle level and so on) and who is the most important customer.
Key resource responses require what resources are vital to make the idea work, making an enumeration from human resources to intellectual property.
The distribution channel is essential for the question: how are the company reach its customers. From the multitude of channels, every company selects the distribution channels from which channels work efficiently and how much the channels cost.
Cost structure regards all the expenses the company what to make to develop the production of its products or services and with marketing. At the same time, an important issue is which key activities or resources are more expensive.
Revenue stream consists of a make a plan about how much can the company earn in a certain period base on how much are customers willing to pay for the acquisition of products or services delivered by the company. For every major product or line of products, it makes a plan of revenue stream as a part of overall revenue.
The Summer School set training objectives were wider than the e-platform use:
-a good understanding of the business system and knowledge of successful business models;
-the market study, identifying current opportunities and sources of finance for developing a business;
-increasing the ability to implement ideas, plans, and activities;
-better knowledge and understanding of the critical skills needed by entrepreneurs to create successful businesses;
-make the participants aware of ethical principles and values applicable in the context of managerial issues;
-strategic analysis, identifying priorities and choosing the right decisions; time and effort management (how to handle working tasks);
-the development of leadership abilities; elaboration and interpretation of a business plan [8].
Students were grouped in 4 international working team and were allocated tasks and responsibilities according to their affinities. Each student has registered in the platform and virtually have been assigned their role: owner, employee, human resource manager, financial manager, product developer. Each team had to create a virtual enterprise having as backbone a product or service related to the field of Life Sciences.
Fig. 3 shows a Business Canvas in the process of elaboration.

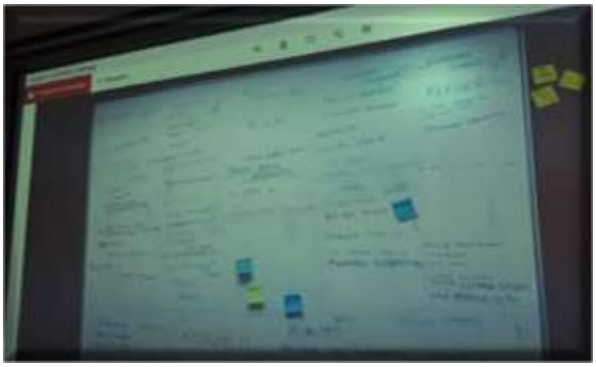

Fig. 3. A Business Canvas in work
Source: elaborated by students.

In the end, 4 start-ups have been designed and simulated in the e-platform; different names and visual identities were proposed by the students: “Enviro Biotech”, “Plantoo”, “PlantPowerOrg” and “PsychoYeast”.).

Fig. 4. "Enviro Biotech" visual identity
Source: elaborated by students.

"Enviro Biotech" (Fig. 4) was built as a company producing CO_2 car filters embedding enzymes able to degrade pollutants. The proposed technological steps were: purifying the enzymes from cell cultures; embedding the enzymes on appropriate support (the future filter); assembling the device according to the car type. An initial investment of 70,000 euros was established and the first production year profit was estimated at 304,000 euros.

Fig. 5. "Plantoo" visual identity
Source: elaborated by students.

"Plantoo" (Fig. 5) start-up has proposed the creation of a package/device for monitoring and bio-ferti-irrigation of horticultural plants. The initial investment reached 176,000 euros and the envisaged profit in the first year was about 80,000 euros.

Fig. 6. "You Grow": visual identity
Source: elaborated by students.

"You grow" (Fig. 6) proposed the development of a mobile application to monitor the indoor plant cultivation for food in very little space, connected to sensors for nutrients, pH, illumination; the application was designed to be expanded for the industrial production system of Green Roofs. The initial investment would be recovered after 3 years with a rate of 5% profit.

Fig. 7."PsychoYeast" visual identity
Source: elaborated by students.

"PsychoYeast" (Fig. 7) aimed to help people suffering from respiratory diseases like COPD and Asthma. It was proposed the development of a cosmetic product, PsychoCreme, made from yeast that purifies the air; by using a super bioengineered yeast will be metabolized the reactive species present around the human face that are potentially harmful for the targeted population; for initial input of 224,000 euro, the 3rd year profit will go close to 400,000 euro.

An external evaluation commission has evaluated the created business according to clear established evaluation criteria (from an economic, technical and organizational point of view).

Different learning outcomes were registered:

-knowing the steps of starting a business;

-show in any situation, from a position of leadership, five essential qualities that describe the ethical side of entrepreneurship;

-identify the necessary resources for developing a business;

-organize a business plan, by taking into account market developments and the business environment within which they will function;

-define the potential market for a certain firm;

-knowledge of the characteristics of public acquisitions;

-identify ways to promote a business using electronic trade:

-discover possible sources of finance for certain businesses;

-calculate financial indicators;

-understand various intellectual property rights;

-make decisions and set priorities based on data analysis;

-improved English and communication skills and acting as a member of a team.

Different simulation games have been provided in the virtual environment in the past years, but our tool is adapted to link the business principles to Life Science specificities.

CONCLUSIONS

The platform was successfully piloted by Master and Ph.D. students during the Summer School; having in the team students with complementary background (Life Sciences and Business) the feasibility and potential sustainability of the proposed start-ups were close to real life, as the evaluation committee emphasized.

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CONSIDERATIONS REGARDING THE LEGISLATIVE FRAMEWORK FOR THE DEVELOPMENT OF THE MOUNTAIN AREA IN ROMANIA

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Abstract

Romania's mountain area constitutes a defined geographic, economic and social entity, with specific climate, relief, natural and socio-cultural heritage, an identity recognized in Europe and all over the world. The paper aims to analyze the main normative acts for the mountain area in Romania developed after 1990, focusing on the specific legislation of the last 7 years. The aim was to create the legislative framework created, starting with the delimitation of the mountain area - to which this legislation is addressed, the public institutions established for the mountain area, as well as the main provisions to support the mountain population, producers and entrepreneurs in this area. The study of documents was used as research methods: laws, government decisions, ministerial orders, as well as content observation or analysis. The data were collected and interpreted. Results obtained: The 3 official delimitations of the existing mountain area during the studied period were identified and presented, the normative acts by which they were legislated as well as the main criteria that were the basis of each of these delimitations. It should be noted that the delimitation has undergone changes over time, depending on the instruments, policies and legislation existing at each of the times when they were developed. The main public institutions, with a role in the development of mountain areas and the application of public policies, were also identified. The development of mountain areas is achieved through specific policies. The Law of the Mountain and the subsequent laws elaborated, aim to support mountain producers, entrepreneurs and implicitly to lead to the development of mountain areas. By acquiring the right to use the optional quality mention "mountain product", at the level of the mountain area in Romania a Register and a national logo were created and a number of 580 "certified" products were obtained on the end of April 2020. Another 5 laws that provide for investments in this area are being drafted and are waiting to be implemented.

Key words**:** *mountain area, Law of the Mountain, delimitation of the Mountain Area, encouragement of activities, mountain product*

INTRODUCTION

Mountain areas are distinguished from other regions by natural disadvantages, which cannot be changed: altitude, climate, slope, low soil fertility, shorter periods of vegetation, etc. and by structural disadvantages, such as: the decrease of the young population, the great distances from the decision-making and administrative centers, the isolation from the communication channels and the markets of the sale.

The mountain area of Romania [1], covers 1/3 of the country's surface and constitutes a special territory, of national interest, with a huge economic, social, cultural and environmental potential.

Due to the considerable limitation of the possibilities of using the agricultural land, due to the climatic conditions, the slopes and the geological substrate, the mountain area is considered as underprivileged [17], aspects that give the agricultural producers of livestock, a natural right to difference and compensation.

The main resources of the Romanian mountains are represented by the forestry and biodiversity fund, the forage flora of the natural grasslands, mineral waters, landscapes and the native anthropic factor, carrying

economic and cultural traditions, determining for the responsible value of the resources.
Given their specificity, the mountains need tailored policies as a result of social, economic and environmental changes. Mountain areas need innovative solutions to diversify their economies and to be able to take care of their precious environmental and cultural resources [24].

MATERIALS AND METHODS

The research carried out mainly concerned the clarification and updating of some theoretical and legislative notions regarding the mountain area.
The main normative acts that were elaborated after 1989 were identified and analyzed for the mountain area in Romania, the existing institutional framework, as well as some opportunities for development of the mountain area, by diversifying the economic activities in the rural area.
The study of documents was used as research methods: laws, government decisions, ministerial orders, as well as content observation or analysis. The data were collected and interpreted. These come from official public sources: the Official Monitor of Romania, the Ministry of Agriculture and Rural Development, the National Agency of the Mountain Area, the Eurolex website, the National Institute of Statistics.
At the same time, the databases of the Training and Innovation Center for Development in the Carpathians, the Mountain Area Agency and the National Agency of the Mountain Area were consulted. The aim was to update, transpose and adapt existing research, collecting, synthesizing and processing data from different sources.

RESULTS AND DISCUSSIONS

Until 1990, there was no specific legal framework for the mountain area, through which, the specificity of the mountain would be subject to mountain policy, differentiated. Nor specialized public institutions for mountain development. After 1990, a number of institutions and bodies with a role in the field were set up, reorganized or sometimes even abolished. Their situation is as follows [25]:
-In 1990, the Commission of the Mountain Area of Romania (CZM) was established - structure with legal personality subordinated to the Ministry of Agriculture and Food Industry, having a network of 28 county commissions in the 28 counties with mountain area, since that time;
-In 1993 the Mountain Area Commission was transformed into a General Directorate within the Ministry of Agriculture and Forests;
-In 1994 the Mountain Area Commission was transformed into the National Agency of the Mountain Area (ANZM) becoming a directorate within the Ministry of Agriculture and Forests (having a small staff);
-In 1994 the Training and Innovation Center for Development in the Carpathians-CEFIDEC Vatra Dornei was established, with headquarters in Vatra Dornei, Suceava county, according to HG Nr. 888 of December 9, 1994 on the establishment, organization and operation of the Training and Innovation Center for Development in the Carpathians; structure subordinated to the Ministry of Agriculture and Food. Its activity was guided, coordinated and monitored by the National Agency of the Mountain Area;
-In 2007, by Law 181/2007 (with effect from January 1, 2008), the National Agency of the Mountain Area becomes a General Directorate with territorial structures, subordinated to the Ministry of Agriculture and Rural Development. The provisions of that law, however, have never been applied;
-Between 2007 and 2008 the National Agency of the Mountain Area worked as an office within the Ministry of Agriculture and Rural Development (MADR);
-In 2009, by Law 329/2009, regarding the reorganization of some public authorities and institutions, the rationalization of public expenses, the support of the business environment and the respect of the framework agreements with the European Commission and the International Monetary Fund, the National Agency of the Mountain Area moved its headquarters from Bucharest (MADR) to Alba Iulia, Alba County and took over the staff of the Training and Innovation Center for

Development in the Carpathians - CEFIDEC Vatra Dornei [25].

-One year later, in 2010 the National Agency of the Mountain Area was abolished, according to GEO 70/2010 on some measures for the reorganization of the Ministry of Agriculture and Rural Development, as well as of some structures subordinated to it. The patrimony was taken over by MADR, and a number of 12 specialists transferred to the General Directorate of Rural Development AM PNDR within the ministry;

-In 2014, the Mountain Area Agency - AZM (through GD 1189/2014) is established according to Law no. 139/2014 regarding some measures for the reorganization of the Ministry of Agriculture and Rural Development, as well as of some structures under its subordination, with the subsequent modifications. Institution based in Vatra Dornei, Suceava county. Former adult training center for the mountain area - CEFIDEC thus becomes a direction within the AZM.

-In 2018, the National Agency of the Mountain Area is organized, according to the GD 1036/2018 for the organization and functioning of the National Agency of the Mountain Area (ANZM) by reorganizing the Agency of the Mountain Area, as well as for establishing measures regarding the regional centers and the offices of mountain development. At the same time, ANZM creates a territorial network for mountain development: 7 Regional Mountain Development Centers and 32 Mountain Development Offices [24].

Apart from the normative acts by which public institutions for the mountain area were created and reorganized, during the study period, a series of laws, government decisions and ministerial orders were adopted, which aimed to support mountain areas and their inhabitants. Regarding the delimitation of the mountain area in Romania, during the period under analysis, a series of studies and researches took place, responding to the requirements of the time followed by normative acts.

In the context of the International Year of the Mountain, 2002, the Government Decision no. 949, for the approval of the criteria for delimiting the mountain area.

According to the respective GD, the mountain areas are defined as those areas that are characterized by the considerable limitation of the possibilities of land use and by the appreciable increase of the costs of their works, due [25]:

-the existence of particularly difficult climatic conditions, determined by altitudes of over 600 m, the effect of which is the substantial shortening of the vegetation season;

- the presence at a lower altitude, on most of the agricultural land, of slopes over 20º, too steep for the use of agricultural machines or which require the use of expensive equipment; or

-the combination of the factors mentioned in letter. a) and b), where the disadvantage resulting from each factor taken separately is less acute, but their combination results in an equivalent disadvantage.

As a result of this GD, the Common Order of the Ministry of Agriculture, Forests and Rural Development and the Ministry of Administration and Interior with no. 328/321/2004, rectified by the Common Order no. 1019/1089/2005, regarding the delimitation of the mountain area, up to the level of municipalities, cities, communes and component villages [5]. Thus, of the 826 Territorial Administrative Units (UAT) included in this order, we have the following situation (Fig. 1):

• 28 counties have a mountain area;
• 199 UATs are fully classified;
• 627 UATs partially framed;
• There are 21 municipalities in the mountain area, of which: 14 are fully framed and 7 partially;
• 73 cities, of which: 53 are fully framed and 20 partially;
• 732 communes, of which 560 are fully framed and 172 partially.

The 28 counties with mountain area are:

Alba, Arad, Argeș, Bacău, Bihor, Bistrița-Năsăud, Brașov, Buzău, Caraș-Severin, Cluj, Covasna, Dâmbovița, Gorj, Harghita, Hunedoara, Maramureș, Mehedinți, Mureș, Neamț, Prahova, Satu Mare, Sălaj, Sibiu, Suceava, Timiș, Tulcea, Vâlcea, Vrancea.

Fig. 1. The delimitation of the Mountain Area in Romania according to the Common Order 328/321/2004.

In 2004, the Parliament of Romania adopts law 347 - Law of the Mountain [16]. The main chapters of this law regulate:

-Purpose, principles and objectives of mountain policy;

-Specific institutional organization for the sustainable development of the area and supporting the forms of association of mountain farmers;

-Agromontaneous education;

-Development and protection of the mountain environment.

With Romania's entry into the European Union, in addition to Regulation (EU) no. 1257/1999 regarding the aid granted by the European Agricultural Guidance and Guarantee Fund (EAGGF) for rural development, the provisions of art. 17 and 18 of Regulation (EU) 1698/2005, with reference to support for rural development, granted through the European Agricultural Fund for Rural Development.

The regulation for establishing the delimitation criteria and the list of UATs framed in the mountain area was achieved by adopting the Order of the Minister of Agriculture and Rural Development no. 355/2007 regarding the approval of the criteria for the classification, delimitation and list of administrative-territorial units in the underprivileged mountain area [25].

According to this Order, the disadvantaged mountain areas are those areas, delimited at the level of UAT, which are characterized by the considerable limitation of the possibilities of land use and by the appreciable increase of the costs of its works, due:

-the existence of average altitudes of over 600 meters, which determines particularly difficult climatic conditions, whose effect is the substantial shortening of the vegetation season; or

-the presence at an average altitude between 400 - 600 meters, which determines difficult climatic conditions, of average slopes of more than 15%, which make mechanization impossible or require the use of specific expensive equipment.

According to Order 355/2007, there are a number of 27 counties with mountain area (Tulcea county not fulfilling the conditions for this delimitation), in which there are 657 UATs, as follows [7] (Fig. 2):

- 17 municipalities;
- 62 cities;
- 578 communes.

Fig. 2. The delimitation of the Romanian Mountain Area according to the National Program for Rural Development 2007 - 2013/Order 355/2007.

Compared to the previous Order 328/321/2004, 206 UATs (of which 84 integral and 122 partial), respectively 6 municipalities, 13 cities and 187 communes are no longer part of the mountain area.

Also included were a number of 37 UATs that, according to the previous criteria were not in the mountain area (of which 2 municipalities, 2 cities, 33 communes).

After the appearance of Order 355/2007, according to Law no. 63/2007 regarding the establishment of Poieni-Solca commune, by reorganizing the city of Solca, was introduced in the list of UATs in the mountain area and the

city of Solca, Suceava county, code SIRUTA 146708, thus, the list includes a no. of 658 UATs.

The provisions of the Order of the Minister of Agriculture and Rural Development no. 355/2007 regarding the approval of the criteria for the classification, delimitation and list of the administrative-territorial units in the underprivileged mountain area were the basis for the payments granted by the EU Fund for Agriculture and Rural Development (EAFRD) for the support measures of the disadvantaged areas with natural handicap - the area mountain, through APIA, valid until the entry into force of the Decision of the European Commission C (2008) 3831/16.07.2008, notified to Romania by address no. 204.671 / 17.07.2008, when the National Rural Development Programme of Romania was approved for the period 2007 – 2013 [7]. Starting with this date, the delimitation of the mountain area is the one included in the National Rural Development Programme, annex 4A - Disadvantaged area. 2.3 List of administrative-territorial units in Romania included in the disadvantaged mountain area.

Starting with the EU financial year through the NRDP 2014 - 2020, the delimitation of the mountain area is the one included in the National Rural Development Programme, Annex 4A - Disadvantaged area. 2.3 List of administrative-territorial units in Romania included in the disadvantaged mountain area. The designation of the Mountain Area within the NRDP 2014-2020, has not undergone any changes compared to the period 2007-2013, having in its composition [15]:

• 17 municipalities;
• 63 cities;
• 578 municipalities,

being realized on the same criteria (altitude and slope) as in the programming period 2007 - 2013.

The designation of the mountain area is carried out at LAU2 level (formerly NUTS5) respectively Territorial Administrative Units (UAT) organized in accordance with the provisions of Law no.2 / 1968 regarding the administrative organization of the territory of the Socialist Republic of Romania, republished, with subsequent amendments and completions.

As the Law 347/2004 - the Law of the Mountain came into force before Romania's accession to the European Union, and the vast majority of the provisions of that law no longer correspond to the current situations, in 2018, a new law of the mountain was drafted. Law 197/2018. Expected by the mountain communities, this law comes to regulate the modalities of protection and sustainable and inclusive development of the mountain area by: enhancing the natural and human resources, increasing the standard of living, stabilizing the population, maintaining the cultural identity, increasing the economic power at local level. and national, while maintaining the ecological balance and the protection of the natural environment.

This includes the following chapters [17]:

-Delimitation of mountain areas and mountain ranges;
-The institutional framework specific to the development of the mountain area;
-Infrastructure and development of the mountain territory;
-Economic and social development in the mountain area;
-Protection and development of the mountain environment, conservation of biodiversity;
-Education, training and research in the mountain area;
-Mountain culture and heritage;
-Program to encourage activities in the mountain area.

The newest delimitation of the mountain area in Romania, is based on Law 197/2018 - Law of the Mountain. In Chapter II it provides [17]:

Art. 2 (1) The mountain area is characterized by natural limitations of agricultural productivity, which lead to reduced agricultural production, due to unfavorable climatic and biophysical conditions for the optimal conditions of agricultural activities.

(2) The mountain area is characterized by a limitation of the possibilities of use of the land and by an appreciable increase of the costs of its exploitation, caused by:

a) the existence, at high altitudes, of difficult climatic conditions, low soil fertility, which

have the effect of substantially reducing the vegetation period and productivity;
b) the presence, at low altitudes, of steep slopes and morphological structures of mountain type, which do not allow the use of machined machines or that require the use of special, expensive equipment;
c) the combination of the factors mentioned in letter. a) and b), where the degree of unfavorability resulting from each factor is less severe, but by combining them results in a level of cumulative unfavorability, higher than the critical level.
(3) For the purpose of this law, "mountain locality" means the territorial administrative unit, municipality, city, municipality, with the territory situated wholly or partially in the mountain area, which falls within the criteria established by the slope and altitude, their limits being those of the physical blocks, identified in the Integrated Administration and Control System.
(4) The classification criteria and the list of localities in the mountain area are established by common order of the Minister of Agriculture and Rural Development and of the Minister of Regional Development and Public Administration, at the proposal of the National Agency of the Mountain Area.
The joint order of the Ministry of Agriculture and Rural Development no. 97 / Ministry of Regional Development and Public Administration no. 1332 establishes the criteria for the classification of the administrative-territorial units in the mountain area, as follows [6]:
The mountain area is characterized by natural limitations of agricultural productivity, which lead to reduced agricultural production, due to unfavorable climatic and biophysical conditions for optimal agricultural activities. The criteria used to define the mountain area are the following:
General delimitation criteria (physical criteria):
- average altitude greater than or equal to 500 m;
- average altitude between 350 and 500 m and an average slope greater than or equal to 15%;
- altitude below 350 m and an average slope greater than or equal to 20%.
The criterion of belonging to the Carpathian Convention by including the administrative-territorial units that fall within at least 50% of the territory within the limits of the Carpathian Convention.
Criterion of the combined score, taking into account the specific situation of the mountain area, based on the following algorithm:
- altitude score: average altitude/500 m (weight 30%);
- slope score: average slope/15% (30% weight);
- meadow score: pastures + hay/agricultural total (25% weight);
- forest score: forest area/total area administrative-territorial unit (weight 15%).
The localities that obtained from this algorithm a combined score of at least 7 (out of 10) are included in the mountain area, except for those that do not meet an elimination criterion related to geology (if the share of the quaternary formations is greater than 50% of the administrative units - territorial).
The criterion of inclusion in the delimitation of the mountain area within the Strategy of Territorial Development of Romania
Criterion for continuity of the mountain area
Considering that following the application of the above criteria, some situations arise in which administrative-territorial units that do not meet the criteria, but are surrounded by mountain administrative-territorial units, resulting in the so-called "non-mountain islands", except for continuity, a number of 10 administrative-territorial units are included in the mountain area.
Following the application of these criteria, the mountain area of Romania comprises 948 localities (Fig. 3).
According to the Common Order MADR no. 97 and MDRAP no. 1332/2019, there are a number of 947 UATs (947 UATs and 1 belonging locality), classified in 27 counties that have a mountain area (Fig. 3). Their situation is as follows [6]:
• 30 municipalities;
• 83 cities;
• 835 communes.

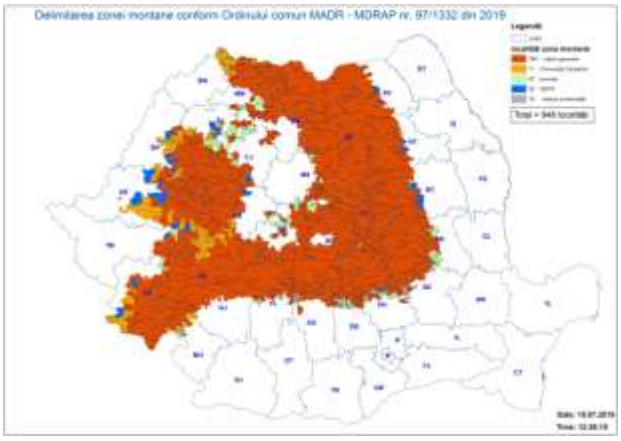

Fig. 3. The delimitation of the Romanian Mountain Area according to the Common Order MADR no. 97 and MDRAP no. 1332/2019.

It is noted that, out of the 28 counties with mountain area, initially existing, according to the Common Order 328/321/2004, at the boundaries of the Order 355/2007 (and implicitly from the National Rural Development Programme - PNDR – 2007-2013 and 2014-2020), respectively of the Common Order MADR no. 97 and MDRAP no. 1332/2019, are considered as having a mountain area only 27, Tulcea county (with the Măcinului mountains) no longer meeting the delimitation criteria from the specified normative acts. And out of the total of 826 UATs existing at the first delimitation, their number decreased to 658 (delimitation from the PNDR), so that later - to increase - according to the new criteria established nationally - to 948 (947 and 1 belonging village) [15].

Also, as a result of the provisions of Law 197/2018 - the Law of the Mountain, 6 subsequent laws have been elaborated, to encourage investments in the mountain area:

Law 334/2018 for the approval of the Program for the encouragement of investments in the mountain area, which aims to make investments in wool and leather processing centers, centers for collecting, washing and primary processing of wool, collecting and/or milk processing centers, slaughter centers for animals and/or small-capacity meat processing units, centers for primary processing and processing of forest fruits, mushrooms and/or medicinal and aromatic plants, from spontaneous flora and/or culture in the mountain area, the establishment of mountain sheep in the localities in the counties that affect the mountain area, as well as other investments that lead to the maintenance and development of activities in the mountain area [2, 23];

Law 296/2018 on the approval of the Investment Program for setting up milk collection and/or processing centers in the mountain area [18];

Law 330/2018 on the approval of the Investment Program for setting up centers for primary collection, washing and processing of wool and leather in the mountain area [19];

Law 331/2018 on the approval of the Investment Program for setting up low capacity units for the slaughter of animals and/or meat processing in the mountain area [20];

Law 332/2018 on the approval of the Investment Program for the establishment of mountain sheep [21];

Law 333/2018 on the approval of the Investment Program for the establishment of centers for primary collection and processing of wild fruits, mushrooms and/or medicinal and aromatic plants from spontaneous and/or culture flora in the mountain area [22];

All these laws, however, have not been enforced so far. They have been notified to the European Commission and its outcome is expected.

The development of high quality agri-food products in the mountain area was one of the priority concerns of the decision-makers. In this sense, the legislation was elaborated by which, the producers in the mountain areas can "certify" their food products of animal, vegetable and bee origin. The following normative acts were adopted:

Decision no. 506/of July 20, 2016 on establishing the institutional framework and measures for the implementation of the Commission Delegated Regulation (EU) no. 665/2014 of March 11, 2014 supplementing Regulation (EU) no. 1.151 / 2012 of the European Parliament and of the Council regarding the conditions of use of the optional mention of "mountain product" [3]:

Order of the Minister of Agriculture and Rural Development no. 52/2017 regarding the approval of the Procedure for verifying the conformity of the data contained in the

specifications for granting the right to use the optional mention of "mountain product" quality and for verifying the compliance with the European and national legislation by the economic operators who obtained the right to use of the respective mention [8];
Order 321/2017, Order 31/2018, Order 49/2019, Order 328/2019, Order 585/2020 - normative acts that come to amend or supplement Order 52/2017 [9,10,11,12].
The mountain product (Fig. 4), represents the product intended for human consumption, where: raw materials, but also feed for farm animals come mainly from mountain areas, and in the case of processed products, processing also takes place in areas mountain.

Fig. 4. The logo for "Mountain product"
Source: Order no. 49/2019 - Ministry of Agriculture and Rural Development [11].

On the end of April 2020, they have acquired the right to use the optional mention of "mountain product" a number of 580 agri-food products, from a number of 157 producers (registered in the National Register of Mountain Products - http://azm.gov.ro / product-mountain /) [1], for the following product categories:
-Milk and milk products = 264
-Meat and meat products = 9
-Vegetable = 190
-Beekeeping = 107
-Fish products = 9
-Bread, bakery and pastry products = 1
In 2019, the Government Decision no. 332/2019 regarding the establishment of the composition, duties and responsibilities of the massive committee and the National Mountain Council [4].
In order to apply the policies and strategies for the development and protection of the mountain environment, a massive committee is constituted at territorial level for each of the 9 mountain groups provided in the annex to the Mountain Law no. 197/2018 (Fig. 5), body without legal personality, with advisory role [17].
And, at the national level, the National Council of the Mountain is constituted, with advisory role, which will ensure the cooperation between the Government and the representatives of the mountain area, for the implementation of its specific strategies and policies.

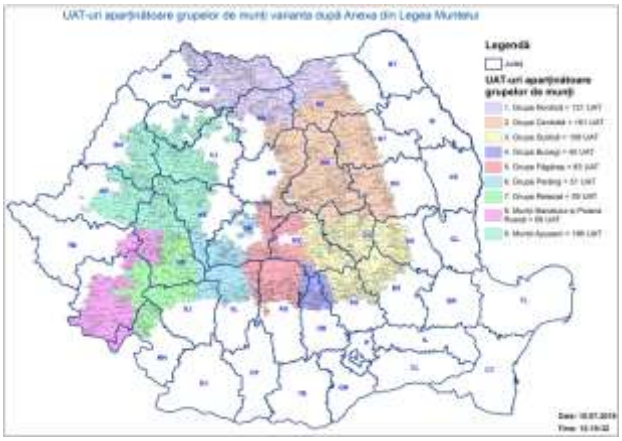

Fig. 5. Representation of mountain massifs, by mountain groups and related counties, according to the annex of the Mountain Law 197/2018.

Existing mountain groups [17]:
• the northern group
• the central group
• Southern group
• Bucegi group
• Fagaras group
• Parang group
• Retezat-Godeanu group
• the group of Banat Mountains and the Poiana Ruscă
• the Apuseni Mountains group
According to Chapter III, Art. 3 of the Law of the Mountain, specialized structures are organized at territorial level, as follows:
- at regional level, regional centers of mountain development;
- at the level of mountain basins, mountain development offices.
In this regard, the Ministerial Order no. 760/R/2019 regarding the approval of the regional centers of mountain development, of the offices of mountain development, of the place of activity as well as of the counties and

the territorial administrative units rounded up [13].

And Order no. 347/2019 comes to modify/ complete Annex no. 2 to the Order of the Minister of Agriculture and Rural Development no. 760/R/2019 [14].

According to these normative acts, in the mountain area there are a number of 7 regional centers of mountain development, to which a number of 32 mountain development offices are rounded up.

CONCLUSIONS

The mountains of Romania constitute a defined geographical, economic and social entity, having relief, climate, specific natural and social-cultural heritage, identity recognized in Europe and in the world. For this reason, the mountain area also needs a specific approach. The mountain areas are characterized by significant natural and social handicaps, which involve greater efforts, with restrictions in the exercise of economic activities, with the limitation of the possibilities of land use and a significant increase in the costs of the works due to the altitude, slopes or climatic conditions with periods of periods. lower vegetation. Mountain areas are ecologically fragile areas, which require support for protection, development and specific management, determined by the right to difference, being a common heritage, with a value that must be recognized and preserved.

In the last 30 years, specialized institutions have been created for the mountain area of Romania. Unfortunately, they did not have continuity, existing, over time, a series of restructurings, reductions of the attributions and / or the specialists trained in this field, or even cancellations. The main specialized institution - the National Agency of the Mountain Area, initially had structures with personnel, in the mountainous territory, then it was reduced to a minimum of existence, so that at one point it was even abolished. Re-established in 2014, it manages to restore, four years later, the territorial structures, but with a small number of personal. During the period studied, a series of normative acts are elaborated, some of them, never being applied. Also from 2014, a series of normative acts necessary for the development of the mountain communities is elaborated. The emergence of the new Law of the mountain 197/2018, creates the specific legislative framework. Laws to encourage investments in the mountain area, aimed at investments in wool and leather processing centers, centers for collecting, washing and primary processing of wool, centers for collecting and/or processing milk, animal slaughtering centers and/or processing units of small capacity meat, centers for primary processing and processing of wild fruits, mushrooms and/or medicinal and aromatic plants, from spontaneous flora and/or culture in the mountain area, setting up mountain sheep in the localities from the counties that affect the mountain area, unfortunately, they have been elaborated and still implemented. And the delimitation of the mountain areas in Romania has undergone modifications and transformations, depending on the requirements of the moment when it was carried out, the specific legislation, and the instruments existing at that time. The three delimitations made, starting in 2004, failed to include the same administrative-territorial units, creating controversies, often by including, not including or excluding UATs.

The legislation elaborated for the acquisition of the optional quality mention "mountain product", has attracted the registration in a relatively short time of a significant number of quality agri-food products, mountain, creating an optimistic outlook for the future. More and more producers in the mountain area, being interested in registering their products.

The stability of the specialized institutions for the mountain area, the retention of experienced specialists, the attracting and training of young specialists, the elaboration of normative acts, in close connection with the needs and the specificity of the mountain area, reinforce our belief that this area can be valued and that the depopulation can be reduced.

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au obținut dreptul de utilizare a respectivei mențiuni (Order no. 49/2019 for the amendment and completion of the annex to the Order of the Minister of Agriculture and Rural Development no. 52/2017 on the approval of the Procedure for verifying the conformity of the data contained in the specifications in order to grant the right to use the optional quality label "mountain product" and to verify compliance with European and national legislation by economic operators who have obtained the right to use of that statement).

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FACTORS OF INVESTMENT ATTRACTIVENESS OF RUSSIAN AGRICULTURE IN THE CONTEXT OF INNOVATIVE STRUCTURAL ADJUSTMENT

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Abstract

In modern conditions, investment activity is a non-alternative option for increasing the competitiveness of agricultural production and a driver for increasing the country's export potential. The aim of the work is the development of methodological approaches to assessing the investment attractiveness of agriculture and the study of factors influencing it, as well as the rationale for practical recommendations to increase it. An author's methodological approach to assessing the investment attractiveness of agriculture has been developed, the essence of which is to build an integrated indicator based on the synergy of assessment indicators of innovative, scientific, intellectual, production and technological potential, natural resources, as well as taking into account the risks of financial and economic activity. The study identified constraining and accelerating factors of investment attractiveness of agriculture at the macro, meso and micro levels. Based on the correlation and regression analysis, a model of the dynamics of innovative development in accordance with investment investments is built. The empirical analysis revealed significant imbalances in the investment policy of agriculture. To eliminate them, innovative sources of financing investment in agriculture are proposed. The study developed a mechanism for managing investment attractiveness in agriculture, a feature of which is the stimulation of innovative susceptibility to the introduction of innovations at all stages of the innovation process. The practical significance of the results of the study is to increase the efficiency of agricultural production by improving the forms and mechanisms of attracting investment resources to the innovative development of the industry.

Key words**:** *agriculture, investment policy, evaluation, investment attractiveness factors, management mechanism*

INTRODUCTION

In modern conditions, innovation is a non-alternative option for increasing the competitiveness of agricultural production and a driver for increasing export potential. As a result of the implementation of innovation transfer processes, interaction is carried out between the subjects of regional agricultural systems regarding the creation, implementation, distribution, commercialization of innovations with the necessary socio-economic effect. Innovation and investment activity is associated with the tasks of structural restructuring of the economy and is aimed at development of agricultural sectors based on the intensification of the introduction of high technology products in the production process [33].

The role and place of agriculture in the country's economy is characterized by the share of its share in GDP, in the commodity structure of exports, the share of the cost of food in total incomes of the population, as well as its contribution to increasing the sustainability of rural development. Starting in 2016, Russian agriculture is characterized by higher growth rates, including due to the restriction of food imports [1].

Over the past few years, the growth rate of agricultural production has significantly outpaced the growth rate of the economy as a whole. From 2014 to the present, there has been an increase in production volumes, the number of unprofitable farms has decreased, import substitution has been provided for many sub-sectors of agriculture, and a pronounced export orientation has been formed for some sub-sectors. At the same time, problems of technical support, the financial situation of agricultural producers, the introduction and use of innovations remain for agriculture [8].

One of the most important factors restraining the development of agriculture is the low level of investment attractiveness of the industry [2]. In the context of the transition to a new technological structure and the formation of an export-oriented economy, ensuring the sustainable development of agriculture is inextricably linked with the search for new forms, methods, mechanisms to stimulate investment activity in agriculture [29].

In recent years, various regulatory documents have been adopted to achieve this goal: the "Food Security Doctrine", the Federal Scientific and Technical Program for the Development of Agriculture for 2017-2025, and the State Program of the Russian Federation. "Scientific and technical development of the Russian Federation", Passport of the national project "International Cooperation and Export» [23].

Following the federal project "Export of agricultural products", it is expected to double agricultural exports by 2024 compared to 2018. These documents reflect the priority directions of the state agrarian policy, according to which the targeted financial resources will be allocated to farmers.

Such priority areas for the development of the agro-industrial complex in the Program include the development of beef cattle breeding; support for small business forms; technical and technological modernization, innovative development; development of land reclamation; rural social development and sustainable rural development. By the Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024", an Action Plan was approved to accelerate the growth rate of investment in fixed assets and increase by 2524 to 25% of their share in gross domestic product [7]. The implementation of the agro-industrial complex sets a significant need for investment resources from agricultural producers.

In recent years, also in Russia, there have also been changes in the methods and forms of state financial support for the agricultural sector. A certain adjustment of government support measures was caused by the changed macroeconomic conditions for the functioning of the economic environment, the economic sanctions of Western countries against Russia, the increase in the cost of investment loans, and the inaccessibility of foreign capital markets [9].

These changes are associated with such issues of increasing the role of the state in investment processes as the conditions and procedure for providing subsidies for investment loans; priority areas of investment for which loan subsidies are allocated; government participation indirect financing of part of the investment costs for the construction of livestock farms, vegetable stores, greenhouses, and other capital facilities. However, despite attempts by the Government of the Russian Federation to increase the inflow of investments in the agricultural sub-sectors, several important problems remain unresolved.

Theoretical and methodological issues of investment analysis and assessment of investment attractiveness were studied by such foreign and domestic researchers as I. A. Blank, N. D. Guskova, V. V. Bocharov, N. A. Borkunov, V. V. Kovalev, I. Ya. Lukasevich, W. Sharp, G. Markovits, A. Damodaran and others, cited by [4]. The generalization of foreign and domestic experience in the study of "investment attractiveness" made it possible to single out the most important conditions for attracting investments at the level of a country, region, or in a particular sector of the economy. Foreign sources consider the term "investment attractiveness" in an entrepreneurial context from the perspective of institutional economic theory. A. Shin's research reflected that investment attractiveness at the level of an agricultural organization is determined by the quality of management, while the capital of this organization is formed by private investment [31]. According to S. P. Kontorovich, investment attractiveness is a system of economic relations between business entities regarding the effective development of a business and maintaining its competitiveness [19]. According to I. V. Sergeyev, investment attractiveness is characterized as a generalized characteristic of prospects, profitability, efficiency and minimization of the risk of investing in its development at the expense of

own funds and other investor funds [30]. In our opinion, the investment attractiveness of an agricultural organization is its ability to realize its innovative potential by attracting additional sources of investment and introducing new innovative forms and methods of investment policy. At the level of the agricultural industry, investment attractiveness is an analytical derivative of the formed business environment. S. Bowes proposed the concept of investment attractiveness of organizations using the branding category. At the same time, brand value is presented as a key criterion for investment attractiveness, and consumer attitudes to the brand are presented as investment attractiveness factors that show either evolution or stagnation depending on the quality of the institutional environment [6]. M. Falk analyzed the degree of influence of the quality of institutions on the investment attractiveness of business models of enterprises [10]. Empirically, he proved that the influx of foreign direct investment is due to the influence of institutional and fiscal factors. Similar conclusions on investment attractiveness in agriculture and the agro-industrial complex are contained in the works of R. Garrett, J. Le Polen de Varou, R. Heilmaira, E. Lambina [21]. The authors substantiated that such sectors of the economy that are characterized by flexible government policies and high availability of natural, scientific, intellectual, material and other resources will have the greatest investment attractiveness. Today, progress in the agricultural sector is inextricably linked with the development of promising high-tech industries. According to World Bank experts, one of the main tasks of the state in the field of managing innovative activity in agriculture is to provide financial resources [28]. The work aims to develop methodological approaches to assessing the investment attractiveness of agriculture and the factors influencing it, as well as practical recommendations for its improvement.

MATERIALS AND METHODS

The methodological basis of the study was the state legislative acts, decrees and decisions of the government, scientific works of domestic and foreign scientists - economists and agricultural specialists on the issue under study. In the process of the study, monographic, abstract-logical, analytical, economic-statistical, and expert research methods were used. The information from the Federal State Statistics Service, the Higher School of Economics, the Ministry of Agriculture of the Russian Federation, and special references was used as the research information base.

When assessing the investment attractiveness of the agricultural sector and the agro-industrial sector, based on the theoretical considerations presented above, it is possible to assume that investment attractiveness is a system indicator that reflects the quality of the institutional environment, the resource potential of the industry from the perspective of future profit from investment in industry assets, period their payback, as well as the possibility of their transfer to management. In methodological terms, assessing the investment attractiveness of the agricultural sector is a more difficult task than evaluating an individual enterprise. The level of investment attractiveness of an enterprise can be assessed by its competitive position, by a set of financial indicators, and by the efficiency of economic activity. These indicators within the organization can be compared with those of other enterprises in the agricultural sector. For the industry, such an assessment is not legitimate and objective.

The scientific and managerial literature contains various methodological approaches to assessing the investment attractiveness of the sectors of the national economy of national economies.

I. A. Blank [4] identified such criteria for assessing the investment attractiveness of sectors of the economy as: significance in the country's economy; industry resistance to fluctuations; level of government support for the industry; volume and share of capital investments in the industry; financial relative ratios; social significance of the industry; industry life cycle stage; level of competition in the industry.

In foreign sources, it is proposed to evaluate the level of investment attractiveness of the agricultural industry not from the perspective of the analytical criteria presented above due to the subjectivity of these procedures, but from the perspective of the dynamics and structure of the processes of innovative activity of the industry from the perspective of inter-regional and inter-country differences [3,13,17].

With this assessment, the rationale for the applied analytical indicators comes to the fore, with the help of which it is possible to assess the dynamics of ongoing innovative processes. The main requirements for the estimated indicators are the reliability of the initial statistical data for analysis and their general availability.

According to V. Maslova, N. F. Zaruk, the assessment of investment attractiveness is carried out based on a rating, the construction of which consists of two stages. In the first stage, to calculate the investment attractiveness of agriculture based on expert assessments, indicators are allocated from the standpoint of both investment potential and investment risks. In the second stage, the integral indicator is calculated, which constitutes investment attractiveness [22].

We share this approach and in its development, we propose the construction of an integrated indicator of investment attractiveness based on the synergy of the indicator of innovative, scientific, intellectual, production and technological potential, land resources, as well as financial and economic risks.

By applying these methodological approaches, constraining and accelerating factors will also be identified in the work, problems of increasing investment attractiveness will be identified, and optimal ways to eliminate them will be proposed. To study the investment activity management system in agriculture and to develop mechanisms to stimulate investment attractiveness, the investment attractiveness of Russian agriculture will be assessed using a dynamic model that reflects the dependence of innovative development on investment in the agricultural sector.

RESULTS AND DISCUSSIONS

The results of statistical studies and empirical calculations for a more in-depth study of investment activity in agriculture have revealed trends in monitoring innovative activity in comparison with Russia and foreign countries.

According to the Institute of Statistical Studies and Economics of Knowledge, HSE, other studies in 2016 and Goskomstat data for 2017, the share of agricultural organizations implementing technological innovations in crop production and animal husbandry in Russia amounted to no more than three, in total 9% [11].

One of the most important factors of low innovation activity in agriculture is the insufficient level of private-state support for the formation of the material and technical base for creating high-tech products by the needs of the agricultural economy.

The share of innovative products in the total volume of goods shipped in crop production is 1.9%, livestock - 1.7% (in the economy as a whole - 7.2%). The average level of innovative agricultural products in total in European countries is about 10%. In terms of technological innovation costs in agriculture, Russia is also inferior to European countries.

A study of the positive experience of increasing the investment attractiveness of agriculture revealed various trends in the implementation of the investment policy of leading agricultural countries. So, an interesting trend is the rejection of direct measures of state support for agriculture of the countries of the Kern Group - Australia, Argentina, New Zealand. The agricultural investment policy of these countries is characterized by a minimum level of direct subsidies to agriculture, the development of production is carried out by increasing competition and the efficiency of production processes. The experience of the Kern group countries demonstrates an increase in the aggregate productivity of factors after the abolition of direct state subsidiary support [15].

In the livestock industry, subsidizing tools are aimed at reducing the cost of breeding animals, the costs of conducting breeding and artificial

insemination of animals, and reducing the cost of livestock production. In the short term, the pork market in European countries will be characterized by such trends as an increase in pork production, intensification of exports, a decrease in imports and a slight decrease in consumption [25]. Analysis and evaluation of financing of agricultural production in Western countries proves that the driver of the development of competitiveness of agricultural products and an efficient production process is government support as the most important source of financing. The highest level of state support is typical for Sweden, Norway, and Japan and amounts to more than 70%.

In developed agrarian countries, an effective system of lending to farmers has been created, through which state regulation and investment of agricultural production is carried out. Specialized funds have been created in the EC for agricultural producers who are faced with financial difficulties: European Social Development Fund (EFRE); European Social Fund (ESF); European Alignment and Guarantee Fund (EAGFL) [5]. Also, various systems of agricultural credit cooperation have developed in European countries [24].

Features of the functioning of these systems are determined by differences in historical traditions, the territorial scale of the country, the level of development of the credit and banking sector. In the Scandinavian countries, there are two-stage systems of agricultural credit cooperation, which are represented by central system-forming banks. In Finland, the central bank of cooperative banks operating within the framework of administrative regions and extending their activities to agriculture operates. In Norway, a bank has been established for small and medium-sized agricultural producers engaged in operations with credit cooperatives. In France, Germany, and the Netherlands there are three-tier systems of agricultural credit cooperation: the central bank of cooperative credit, regional cash registers of cooperative credit, and local credit cooperative associations.

A specialized credit system in market conditions is a characteristic feature of the mechanism of lending to agricultural producers in market conditions. A study of the positive foreign experience of countries with developed agricultural economies shows that a large proportion of loans are secured by property, such as land. If we take the experience of the United States, it becomes clear that American farmers are laying their land to pay for current production costs, to purchase equipment, and sometimes additional land. Preferential taxation in developed countries as one of the types of state support aimed at stimulating the investment activity of agricultural producers. Cooperatives engaged in the production of environmentally friendly products are exempted for several years from taxation in several countries. For example, in Germany, such benefits are characteristic of companies using alternative energy sources. The income tax for individuals reaches 50%, and for cooperatives - only 20%.

The experience of developed Western countries, as well as countries of Central and Eastern Europe, is useful for improving Russian investment policy. One of the most advanced methods of financial support and logistics of agricultural production is leasing. In the USA, from 20 to 30% of investments in the USA are financed through leasing, in the UK - 11-20%, in France - 16-17%, Germany - 15-16%, Italy - 14-15%, Canada - 8-10% [16]. In Germany, a policy of mixed financing of investments is being implemented by combining such economic instruments as tax incentives, accelerated depreciation, subsidies, loans from federal and land budgets. The maximum possible amount of federal assistance for the investment project is 35%, the rest is covered by the investor [20].

The solution of the priority tasks of agricultural production is possible only if the investment subsidy program is improved, which will be aimed at reducing investment costs and reducing investment payback periods projects. Thus, it is possible to achieve accessibility of state support measures for all agricultural facilities on equal terms.

The structure of costs for technological innovations in agriculture in Russia is dominated by investments in the acquisition of machinery, machinery, and equipment (50.3%). The cost of research and development is a little more than 10%, which explains the

low demand from agricultural producers for the results of innovation.

State budget support accounts for 1.1% of technological innovation costs (including 0.5% from the federal budget, 0.6% from the budgets of the constituent entities of the Russian Federation and local budgets). Foreign investment is 0.5%. Smart technologies in crop production, according to data, are applied to 7 million hectares. According to surveys, no more than 1% of farmers used differential fertilizer and plant protection systems. Only about 10% of dairy farms use robotic equipment in Russia [18].

In Denmark and Sweden, the proportion of milking robots is about 60%, in Finland - 80% [27].

In Table 1, we may notice some trends in the development of agricultural and industrial production in Russia from 2012 to 2017.

Table 1. GDP growth rates of agricultural and industrial production (% of the previous year), RF, 2012-2017

Indicators	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Physical volume of gross domestic product	103.5	101.3	100.7	97.2	99.8	101.5
Industrial output	103.4	100.4	101.7	96.6	101.1	101.0
Volume of agricultural production	95.2	105.8	103.5	102.6	104.8	102.5

Source: Rosstat data.

Currently, in Russia, there is an insufficiently stable tendency for the influx of investments in agriculture. The dynamics of the index of investments in the development of agriculture in fixed assets are presented in Table. 2. The analysis shows that despite the increase in investment in 2016-2017. their share in the total economy in 2017 amounted to only 3.1%, which is lower than the contribution of the agricultural sector to gross value added.

Table 2. The index of investment (% of the previous year), RF, 2012-2017

Indicators	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Investments in fixed assets for agricultural development	101.0	106.6	94.8	87.3	117.1	103.1
Investments in fixed assets for all types of economic activity	106.8	100.8	98.5	89.9	99.8	104.2
Investments in the development of agriculture as a% of the total volume of investments in fixed assets	2.9	3.1	3.0	2.9	3.4	3.1

Source: Rosstat data.

As a result of the analysis, we can identify some trends in innovation and investment in agriculture. So for the investment sector is characterized by a slight increase in innovation activity, the development of the structure and sources of investment. However, investment processes in agriculture are faced with the problems of regulating the regulatory support of innovation. The innovation sphere is characterized by a low rate of increasing the introduction of high-tech products, an insufficient level of personnel competence in the context of the structural transformation of the economy. The author's methodological approach to assessing the investment attractiveness of the industry is to build an integral indicator of investment attractiveness based on the synergy of the indicator of innovative, scientific, intellectual, production and technological potential, natural resources, as well as the risks of financial and economic activity (Table 3).

The results of a sociological survey conducted by Deloitte Company highlight several key problems that Russian agricultural producers face in the course of their activities. In particular, they include the imperfection of state regulation of the industry, insufficient state support and financing, low production and technical potential, currency risks, the unattractiveness of this business for external investors, geopolitical risks, the inflexibility of the tax system and others.

Table 3. Estimated indicators of investment attractiveness of agriculture

Indicators	**Private indicators**
Innovation potential	Costs of technological innovation in agriculture, million rubles The share of innovative products in agriculture in the total volume of goods shipped, work performed, services,%
Scientific and intellectual potential	The proportion of organizations engaged in innovation in the total number of organizations surveyed,% The share of scientific and technical work performed in agriculture, the total volume of products produced, work performed, services,% The share of employees of innovatively active enterprises in agriculture in the number of workers in the enterprises of the sample,% of the number of people employed in agriculture, thousand people The number of students in agricultural universities per 10 thousand people. economically active population, people The number of graduate students and doctoral students in agricultural universities per 10 thousand people. Population Labor supply, people per 100 hectares of sown area Average salary per 1 worker in agriculture, USD / month
Production and technological potential	Indices of agricultural production,% Investment rate,% The coefficient of renewal of fixed assets in agriculture,% The profitability of agricultural products,% The number of cultivated varieties and hybrids of crops The number of breeding forms of animals, birds, fish, and insects The number of developed new and improved technologies for vaccines, diagnostic kits, biological products Number of new food items developed Indicators of the novelty of innovative goods, works, services Indicators of export of innovative goods, works, services Indicators of the volume of goods, works, services produced using marketing innovations
Land resources	The total area of cultivated land, thousand ha The share of agricultural land in the total land area,%
Risks of financial and economic activity	Interest rates on long-term loans,% The tax burden on agriculture Return on assets

Source: Own concept of the authors.

Factors affecting the investment attractiveness of agriculture in the work are considered at the national, regional and enterprise levels (Fig. 1). At the national level, investment attractiveness is determined by such factors as the efficiency of market mechanisms, the level of state regulation, the natural and climatic risks of the agricultural business, the degree of integration of agriculture in the world economy [14].

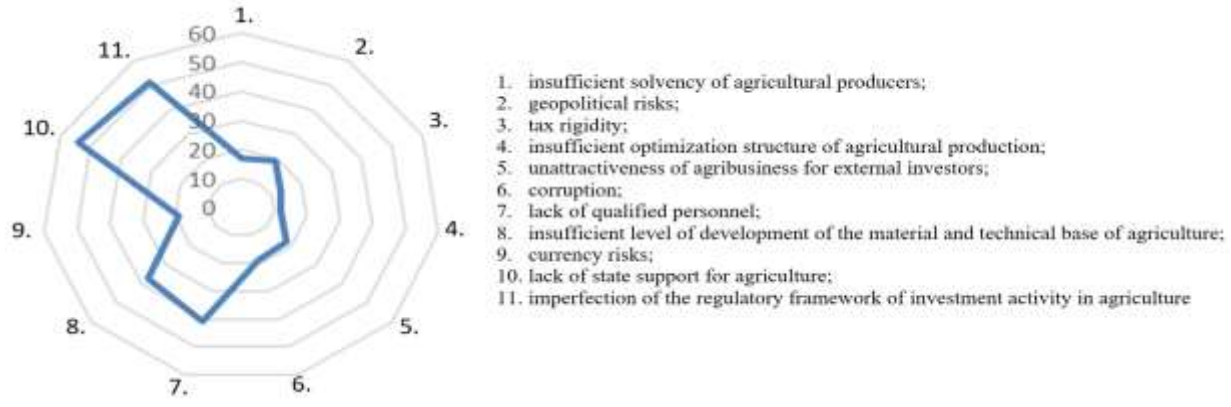

Fig. 1. A study of factors holding back investment activity in Russian agriculture in the 2018.
Source: Own determination.

The study systematizes and classifies the constraining and accelerating factors of the investment attractiveness of agriculture, combined into groups: climatic, institutional, financial, industrial, economic, innovative, social.

At the level of an agricultural enterprise, factors affecting investment attractiveness are the degree of technical equipment of production, the presence of a development strategy, the level of competitiveness of its products, the availability of qualified personnel, the financial condition of the enterprise, market share, etc.

Figure 2 presents a factor analysis of the dynamics of the volume of shipped products per one ruble of investments in fixed assets for 2006-2016.

Fig. 2. Dynamics of the volume of shipped products per one ruble of investments in fixed assets for 2006-2016.
Source: Own determination.

Based on the conducted correlation and regression analysis, it is shown that the growth of investments is 2006-2007. Led to a positive increase in the indicator in 2008-2009, and a significant decrease in investment in 2009 has a negative impact in subsequent years, up to 2013. Moreover, the decline in these years (2010-2013) is also explained by the growth of investments, the return on which leads to a positive increase of 15% and 23% in 2014 and 2015, respectively. In general, for the entire study period, this indicator showed a slight increase of 0.29%. Moreover, the factor "Investments in fixed assets" hurt this indicator - 12.26% and the factor "Volume of goods shipped" had a positive effect of 12.55%.

The results obtained indirectly may indicate a high degree of depreciation of fixed assets and insufficient investments in fixed assets, as well as inefficient management.

The empirical analysis revealed significant imbalances in the investment policy of agriculture. To eliminate them, it is necessary to improve the investment climate, as well as develop measures to increase the attractiveness of agriculture for potential investors. This set of measures is aimed at creating an export-oriented model for the development of the agricultural sector of the Russian economy.

The financial support of innovation is provided by state and non-state support funds; there are two main forms of sources of financial support for innovation - direct and indirect financing. Direct sources of financing innovative activities in agriculture include budgetary and extra-budgetary funds, own funds of agricultural enterprises, Russian and foreign loans, grants. Indirect sources of financing include tax incentives and discounts, loans, leasing, customs and depreciation benefits.

According to a study by the All-Russian Center for the Study of Public Opinion, in 2018, farmers more often began to apply for credit resources, due to a lack of own funds for agricultural production. Currently, ordinary bank credit is becoming less popular due to the emergence of interested organizations and private investors who are ready to provide a loan on more favorable terms. The disadvantage of bank loans is that payments on them must be paid from the first month of using the loan. In the agricultural sector, this is not

always possible, since the product must first be grown and then sold. With such a form of support as leasing, which is a rental of the property with the possibility of subsequent redemption, taking into account the payments made, the property is not taxed.

Thus, in agricultural production, there are such types of financial support as subsidies, leasing, insurance, lending, investment, and taxation.

Among the innovative opportunities for attracting finance to the agricultural sector of the economy, crowdfunding and business angel financing can be singled out [32].

Crowdfunding is an activity aimed at seeking funding from the general public. This investment attraction mechanism is aimed at seeking to interest the maximum number of people, for example, to open a new business or start a project. The advantage of this tool is the absence of the need to repay loan funds for the implementation of the idea. In turn, the disadvantage of this investment tool is the need to interest the largest number of people who are willing to invest in the proposed ideas.

Another way to raise funds for the development of agricultural production is business angel financing, with this method, investors invest in promising innovative projects with a high degree of risk to make a profit.

In recent years, the investment attractiveness of agriculture has increased thanks to certain government policies. In particular, in 2019, the Ministry of Agriculture began to conclude agreements with companies on improving competitiveness. They are aimed at increasing the production of products that are in demand abroad and in this regard enable agricultural producers to receive soft loans for short-term and investment purposes [26].

The development of the mechanism for managing innovation and investment activities of enterprises of the agricultural sector of the economy is based on improving methods and scientific approaches to organizing interrelated tools for its functioning, the main purpose of which is to increase the efficiency of agricultural production on an innovative basis.

As a result of the research, innovation-investment management tools in agriculture were proposed that provide managerial decision-making in the field of innovation promotion and dissemination. Regarding the object of study, standard management functions are considered: planning, organization, motivation, coordination, control.

The results were used to create a model for managing innovation and investment in agriculture, the principal feature of which is to stimulate innovative susceptibility to the introduction of innovations at all stages of the innovation process, as well as its investment. At the planning stage, conceptualization and research processes are carried out, a business plan is developed based on the existing concept of innovation policy [12]. At the stage of innovative investment, the innovation process solves the tasks of finding investors and monitoring the sources of investment, creating a schedule and developing a budget for the investment project. The stage of consumption is devoted to the investment in agricultural production and the implementation of an innovative product.

It is planned to raise funds for the introduction of innovations, launch production of high technology products, bringing it to the end consumer. At the final stage of the innovation process, an efficiency assessment is carried out, the contribution of various investment policy instruments to improving the efficiency of agricultural production during the transition to an export-oriented economy is analyzed. Presented in Figure 3, agricultural investment attractiveness management model based on a symbiosis of management functions, approaches to stimulating innovative susceptibility at all stages of the innovation process and sources, forms and methods of investment policy.

The presented author's model makes it possible to simultaneously regulate investment processes at all stages of the innovation process and create conditions for the implementation of high-tech products in agriculture by stimulating innovative susceptibility on the one hand and parallel investment of all stages of the innovation process on the other. The implementation of this model is aimed at improving the quality of managerial decisions

to introduce innovations in the production processes of agricultural enterprises.

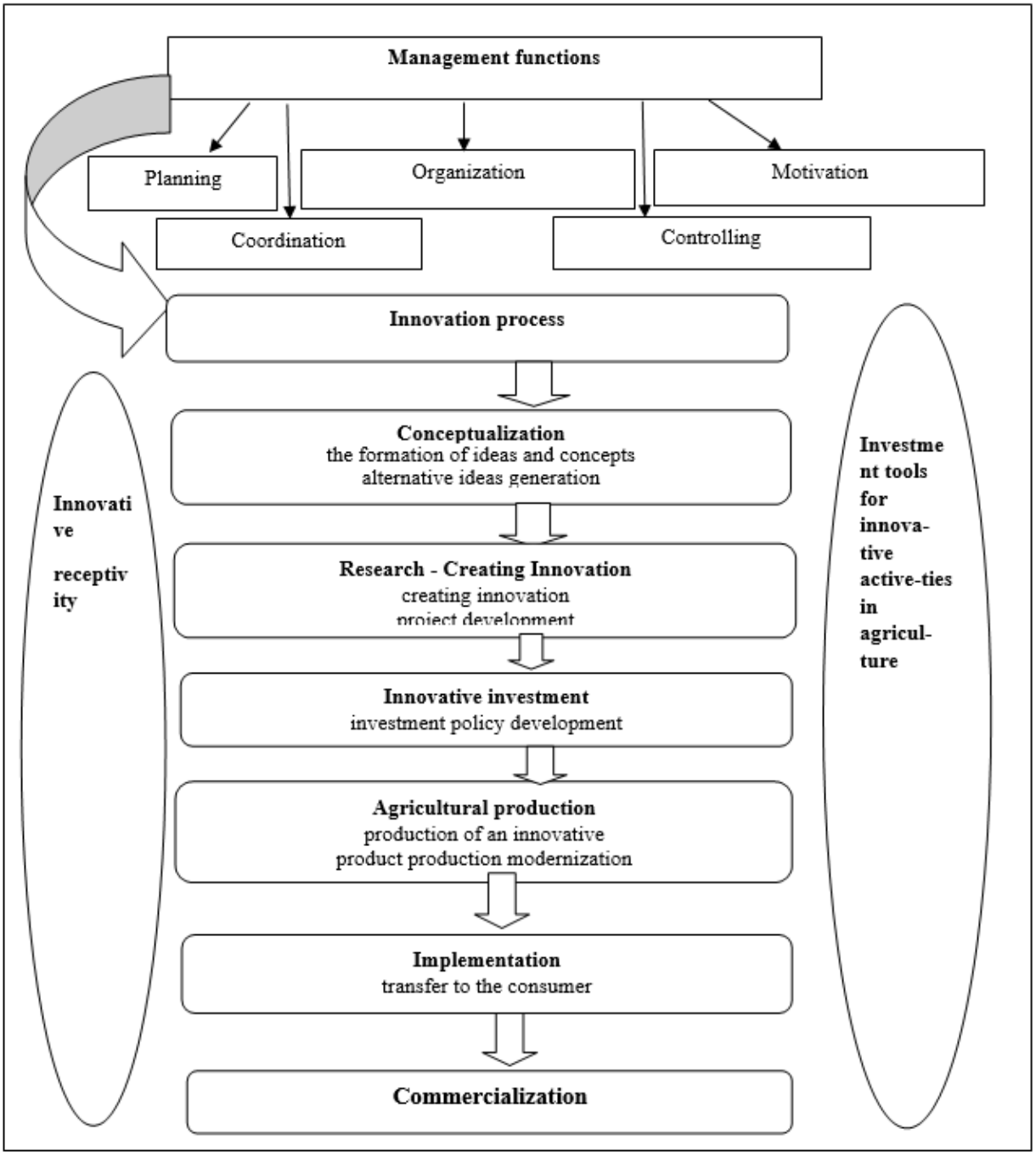

Fig. 3. Multifunctional model of the managing innovation-investment in the agricultural sector
Source: Own determination.

CONCLUSIONS

The paper substantiates the role of the state in the development of investment policy in agriculture. Based on the analysis of the "investment attractiveness" interpretations, the author's definitions are formulated. Various methodological approaches to assessing the investment attractiveness of the agricultural industry are investigated.

The authors developed a methodological approach to assessing the investment attractiveness of agriculture, the essence of which is to build an integrated indicator of investment attractiveness based on the synergy of the estimated indicators of innovative,

scientific, intellectual, production and technological potential, natural resources, as well as taking into account the risks of financial and economic activity.

A study of the positive foreign experience of the leading countries in increasing the investment attractiveness of agriculture revealed various trends in investment and innovation that are characteristic of the agricultural industry: a slow increase in implementation activity based on advanced scientific and technological achievements, a concentration of new developments in the production sector, and a poor supply of innovative personnel in conditions of innovative structural adjustment.

The study systematizes the constraining and accelerating factors of investment attractiveness of agriculture at the macro, and micro levels, such as climatic, institutional, financial, social, innovative, economic, industrial. It is proved that when pursuing innovation policy in agriculture, factors accelerating innovation development must be taken into account.

An analytical assessment of the investment attractiveness of Russian agriculture was carried out using a dynamic model reflecting the dependence of innovative development on investment in the agricultural sector. The empirical analysis revealed significant imbalances in the investment policy of agriculture. To eliminate them, the use of innovative sources of financing innovation in agriculture is proposed.

Based on the analysis and assessment of factors affecting investment attractiveness, research on positive foreign experience in investing innovative activities in agriculture, a mechanism for managing investment attractiveness in agriculture based on a symbiosis of management functions, approaches to stimulating innovative susceptibility at all stages of the innovation process and sources were developed forms and methods of investment policy.

The practical significance of the results of the study is to increase the efficiency of agricultural production based on improving the forms and mechanisms of attracting investment resources, as well as the quality of managerial decisions to introduce innovations in the production processes of agricultural enterprises.

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SUSTAINABLE DEVELOPMENT OF RURAL AREAS OF SOUTH-EAST REGION OF ROMANIA

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Abstract

The South-East region could benefit from the rural area. Agriculture has an important share in the region's economy, 40.4% of the region's employed population activating in this sector. The agricultural land represent 65% of the total area of the region and the private sector holds the largest share of agricultural land. The South-East region ranks first in the country, regarding area of the vineyards, holding 40.3% of the country's wine-growing area. There are essential elements in the region that can lead to a positive evolution regarding rural development, if European funds for agriculture will be drawn and used efficiently. The paper proposes an integrate analysis of current situation of South East region by means of data and statistics provided by international and national statistics institutions. The purpose of the paper is to evaluate the evolution of Romanian South East region under the influence of European funds for agriculture. It is good to understand the reason of current evolution in order to forecast the future evolution.

Key words**:** *sustainable development, efficiency, agriculture, rural development*

INTRODUCTION

The theory of sustainable development is relatively new, the concept of sustainable development taking shape when the subject of the environment was in the foreground of the political debates. At international level, it was decided to treat the environmental matters through collective measures based on an adequate international framework. This action framework is being in a dynamic evolution, including mandatory or optional legal measures. The first international meeting was in 1972 at the Stockholm Conference concerning the Human Environment [5].

After eleven years from the Stockholm Conference in 1983, the United Nations set up the World Commission for Environment and Development, known as the Brundtland Commission. This commission worked out and published in 1987 the document titled Our Common Future (Brundtland Report) [1] and defined sustainable development as development that meets the needs of the present generation, without compromising the ability of future generations to satisfy their own needs. According to this first official document, sustainable development has three dimensions: ecological, economic and equity.

In June 1992, it was held the United Nations Conference on Environment and Development in Rio de Janeiro, where it has been recognized the need to integrate economic development and environmental protection into the goal of sustainable development, and put forth the increasing importance of international environmental law, as mechanism of codification and promotion of sustainable development.

An evaluation of the progress achieved five years after the Rio Conference (New York, 1997), highlighted a number of shortcomings, particularly related to social equity and poverty.

The United Nations Summit on Sustainable Development, which took place in Johannesburg in 2002, had as main results:

- Johannesburg Declaration on Sustainable Development
- The implementation plan of the World Summit on sustainable development.

Lester R. Brown [2] is the initiator of a number of studies, and the annual reports concerning the progresses on the way to structuring a sustainable society: The State of the World or Vital Signs.

Lester R. Brown draws attention, in the paper Plan B 2.0 on the conflict between industrial civilization and the environment, and mentions a few aspects such as the proclivity towards the depletion of natural resources of energy, raw materials and food, the consumption of renewable resources at a rate higher than their capacity of regeneration and physical deterioration and pollution of some vital environmental factors: water, air, soil [2].

The UN Conference on Sustainable Development - UNCSD from Rio in 2012 had a preoccupation with ensuring a renewed political commitment to sustainable development, evaluating the progress made to date and blanks in the results implementation [6].

In 2015, in New York there have been adopted the so-called Sustainable Development Goals, promoting sustainable development in all societies of the world [14].

The United Nations Educational Organization (UNESCO) identified 11 (eleven) thematic areas for Education for Sustainable Development, including Area 8: Sustainable Lifestyle. This thematic area considers that the processes of production and consumption influence the global economy, and the choices of citizens as consumers can have important consequences. The adoption of sustainable attitudes and applying the principles of sustainable development in daily life can have a major impact at local but also global level, from a social, economic and environmental point of view, at present and in the future. The education for sustainable development is a process of transforming the manner in which people interact with the world, a process of educating consumers concerning the products they buy [15].

Rural sustainable development is an even newer concept, which involves actions at local level, and furthermore, at the level of quite isolated rural settlements.

Rural development refers to village and rural settlements somewhat isolated and intends to improve the quality of life through development and innovation. Sustainable development focuses on careful consumption of resources, the relationships with the environment and social equity. Sustainable rural development combines the above elements, through behaviors friendly towards the environment and towards the inhabitants of rural settlements [4].

MATERIALS AND METHODS

The purpose of this research paper is to develop an analysis about sustainable development of South-East region from Romania. For this purpose, there have been used studies and reports of local, national and international institutions and communities. The analysis is a quantitative research using indicators and statistics of some institutions such as Eurostat, National Institute of Statistics of Romania and some national and community institutions that deal with accessing and absorbing European funds at rural level.

The purpose is to understand whether the absorption of European funds has contributed or not to the sustainable development of rural communities, laying emphasis on the south-eastern region of Romania.

The analysis uses the evolution of the demographic and economic indicators to explain the positive or negative evolution of the South-East region of Romania from the rural sustainable development point of view.

RESULTS AND DISCUSSIONS

Rural development in Romania is a very important theme since Romania ranks 6th in Europe from the perspective of agricultural area employed [3]. The purpose is to create a competitive agri-food sector that will support sustainable development at national, regional and local level. The reason is the betterment of the quality of life and providing for living conditions in rural areas close to those in urban environment. Another important goal, also supported by the EU, is the promotion of local and green production [7].

Attracting the European funds for sustainable rural development was started during the time

of financial programming 2007-2013 and is continuing in the period 2014-2020, according to Table 1.

Table 1. Implementation level of RDNP 2014-2020 in 2019 (Mil euro)

RNPD 2014-2020	Allocations	Contraction rate %	Payments (Amounts reimbursed)	Payment rate %
Priority 1	1,989,79	81.8	4,236.44	52.7
Priority 2	1,139.51	51.2		42.7
Priority 3	2,718.62	52.8		52.8
Priority 4	809.15	53.3		19.3
Priority 5	2,575.41	87.1		40.4
Technical assistance	209.10	35.8		33.5
TOTAL	9,441.58	67.7		44.87

Source: [8].

In the case of RDNP 2014-2020, in December 2018, all indicators were achieved, having reached over 85% of the value of the goals for all priorities.

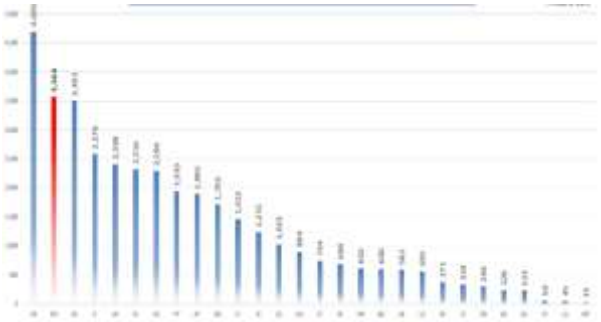

Fig. 1. The payment situation of EU to member's state 2014-2019
Source: [8].

According to Figure 1, it is noted that Romania ranks 2nd after France in the payments reimbursed by the EU within the Common Agriculture Policy. This correlates with the indicators in Table 1.

Romania has an area of 238,000 km^2, out of which 87% is represented by the rural area. Agricultural lands represent 57%, and 45% of the population lives in rural environment. The agricultural sector supplies 30% of the jobs, six times higher than the European average.

The weight of the agricultural sector in the Romanian economy is 6.6%, being three times higher than the European average, according to the Eurostat 2017 report.

Between 1995 and 2016, the contribution of agriculture to the formation of national GDP registered a major decrease, from 14.7% in 1995 to 4.7% in 2016, given the fact that the weight of the labor force employed in agriculture had a value very close to the one registered in 1995. In 2015, the weight of the labor force in agriculture, in Romania, was 25.9%, being the highest weight in the EU, whose average was 4.4%. 17 Eurostat – Land Cover Statistics.

The average labor productivity accounts for 30% of the European average, a major problem of the Romanian economy even since the Revolution, as well as with a low harvest yield, even though Romania is among the main exporters of corn and wheat at global level. This is thanks to the size of the available agricultural area.

The principles at national level also apply at regional level. Thus, the Southeastern region is the second largest of the 8 regions of Romania, having 35,762 km^2. The area of the region accounts for 15% of the total area of the country.

The administrative structure of the region includes 6 counties: Galati, Brăila, Buzău, Vrancea, Constanța and Tulcea.

In the South-East region, due to the relief conditions (the plains, the Danube river and the vicinity with the Black Sea are prevalent) the agricultural activities have been developed.

These did not affect the environment significantly, in particular in the rural environment. Nevertheless, there are problems in the hill and mountain areas of Vrancea, Buzău and Galaţi counties, where deforestation has affected the stability of the lands [13].

The population of the region is predominantly urban, except for the counties of Vrancea, Buzau and Tulcea, where the population is prevailingly rural. The percentage of the rural population is 35.1% in Braila, 30.6% Constanta, 43.8% in Galati, 61.3% Vrancea, 59% Buzau and 50.7% in Tulcea. The rural population by region numbers is 44.71%, and at the country level is 44.85% (Fig. 2).

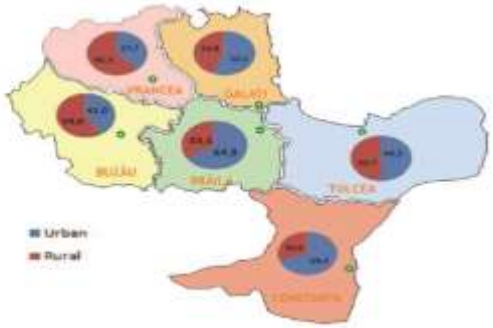

Fig. 2. Structure of the urban and rural population in the South-East region
Source: [13].

The number of inhabitants of the South-East Region registered in the 2011 census was 2,545,923 persons, accounting for 12.6% of the population of Romania. The same thing occurs in rural areas. It is seen that in the last 12 years the population in the rural environment has diminished continuously, the main cause being domestic and international migration, due to the low income per capita in the rural area.

The population occupied in the South East region is 40% distributed in agriculture. The agricultural lands were about 65% of the area of the region, and the arable area represents 78.2% of the total agricultural area.

In the South-East region, agriculture and forestry represent 44.8% of the total activities in the region. Thus, agriculture plays an important part, remaining an area for attracting investments. Furthermore, the area is backed up by subsidies, taking into account the fact that half of the fertile land in Bărăgan Plain are located in the South-East region. The private sector owns most of the agricultural land and, obviously, produces most of the harvest. The South-East region holds, through Vrancea county, the first place in the country regarding the area of the vineyards.

However, despite the high agricultural potential, the processing capacity of agricultural products is low, due to the obsolete technologies, as well as the low labor productivity.

The harvest in the region as a value accounted for 13.68% of the agricultural production at national level in 2007, reaching in 2016 at 15.86. The region ranks 2nd in the country as concerns the total value of the harvest in 2016 compared to position 5 in 2007.

The region participates by 10.6% in the formation of the national domestic product in 2018, on the decrease from 2007, when the contribution was 11.55%. This decrease is due in particular to the economic evolution of the other regions, the predominantly agrarian structure, with the lessened competitiveness of the South-East region but also to the disparities between the counties that make up this region. (Constanta has a weight in GDP of 4.58% - ranking the 2nd after Timis, and Tulcea has a weight of 7% in the GDP of Romania).

Table 2. Evolution of GDP/capita, 2007-2013 (euro per capita)

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2013/ 2007 %**
SE Reg.	4,680	5,380	4,440	4,580	4,860	5,060	5,380	114.9

Source: calculated on statistical data from [10].

Table 3. Evolution of GDP/capita, 2014-2017 (euro per capita)

	2014	**2015**	**2016**	**2017**	**2017/2014 %**
SE Reg.	5,980	6,020	6,370	6,800	113.7

Source: calculated on statistical data from [11].

According to statistical data, the GDP per capita of the South-East region was 38% of the European average, ranking sixth in Romania. GDP per capita being lower than the European average (75%), the South-East region is still considered a less developed region.

The general tendency is for GDP growth, the region still not equaling the growth levels of the national economy, the regional GDP per capita remaining below the national average.

The regional GDP on average increased by 2.6, in 2016 by 3.8, in 2017 by 4.3, in 2018 4.5 and in 2019 by 4.7%. However, the GDP in agriculture, forestry and pisciculture had another evolution: it fell off by 9.3 in 2015, it went up by 5.1, in 2016 by 1.8, in 2017 by 1.9 in 2018 and by 1.9 in 2019 [9].

Another element of sustainable development at rural level is the situation of roads. Unfortunately, this is quite bad, 63% are roads with simple revetments.

The connection to the systems for drinking water distribution is lower in the rural environment (86%) and the same is the case with the connection to the sewerage system, 35% in 2011 [13].

All the elements of rural sustainable development can be supported by the Common Agricultural Policy. Accessing European funds is an opportunity for the future development of the region.

According to the Development Strategy for the South-Eastern Region, there are several priorities on which could be based the European funds attraction [13] Priority 2: Creating conditions favourable for the development of the investment environment, - Supporting SMEs in order to enhance competitiveness - and Priority 7: Modernizing the rural economy, 7.1 Improving the competitiveness of agricultural enterprises, zootechnical and agri-food farms in a system production channels, by entering innovation and food safety and certification systems.

The counties in the South-East region attracted funds from RDNP, in the period 2007-2013, in the amount of 2,674,467,242.56 lei, according to Figure 3.

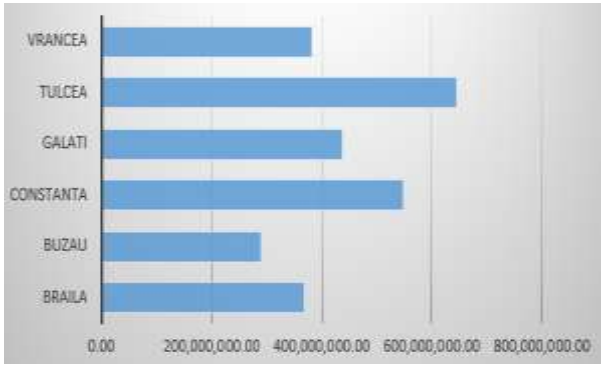

Fig. 3 Payments from RDNP 2007-2013
Source: Data from [12].

For the period 2007-2013, the county that attracted the most funds from the RDNP was Tulcea, followed by Constanta and Galati. The weakest position was Buzau, with payments totalling 289,178,694.9 lei, which represents 44.72% of what Tulcea achieved.

For the period 2014-2020, the data are collected until 31.03.2020. It can be observed that the hierarchy of counties in this period is the same as that of the period 2007-2013. Tulcea is in first place, and Buzau attracted 39.27% of the funds attracted by Tulcea.

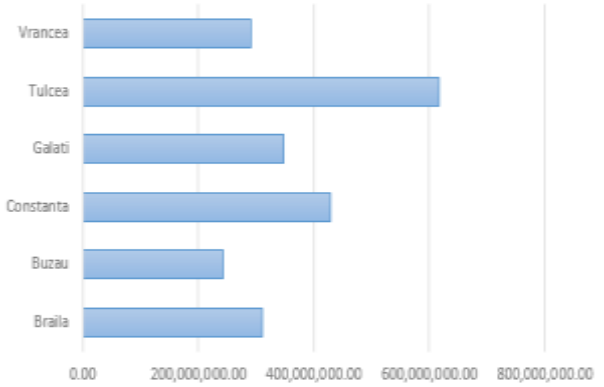

Fig. 4. Payments from RDNP 2007-2013
Source: Data from [12].

Until 31.03.2020 South-East region received payments of 2,237,717,637.07 lei.

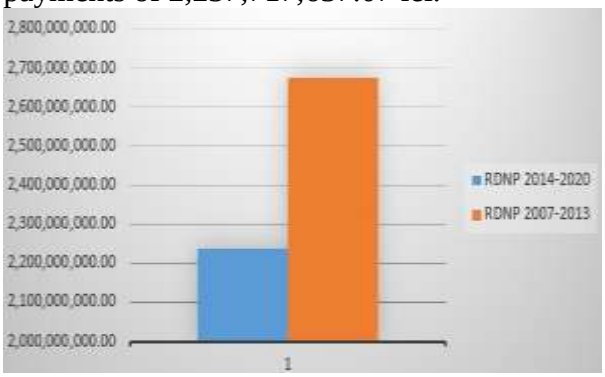

Fig. 5. Payments from RDNP 2007-2013 vs RDNP 2014-2020
Source: Data from [12].

The payments from 2014-2020 are only 83.66% of the payments from 2007-2013 (Fig. 5).

It is fair that there are still 8 months until the end of the year, the period in which EU payments usually increase, the final percentage of absorption of these funds may be higher.

However, it would have been desirable that absorption at this time to be higher.

This shows that we have not yet succeeded in the region to develop our strategies for attracting CAP funds, strategies that should stimulate companies but also farmers. However, without these funds, rural development in the South East region would have been much reduced.

CONCLUSIONS

The impact of European funds in the rural environment is major. In addition to the infusion of over 7.6 billion euros in the

development and modernization of agriculture and rural infrastructure, European funds have ensured a rise in the standard of living for those who live in the rural area. There have been made investments in services and utilities. Up to the present day, 75,000 farmers and 2,787 agricultural undertakings benefited from the allocated funds**.**

The funds absorbed have been invested in protection against flood, modernization and rehabilitation of the irrigation infrastructure.

Over 100 thousand jobs were created in the rural area, over 3,606 km of agricultural and forestry roads built for 3 million inhabitants in the rural area. The funds have also been used in order to create the water supply and sewerage system.

There have been started 3290 non-agricultural SMEs and there have been backed up projects implying tourism activities that generated jobs, all supporting the sustainable development of rural economy.

The need for sustainable development of the Romanian rural area is still utterly high. It involves the development of education, namely, the support of schools even though the number of children does not come under the limits imposed at national level. It is known that the Internet network is developed In Romania, but in rural environment, especially in isolated rural localities, access to the Internet is expensive for the locals. Therefore, facilitating communication through the use of the Internet will produce positive results from the economic, social and psychological point of view. The sustainable development challenge is an enhancement of the level of agricultural productivity, without endangering the environmental factors (air, water, soil quality, biodiversity). It is considered that the cooperation between farmers, increase in the level of farmers' training and growth of the technological endowment level of the farms can contribute to reaching sustainable rural development. For the sustainable development of Romania, considered the most rural country in the European Union and, implicitly, of the South Eastern region, it is necessary to continue the efforts to attract European funds for agriculture, along with a clear vision of development and conservation of the rural environment. That is why we should also make use in the following period 2021-2027 of the 365 billion euros that the European Union has allocated to the CAP. Romania will be able to access 20.5 billion euros, 13.3 billion for direct payments, 363 billion euros for market support (EAGF) and 6.7 billion euros for rural development (EAFRD) [12].

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ECONOMIC EFFICIENCY OF THE NUTS COMPLEX BUSINESS IN THE AGRICULTURE OF UKRAINE

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Abstract

The purpose of the article is to justify the conditions for saturation of the walnut domestic market and export development, analysis of the domestic market conditions, outline problems and prospects for industrial nuts production, development of a number of measures for the competitive development of the industry in Ukraine. The current state and tendencies of supply and demand formation are considered, the level of production and consumption of walnuts is estimated, the norms of labour and money costs for the creation and use of marketable plantations are determined, the investment needs for the development of the domestic branch of nuts production and the expected socio-economic effect are determined. The validation of the proposed valuation methodology has confirmed that agricultural enterprises can make adequate management decisions for the efficient management of nut businesses by farmers. It is proved that laying of industrial walnut gardens in Ukraine will increase the level of their production and will promote its export growth. In this regard, determining the priority of economic efficiency of nuts production, becomes of particular importance, which determines the relevance of the chosen topic and the importance of the results obtained.

Key words**:** *agriculture, nuts complex, walnut, consumer market, prospects, production program, cost, efficiency*

INTRODUCTION

The current stage of development of the agrarian sector of the economy is characterized by intensification of the processes of its dualization, as a result of which the problems of the sector of small agricultural enterprises and individual agrarian entrepreneurs are aggravated, as it becomes increasingly difficult for them to confront large enterprises, especially agro holdings. The way out is the reorientation of the small business sector to produce products related to the cultivation of so-called niche crops, which today include walnuts.

In Ukraine walnut came from Wallachia (region of Romania), which is why it has this name. Nowadays, this culture is popular in our country for laying gardens, because demand for nuts is constantly growing, they are a valuable raw material for the food industry, are well preserved for a long period, relatively simple to pack. Their plantations are characterized by high productivity – the annual harvest of walnuts in Ukraine is up to 100 thousand tons, of which more than half are exported abroad. The quality of walnuts grown in Ukraine is one of the highest in the world [6].

That is why this type of economic activity is best suited for agricultural development. Recognizing the high relevance and importance of the development of nuts production for the Ukrainian economy and its potential prospects, many scholars are paying sufficient attention to this problem. Among them should be mentioned such scientists and practitioners as N. Dronyk [3], S. Klischenko

[4], V. Lanovenko [5], A. Porembskyi [7], G. Satina [9]. In particular, V. Lanovenko [6] emphasizes that apart from profitability, nuts production has a socio-economic basis, since for the family it is a stable income, for society - additional jobs, and for the country - replenishment of the budget, creation of enterprises for processing and storage of products. Today Ukraine holds the leading position on walnut production in Europe and the fifth in the world. According to official statistics, we have 16 thousand hectares under nuts. In the 2016 season, 40 thousand tons of nuts were exported, totalling 79.28 million USD. However, this is not enough - Ukraine retains virtually the last place in the value of nuts, and that is our biggest problem - almost all nuts are not varietal, but grown in households, on private plots [10].

Therefore, there is a need to systematize and complement disparate and partial research, comprehensive assessment of our country`s capabilities in industrial walnut cultivation and the saturation of the consumer market.

MATERIALS AND METHODS

The theoretical and methodological basis of the study is the basic provisions of modern economic theory, the work of leading domestic and foreign scientists on nuts production and the development of food markets. Methods of analysis and synthesis, grouping, balance sheet are used to assess the state of the nut market; at establishment of perspective volumes of production - calculated, normative, for substantiation of bases of effective development of branch - modelling, comparative analysis. To determine the relationship of the cost of production with the resources of the enterprise and its impact on the performance indicators of the enterprise used: linear multivariate regression analysis - to establish the relationship of the aggregate components of cost and profit and nine-factor economic and mathematical model for the impact of elements cost of production for profitability of products. In general, all the materials in the article have been elaborated using a set of scientific research methods. The efficiency of running a nut business with farms, private peasant farms is based on the concentration and intensification of agricultural production.

RESULTS AND DISCUSSIONS

Increasing the competitiveness of agri-food enterprises is inextricably linked to increasing the competitive advantages of products created using various types of innovations [1].

The nut business in the investment plan is very attractive in Ukraine. Climatic conditions and soils throughout Ukraine are practically suitable for growing this valuable product in every respect. The Ukrainian market for nuts is far from perfect. The development of the nut market can be guided by the maximum convergence of consumer demand (1.4 kg) to food standards (3.6 kg per year) and meeting the needs of the external market. Of all walnuts collected in Ukraine, 60% is exported, 20% remains in the domestic market, and another 20% is lost [2].

Ukraine has formed three areas of foreign trade in nuts. These are exports of high quality fresh fruits for consumption in Western Europe and northwest Asia, and trade in medium quality nuts for domestic consumption; import of nuts for further commodity processing and resale to the commodity markets of the countries of Western and Eastern Europe. In recent years, there has been an increasing tendency for exports of purified nuts, as well as processed products (oil, meal, dietary supplements), resulting from economic feasibility. The positive is that the nut will be guaranteed to bear fruit for 100-150 years, because the nut tree can survive up to 300 years. Thus, nuts production turns into a long-term profitable business, when 12 hectares of industrial nut garden produce an income of 45,000 euros per year. Payback of all costs is 5-7 years.

Ukraine ranks second in the world as a walnut exporter and the fifth largest gross crop in the world. Almost all walnuts are harvested in households. There are no large fruitful orchards in our country yet. Those that have been laid for the last 5-10 years are now only reaching the level of full fruition. Importers of Ukrainian nuts - Turkey, Romania, Iraq, Vietnam, France, Bulgaria and others.

Switzerland and Germany are leaders in the import of organic products, they are interested in organic nuts. The price for purified walnut, for example, in Germany is 25 euro (retail), 11 euro (wholesale price). An eco-friendly nut costs 30-35 euro (retail), 11 euro (wholesale). As of 2019, the price of walnuts in Ukraine ranges from 4-6 USD (wholesale) per 1 kg of peeled nuts, round wood (unpeeled) is sold for 30 UAH/kg. The largest walnut producers in the world are China, the USA, Iran and Turkey. Ukraine exports most nuts to the markets of Italy, Azerbaijan, Belarus, Turkey, France, Greece. The largest quantities of nuts are produced by the markets of China (48%), the USA (28%), Ukraine (6%), Turkey (6%), Chile (2%), France (2%), India (2%) and Romania (2%).In Ukraine, all the collected walnuts are exported more than 50%. This practice shows that walnut production has a large export potential. In Europe alone, consumption of walnuts is over 100,000 tons per year, including 30% of walnuts. Italy, Germany are already ready to buy large consignments of nuts in Ukraine.

Taken together, these findings confirm the weak position of the `leader producers` among the gardeners. Overall, more than 60 percent of gardeners cited the effectiveness of leader producers as average [8].

The modern enterprise engaged in cultivation of a walnut, should have not less than 100 hectares of a garden with carefully selected varietal composition adapted to local conditions, the latest technical equipment for care and harvesting, and also modern technology of production processing. From one tree, starting from 8 years for industrial production, the productivity of the whole nut is about 12 kg, with a gross harvest of 22.2 kg/ha (planting scheme 9x6 m – 185 trees per 1 ha). With an average yield of 50% pure kernel of the nut can be obtained from a hectare of at least 11.1 c of purified nut (halves + small kernel residues). The amount of investment for the creation of 1 ha of industrial walnut garden is about 100 thousand UAH.

The most important step in the development of an effective strategy in competition is strategic analysis, which makes it possible to evaluate their own resources and capabilities of the state and needs of the environment [10]. SWOT – analysis is an effective method for exploring opportunities and threats in your activities. The study of the prospects of the company is aimed at discovering the resource strengths and weaknesses of the activity. The SWOT–based assessment is shown in Table 1.

Table 1. SWOT Analysis. Assessment of own strengths and weaknesses of competitors in the nut complex of Ukraine

SWOT – analysis and potential risks	
Strengths	*Weaknesses*
- Convenient geographical and economic location; - Use of intensive cultivation technologies; - High quality products; - Protection against pressure from competitors.	- Limitation of marketing personnel; - High transportation costs; - Insufficient number of developed markets.
Opportunities	*Threats*
- Attracting new customers; - Expansion of sales areas; - Increase of landing area; - Strengthening market position; - Introduction of new technologies.	- The likelihood of new competitors; - Technical problems in the organization of production; - Slow growth in demand.

Source: own research.

Particular attention has been paid in recent years to the development of nut farming by private entrepreneurs, as it is a very profitable business. Pumpkin cultivation is proposed as a green manure in the garden row. Pumpkin can be grown all over Ukraine, it is better than watermelon and melon tolerates a lack of light, but among all melons plants is the most demanding of moisture in the air and soil. Potential yield of pumpkin fruits reaches 50-80 t/ha, seeds – 500-800 kg/ha. The calculation of the yield of a nut garden is shown in Table 2.

Table 2. Calculation of garden yield indicators for a nut complex in Ukraine

	Culture	Years									
		2020	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
1.	Ferzhan, tons	-	-	-	-	-	12	15	14	18	20
2.	Fernor, tons	-	-	-	-	-	4	4.5	4.5	6.4	6
3.	Kyshebnivskyi, tons	-	-	-	-	-	2.2	2.2	2	2.2	2
4.	Bukovynskyi 1, tons	-	-	-	-	-	2.8	2.5	2.7	2.4	2.8
5.	Klishivskyi, tons	-	-	-	-	-	2	1.8	2	1.7	2.2
6.	**Total nuts**	**-**	**-**	**-**	**-**	**-**	**25**	**26**	**25.2**	**30.7**	**33**
7.	Pumpkin seeds, kg	4,800	6,000	5,400	6,600	7,200	-	-	-	-	-

Source: Own calculations.

In the first decade, the average nut yield is 28 tons, or 2.3 tons per hectare. In the next decade, 4.94 tons per hectare, or 59.28 tons in total. The average yield of pumpkin seeds is 6,000 kg or 500 kg per ha. Calculation of the cost of nuts presented Table 3.

Table 3. The cost of nuts (peeled) in Ukraine

	Cost article	Unit of measurement	Number	Price, UAH	Sum, thousands UAH
1.	Watering and irrigation	cycle	2.4	7,500	18,000
2.	Phytosanitary care	item	2,366	66.65	157,694
3.	Annual Wage Fund with deductions	WF	1	132.03	132,03
4.	Harvesting	person/day	3,200	35	112,000
5.	Cleaning, packing	person/day	3,200	45	144,000
6.	Rent	ha	12	1,000.00	12,000
7.	Insurance	item	2,366	13.50	31,941
8.	Depreciation of fixed assets	%	10	577,580	57,758
				Total	**665,426**

Source: Own calculations.

The total cost of the peel nut is 665.42/11,200 = 59.41 UAH/kg. The total cost of a whole nut is 521.42/28,000 = 18.62 UAH/kg, excluding cleaning and packing. The cost of pumpkin presented in Table 4.

Table 4. Cost of pumpkin in Ukraine

	Cost article	Unit of measurement	Number	Price, UAH	Sum, thousands UAH
1.	Seeds	kg	10	60	0.6
2.	Sowing	complex	1	10,000	10
3.	Manual double weeding with rolling	person/day	400	100	40
4.	Nutrition, fertilizers, pest and disease control	complex	1	12,000	12
5.	Harvesting	person/day	400	100	40
6.	Pre-sale preparation, processing	complex	1	12,000	12
				Total	**114.6**

Source: Own calculations.

The cost of pumpkin seeds is calculated as follows: 114.6/6,000 = 19.1 UAH/kg. The purchase price calculation is shown in Table 5. We calculated the average husking category = (87.5 + 160 + 62.5)/3 = 103.33 UAH/kg. The average yield ratio of peeled walnut is 0.4. The calculation of revenues for 2020-2029 according to the production program indicators and average prices in Ukraine is made in Table 6.

Table 5. Purchase prices as of 2019 in Ukraine

	Products	Purchasing price range in Ukraine, UAH/kg	The average price in Ukraine, UAH/kg	The average price of Europe, euro/kg
1.	Whole nut	22-35	28.5	-
2.	Peel nut, category C	50-75	62.5	-
3.	Peel nut, category B	75-100	87.5	5.6
4.	Peel nut, category A	100-220	160.0	8.3
5.	Walnut shell	0.6-1	0.8	-
6.	Pumpkin seeds	30-60	45.0	-

Source: Own calculations.

Table 6. Calculation of revenues for 2020-2029 according to the indicators of the production program and average prices in Ukraine, thousand UAH

	Income item	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
1	Revenues of nuts production	-	-	-	-	-	1,033.3	1,157.3	1,041.6	1,268.9	1,363.9
2	Income from pumpkin production	216	243	270	297	324	-	-	-	-	-
Total		**216**	**243**	**270**	**297**	**324**	**1,033.3**	**1,157.3**	**1,041.6**	**1,268.9**	**1,363.9**

Source: Own calculations.

We calculate the economic efficiency of the garden complex on area of 12 hectares (period of 10 years). The results of the calculations are shown in Table 7.

Table 7. Calculation of the economic efficiency of a garden (nut) complex in Ukraine on an area of 12 hectares (for a period of 10 years)

	Years	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Average value
1.	Number of employees employed, total	46	46	46	46	46	56	56	56	56	56	51
1.1	Including seasonal workers	40	40	40	40	40	50	50	50	50	50	45
1.2	Permanent employees	6	6	6	6	6	6	6	6	6	6	6
2.	Total annual wage fund, thousand UAH, total	734.08	301.82	295.6	315.2	330.05	287.79	291.79	273.79	295.32	302.45	342.789
3.	The cost of fixed assets, total, thousand UAH	1,062.5	1,168.75	1,285.6	1,414.1	1,555.6	1,711.1	1,882.2	2,070.5	2,277.5	2,505.32	1,693.35
4.	Other expenses, thousand UAH	957.28	195.33	170.5	154.98	114.6	201.86	204.86	201.86	206.17	208.86	261.63
5.	Total production cost, thousand UAH	2,653.86	497.15	466.10	470.18	444.65	489.65	496.65	475.65	501.49	511.31	700.669
7.	Revenue from sales, thousand UAH	216.00	270.00	243.00	297.00	324.00	1,033.3	1,157.2	1,041.5	1,268.8	1,363.96	721.502
8.	**Profit, (loss), thousand UAH**	**-2,537.86**	**-227.15**	**-223.1**	**-173.1**	**-120.6**	**543.68**	**660.64**	**565.9**	**767.4**	**852.65**	10.833
9.	Profitability level	-0.956	-0.4569	-0.478	-0.368	-0.271	1.1103	1.3301	1.1897	1.5302	1.6675	0.42966

Source: Own calculations.

From Table 7 it follows that the income from the cultivation of nuts will be in increasing order from 6 years, and by this time the profit will be formed from the proceeds from the sale of pumpkin. This is the complex cost-effectiveness of the combined garden of nut stands. It is well-known that nut cultivation is a very effective type of economic activity and provides a stable income for many years. All you need to do is to plant the tree saplings properly and take care of them, which will ensure a good harvest for the 7-8 years and, accordingly, the income from its sale. It will not be difficult to organize this business, since it does not have significant administrative and legal obstacles. Every citizen, using a land suitable for agricultural activity, certain knowledge and experience, as well as desires and financial means, is able to organize his own nut business. Of course, the success of this business will be primarily determined by the yield of successfully selected varieties that are most suitable for use in certain natural and climatic conditions.

In general, growing nuts is a modern and promising idea for profit.

CONCLUSIONS

In Ukraine, the nuts industry has significant untapped prospects for development in all categories of farms, including small and medium-sized agro-industries.

Among the risks that may arise in the process of calculating the economic efficiency of the nut business in agriculture are the following: price risk associated with the price of sales of manufactured products; production risk associated with the production of products; risks of basic production; risks associated with natural conditions.

Minimization of risks aimed at stabilization in the sale of manufactured products should provide for the influence of factors of micro- and macro-environment, and combine in a comprehensive way the mechanisms and means of production in a highly specialized field. A significant factor in regulating pricing policy on manufactured products is also the socio-political situation in the country, which directly, through leverage regulates the formation of economic aspects in the markets for product sales. Innovative industrial technologies for the cultivation and processing of nuts are needed to achieve a significant increase in production volumes. With minimal investment in the industry, nuts production is a world leader in manufacturing and exporting.

In Ukraine, the nuts market is one of the most stable, substantially growing and solvent. The supply on the nuts market in modern conditions is formed at the expense of internal production of separate kinds, in particular walnut.

In the future, the development of nut industry in Ukraine can become an effective tool for overcoming the poverty of the population, reducing unemployment and increasing its employment, as well as increasing the country`s export potential.

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