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C O N T E N T S

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ANALYSIS OF CONSUMERS' WILLINGNESS TO PAY FOR COUNTERFEIT LEATHER PRODUCTS IN ABIA STATE SOUTH EAST, NIGERIA

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Abstract

The study analysed the consumers' willingness to pay for counterfeit leather products in Abia State, Nigeria. A random sampling technique was used to select respondents. From the three senatorial zones, three local government areas were selected. From these local government areas, 50 respondents were selected, in this case, making a total of 150 respondents. However, a total of 138 respondents returned their questionnaire, while the remaining 12 were either not returned or not properly filled. Effectively 138 questionnaire responses were used in the data analysis. Binary logit model was employed in analyzing the data. It was found that age, education, price, income and female gender played critical roles in influencing consumer's willingness to pay for counterfeit leather products. It was therefore, recommended that education of the consumers should be stepped up to enable them make better choices and income level improved among other recommendations.

Key words**:** *binary logit, counterfeit, consumer, leather products, willingness*

INTRODUCTION

Counterfeit goods have been defined as identified copies of authentic products [11]. In most countries including Nigeria, the trafficking and sale of counterfeit merchandise is unlawful. According to [1], counterfeiting involves the deliberate use of false mark that is indistinguishable from the registered mark. Thus any item that bears a brand name or logo without the permission of the registered owner is counterfeit or fake.

Counterfeit products and merchandise has been known as a global problem. The $600 billion annual industry according to [8] and [15] continues to grow every year and increases as the most serious threat facing most economies. [19] reported that the counterfeit business as a whole would be the world's largest business if it were recognized as a business.

Literature has identified that consumer's moral stance on counterfeit consumption is an important predictor of consumption between genuine and counterfeit purchases [13, 9, 11, 24]. Higher morality is held by consumers who abstain from such purchases [9, 10, 25]. In fact, morality has been found to be best predictor of counterfeit purchases compared to perceived value and previous experience [17]. But morality does not impact all market segments the same way [26].

There are also basic theoretical economic rationalizations behind consumer behaviours towards certain products. For instance, prominent variables used to explain the demand for any good include the price of the unit of that good, prices of related goods and the wealth of the consumer. Under the fundamental theory of demand, as prices of products rise, consumers substitute away choosing less costly alternative. Subsequently, as the wealth of the individual rises, he goes less for inferior goods choosing higher priced alternative. These have been respectively described as substitution, income and demand effects [20]. The behavioural assumption of consumer theory is that all consumers are rational decision makers who seek to maximize utility, subject to budgetary

constraints.

It is against the foregoing theoretical analysis that one can also understand one of the factors underpinning consumers' willingness to purchase leather products which they know to be counterfeited. At the basic level, Nigerians have distinguished themselves as having the insatiable appetite for all manner of luxury items. Any group of people that does not discriminate and goes to anything will be laying itself bare for criminal exploitation. This is because people prefer to show off, they either fall victim to fake or counterfeited products or simply and deliberately go for the counterfeit versions on ego trip. About the case of leather products under review, there are tested and global brands like Giorgio Armani, Gucci, Hugo, Moonax, etc. These brands have been faked and marketed as original and the consumers with craze for top brands are easily potential targets.

Standard Organization of Nigeria argued that influx of fake and substandard products into Nigerian markets has continued to undermine the country's economy. In addition, that the appetite for cheap products by Nigerians is the bane of the economy as this has turned the country into the dumping ground for some foreign producers. [23] This has created an avenue for some Nigerians to exploit the citizenry with fake products and subjecting them to abject poverty by under developing the economy. Similarly, Standard Organization of Nigeria (SON) has estimated that the annual loss to sub-standard products is in excess of one trillion naira due to importation of sub-standard products into the country.

There are obviously many factors that lead to the phenomenon. One of them is identified in the consumer theory which posits that consumers tend to purchase products that will give them the highest level of benefit for the amount of money they can afford. It is very obvious as also stated that there appears to be so much poverty in Nigeria which probably defines the choice of product they make.

Previous studies have explored the question of why consumers buy counterfeit products. And it has been found that generally speaking consumers do understand the difference in the value of purchasing authentic versus counterfeit products [3]. Very often product price is the main factor that lures consumers to buy counterfeit products [17, 18]. Personal preferences and attitudes have also been determined to be the critical factors that contribute to counterfeit purchases [4, 6].

Staake et al.(2009) had observed that counterfeit consumption is still a new area of research leading to several literature gaps. Specifically, there is a gap in the literature not only for theory driven and replication research; there is also a need for more rigorous research. [22]

This study is therefore aimed at estimating the factors that influence consumers' willingness to pay for counterfeit leather products in the study area and make recommendations based on the findings.

MATERIALS AND METHODS

Area of Study

The study was conducted in Abia State. Abia state was created on 27th August 1991 having been carved out of old Imo state. Abia state was part of the East central state and later part of Imo state between 1967 and 1976.

On the North and North –East, it is bounded by Anambra, Enugu and Ebonyi states. It is bounded on the East and South East by Cross River and Akwa Ibom states, while it shares southern boarders with Rivers state where the Imo River demarcates the two states. Its axis has a North East to South –West orientation and lies within Longitude 6^0 50' E to 8^0 35' E and Latitude 4^0 30' N to 6^0 30' N. The state has total of 5833.75 square kilometres and population density of 487 persons per square kilometre. The state capital is Umuahia with a distance of 596 kilometres from Lagos and 498 kilometres from Abuja Federal Capital Territory.

The population of Abia state is 2,333,999 with 1,430,248 males and 1,415,082 females [14].The state is divided into three senatorial districts namely Abia North, Abia Central and Abia South with a total of 17 local government areas.

The state is predominantly a mercantile state where every available space, especially in the

urban areas, is converted to trading spots. It also has a rich cultural heritage with varied traditional festivals and dances. Famous among the cultural dances are the Ohafia war dance, Ikoro, Ekpe masquerade as well as the Nkwa Mgba (wrestling dance), among others.

The people of Abia state are mainly traders/business men and women, craftsmen/women (hairdressers, mechanics, carpenters, plumbers, electricians and so on), students, civil/public servants etc. They have varying degrees of educational qualifications. Educational qualifications include, First School Leaving Certificate, SSCE/GCE, OND/NCE, HND/Bachelors, etc. There is also disparity of income in Abia State that is why there are rich, middle class and poor people, all leaving together in Abia State.

Sampling Technique

A random sampling technique was used to select respondents to form the sample size of the study. From the three senatorial zones, three local government areas were selected. From these local government areas, 50 respondents were selected, in this case, making a total of 150 respondents. However, a total of 138 respondents returned their questionnaire, while the remaining 12 were either not returned or not properly filled. Effectively 138 questionnaire responses were used in the data analysis.

Data Collection and Method of Data Analysis

This study employed primary source of data obtained from using the questionnaire administered to the respondents selected and employed binary logit model in the analysis of the data.

Model Specification

The simple logistic model is based on a linear relationship between the natural logarithm (ln) of the odds of an event and numerical independent variables. The form of this relationship is specified follows:

$$L = \ln(0) = \ln\left[\frac{P}{1 - P}\right]$$

$$= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 + X_3 + \beta_n X_n \ldots\ldots + \varepsilon$$

Where: Y is binary and represent the event of interest (response), coded as 0/1 for willingness to pay or not,

P is the proportion of this willingness,

0 is the odds of the event,

L is the ln (odds of event),

X_1, X_2, X_3, Xn are the independent variable, $\beta 0$, β_1 and βn, are the Y-intercept and the slope, respectively, and ε is the random error.

The regression coefficients are estimated through the iterative maximum likelihood method [16].

RESULTS AND DISCUSSIONS

Maximum likelihood estimates of the parameters of the factors influencing customers' willingness to pay for counterfeit leather products in the study area.

Table 1. The estimates of the factors affecting consumer's willingness to pay for counterfeit leather products in the study area

Variable	Co-eff(B)	SE	Wald	Exp(B)
Value expressi-ve goal	0.190	0.224	0.793	0.013
Age	-0.556	0.279	3.882	0.948***
Education	-0.537	0.175	9.536	0.946***
Price	-0.5663	2.706	4.462	1.003***
Income	-0.430	0.220	3.793	1.837***
Gender	-1.552	0.001	6.540	1.963***
Constant	4.221	3.192	1.321	0.023***
Negelk-ereke R^2	0.785			

Source: Computations from Field Survey Data, 2013.
Note: ***- Significant at 1% level.

The estimates of the factors affecting consumer's willingness to pay for counterfeit leather products in the study area as shown in Table 1 above indicated that age, education, price, income and gender had significant effects.

The coefficient of age was significant at one percent probability level with a negative sign. This means that with decreasing age of the consumers, the probability of going for counterfeit leather product increases. [5] had observed that the variability of purchase intention based on age may be due to the fact that younger consumers view counterfeit products to be more acceptable and as a

consequence are more likely to purchase counterfeit goods than older consumers. This study corroborates with their findings.

The coefficient of education was significant at one percent level but with a negative relationship. By implication, the higher the educational attainment of the consumers, the less likely they are to go for counterfeit products and vice-versa.

Price of the products had a negative relationship with consumers' willingness to pay for counterfeit products but was significant at one percent level. Price has been known as one of the most recognized motivations for purchasing counterfeits [21]. [2] had also noted that selling price enhances willingness to buy counterfeit products. Given the economic situation, particularly as it affects the low income groups, the result seems plausible. The result of this study consolidates these previous findings.

Consumers income level was seen to be significant at 99 percent confidence level but with a negative sign. This meant that as consumers' income decreases, the probability of them going for counterfeit products increases. [7] had noted that middle and high income families are likely to be heavy buyers of VCDs. However, no reason was given for that. In an environment such as where this study was carried out, there is this tendency for consumers to feel belonged in a particular fashion or otherwise band wagon effect on consumption. Bearing this in mind, people may want to go for counterfeit products just to show that they belong.

Gender coefficient was significant at one percent probability level with a negative sign. Given that the negative sign was in favour of the female gender, it simply implies that females are more likely to pay for counterfeit products more than the males.

Cheung et al, 2006, had opined that females are more likely to be heavy buyers of pirated clothing and accessories than their male counterparts. This result is in line with their findings. [7]

The Negelkereke R^2 of the model which shows the goodness fit was 0.785, meaning that 78.5 percent of the variables has been explained in the model. This certifies it a good fit.

CONCLUSIONS

The study has shown the factors affecting the willingness of the respondents in the study area to pay for counterfeit leather products. It is therefore recommended that the purchasing power of consumers should be improved upon since their income determines their choice of leather products. Secondly, regulatory frameworks should be improved upon to guide if not eliminate the importation and production of counterfeit leather products in Nigeria. Furthermore, competition among genuine leather producers should be steadily improved upon to reduce the cost of their products thus making them accessible and affordable to the consumers. Again, negative attributes of counterfeit leather products should be highlighted to make consumers aware of negative implications of purchasing them. Finally, more research work in similar areas should be encouraged to assist consumers' decision making process.

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DETERMINANTS OF AGRIBUSINESS ENTREPRENEURS' PARTICIPATION IN INNOVATIONS: A STUDY OF ABIA STATE, NIGERIA

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Abstract

This study examined the determinants of agribusiness entrepreneurs' participation in innovations using Abia State Nigeria as the study area. The study employed a multi stage sampling technique in the selection of entrepreneurs from the agricultural zones of Abia State (Aba, Ohafia and Umuahia). In the first stage, 2 Local Government Areas (LGAs) each were selected from the zones. The second stage involved random selection of 2 communities each from the 6 LGAs, bringing it to 12 communities. The last stage involved the selection of 15 households each from the communities, giving a sample size of 180 agribusiness households. The probit model was employed in the analysis of the data which was obtained by the use of questionnaire administered on the selected respondents. The study found that age, gender, household size, income and output were statistically significant determinants of entrepreneurs' participation in innovations in the study area.

Key words**:** *agribusiness, entrepreneurs, participation probit, innovation*.

INTRODUCTION

Agricultural innovations has been defined as the application of new inputs, machines, and methods used in agricultural production processes in order to increase production, yield or quality [6,3].

According to [3], innovations in agriculture can reduce poverty, foster development, and stimulate economic growth in many developing countries. In particular, the adoption of innovation can transform the lives of farmers through increased incomes and improved living conditions.

It has been known that in developing countries, including Nigeria, small-scale farmers dominate the agricultural economy where, over 80 percent of the farming population in Nigeria are small holders residing mostly in rural areas [1].

Most of these smallholder farmers still cultivate using hoe technology and rely heavily on family labour, amongst other traditional methods and so the dominance of subsistence farming with traditional farming systems in the smallholder sector is one of the concerns in achieving higher agricultural productivity.

The technologies people use plays a significant role in determining how fast agricultural productivity grows and how that growth affects the poor and the condition of natural resources [10].

According to the report the experience and evidence from countries within and around the sub-Saharan African region indicates that returns to agricultural technology development could be very high and far reaching, not only in the smallholder sector, but in the entire economy as well. However, improved technologies are of little value unless farmers judge them to be appropriate and subsequently adopt them. It is therefore imperative not only to develop new agricultural technologies, but also promote their adoption by smallholder farmers.

Although, huge financial resources has been expended on formal agricultural research and

development, many poor farmers in remote and less favoured regions have not benefited from technologies developed for resource rich areas, especially were government policies have been unsupportive. A key challenge therefore is for the entrepreneur - innovation approach to be effective is dissemination of technology and methodology.

However, [15] had observed that there is an important role of farmer-to-farmer exchanges and exploitation of indigenous systems and channels for sharing agricultural information and inputs, rather than relying on formal extension system to disseminate innovations. The critical challenge is to involve national agricultural research systems in strengthening the innovative capacity of farmers.

The major problem facing small scale agriculture in Nigeria is over dependent on traditional technologies characterized by poor yield and inefficiency. Transformation of traditional farming system for increased food production calls for adoption of improved practices. One of the major challenges facing agricultural policy makers is the need for the investigation of those economic factors which contribute to the adoption of improved farm technology [13]. Therefore, this study was articulated to determine the factors that influence agribusiness entrepreneurs' participation in innovation using Abia State, Nigeria as a study area.

MATERIALS AND METHODS

Study Area

The study was conducted in Abia state, Nigeria. The state is located within the south eastern geo-political zone of Nigeria and lies between Longitude 04^0 45' and 06^0 07' North and Latitude 07^0 00' and $08^0$10' East. Abia state is bounded by Imo state on the western boarder; Ebony and Enugu States on the North; Cross River and Akwa-Ibom states on the East and Rivers state on the South. Its population stood at about 2.883,999 persons with relatively high density at 580 persons per kilometre [11]. Abia State is divided into administrative blocks called Local Government Areas which is grouped into three (3) agricultural zones namely Aba, Ohafia and Umuahia zones. In terms of occupation, about 70% of Abians are farmers and have potentials for the production of crops (both arable and permanent), livestock, and fish and also engage in food processing.

Selection of Respondents

The study employed a multi stage sampling technique in the selection of the entrepreneurs from the agricultural zones of Abia State (Aba, Ohafia and Umuahia). In the first stage, 2 local government areas each were selected randomly from the zone (i.e. 6 LGAs).The second stage involved random selection of 2 communities each from the 6 LGAs, set aside for the study (i.e. 12 communities).The last stage involved the selection of 15 households each from the communities, giving a sample size of 180 households, including palm oil processors, poultry and vegetable farmers. For the purpose of social inclusiveness, male and female-headed households were selected.

Method of Data Collection

The study obtained data from primary sources. The primary data were collected with the use of pre-tested and structured questionnaire administered on the respondents.

Method of Data Analysis

Probit model was adopted in the analysis of the data obtained.

Specification of Model

The probit model is a statistical probability model with two categories in the dependent variable. Probit analysis is based on the cumulative normal probability distribution. The binary dependent variable takes on the values of zero and one. The probit analysis provides statistically significant findings of which demographics increase or decrease the probability of consumption.

In the binary probit model, the participation in innovations was taken as 1, while non participation as 0. It is assumed that the household obtains maximum utility if it participates in innovation rather than not participating.

The probability of choosing any alternative over not choosing it can be expressed as in (1), where the probability Yi of choosing any alternative over not choosing it can be expressed as in (1), where ϕ represents the

cumulative distribution of a standard normal random variable.
The probit model is specified as follows;

$Y(1,0)= bo+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5 +b_6X_6+b_7X_7+b_8X_8+ \mu$

where: Y (1, 0) = is the dependent variable, which is the participation index
X_1= age of respondents (years)
X_2 = gender (dummy; male =1; female = 0)
X_3= marital status (dummy; married =1; otherwise = 0)
X_4= education (years)
X_5 = household size (number of persons)
X_6 = income (₦)
X_7= years of experience (years)
X_8 = output (kg)
μ= error term
bo= constant
b_1-b_8= coefficients

RESULTS AND DISCUSSIONS

Estimates of the determinants of entrepreneurs' participation in innovation in the study area

The maximum likelihood estimates the determinants of entrepreneurs' participation in innovation in Abia state, Nigeria is presented below in Table 1.
The maximum likelihood estimates results of the determinants of agribusiness entrepreneur's participation in innovation in the study area indicated that the coefficients of age, gender, household size, income and output were statistically significant at various probability levels with different signs.
The coefficient of age was significant at 10 percent probability level possessing a negative sign. This meant that as the age of the entrepreneur's increases, the probability of them participating in innovations decreases. Many studies in the past had noted that older farmers tend to be more risk averse than younger ones in terms of utilizing agricultural innovations [9, 5, 13]. The result of the present study agrees with these previous findings.
Gender was statistically significant at 99 percent confidence level with a negative sign.

Table 1. The maximum likelihood estimates the determinants of entrepreneurs' participation in innovation in Abia state

Variable	Coefficient	Standard error	z-test
Constant	0.1969037	0.832243	0.24
Age	-0.0040718	0.001838	-2.22*
Gender	-0.5103345	0.143646	-3.55***
Marital status	0.1555072	0.182703	0.85
Education	0.0403741	0.0289831	1.39
Household size	-0.295639	0.0107838	-2.74***
Years of experience	-0.0243066	0.0128427	-1.89
Income	0.318906	1.780006	4.67***
Output	0.605511	0.220140	2.75***

LR chi^2 - 33.09
Prob chi^2 - 0.0001
Pseudo R^2 - 0.6987
Note: *, *** denotes 1% and 10% significant levels respectively
Source: Computations from field survey, 2014.

This implied that the female gender tend to participate in innovations more than the male entrepreneurs in the study area. [8], in their study observed that women tend to adopt improved technologies at a lower rate compared to men. This they attributed to time and resource constraints that women often face. This result is in contrast with the present study. However, going by the fact that women are more involved in very many social activities, including their participation in organizations than their male counterparts in the study area, this result is plausible. The opportunities posed by these organizations could be avenues where they learn about innovations.
Household size possessed a negative sign but was statistically significant at 1 percent probability level. By implication, the greater the number of persons in the household, the probability of the entrepreneur participating in innovation decreases. [4] had a contrary opinion when he reported a positive relationship between household size and technology adoption. [2] had opined that for the fact that agricultural mechanization is still very capital intensive coupled with other institutional problems, farmers in the rural areas will hardly afford it and therefore, the chances of participation in agriculture

decreases. Given this assertion, households with large number of persons may not be very willing to participate due to the cost associated with them and rather will prefer to use the family members as cheap sources of labour.

The coefficient of income was also statistically significant at 99 percent confidence level with a positive sign. This posits that as income of the respondents increases, the probability of their participation in innovation also increases. The economic status of an individual often times plays a significant role in adoption of new techniques. This is basically because the ability to purchase new implements will usually be dictated by individual financial capability. Furthermore, with improved income, the farmer will be better disposed to spend more on recommended farm practices that would further increase his farm earnings. Following this, the result is plausible and is in agreement with [16, 14].

Finally, output came out with a positive relationship which was statistically significant at 1 percent probability level. This result meant that increasing output could probably lead to increased participation in innovation among agribusiness entrepreneurs in the study area. [12] had also observed that there was a positive relationship between intensity of technology adoption and output. This finding is also in line with previous finding of [17, 7, 18].

The LR chi^2 was 33.09 which is significant at one percent level, while the pseudo R^2 was 0.6987 meaning the 69.87 percent of the variability has been explained in the equation.

CONCLUSIONS

The study has revealed the determinants of participation in innovation by agribusiness entrepreneurs in Abia state, Nigeria. It is therefore recommended that the female gender should be encouraged to participate in meaningful social activities which often times exposes them to these innovations. Barriers which tend to place the female gender at disadvantaged positions should be dismantled. It is true that the result of this study went contrary to many other previous results in terms of women and their participation in productive activities, this result has shown that with adequate support and encouragement, changes could be very visible.

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FACTORS INFLUENCING CASSAVA VALUE ADDITION BY RURAL AGRIBUSINESS ENTREPRENEURS IN ABIA STATE, NIGERIA

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Abstract

The study analyzed the factors influencing cassava value addition by rural agribusiness entrepreneurs in Abia state, Nigeria. The specific objectives were to: ascertain the various forms of the value added cassava products produced by the respondents; estimate the factors that influence farmers' decision to add value to cassava; and make recommendations based on the findings. A multi-stage random sampling technique was used to select 70 respondents. Primary data were collected through the aid of a well structured questionnaire. Data collected were analyzed using descriptive statistical tools such as frequency, mean, tables, percentage as well as the binary logit model. The result of the binary logistic results indicated that the coefficients of gender, education, income, household size and output were statistically significant at different levels of probability. The study therefore recommended that encouragement should be given to females to go into cassava value addition as well as making high yielding varieties available to the entrepreneurs by the government and its agencies whose mandate is to do so.

Key words: *cassava, binary logit, entrepreneurs, value addition*

INTRODUCTION

Cassava (*Manihot esculenta*) has its origin in Latin America where it has been grown by the indigenous Indian population for at least 4000 years. After the discovery by the Americas, European traders took the crop to Africa as a potentially useful food crop; later it was also taken to Asia to be grown as a food security crop and for the extraction of starch [3]. In recent years cassava has gained global attention as an important root crop in Africa. This is because climate variability does not affect its productivity [1]; it has a flexible planting and harvest cycle; it can withstand drought and diseases as well as thrive on soil with low quality [13]. Also, every part of cassava crop is useful. Its leaves are relished as vegetables in countries like Congo and Tanzania [10]; its peel is used as animal feed; while its peeled roots can be processed into various value added by-products such as: garri, fufu, flour, starch, chip and ethanol.

Throughout the tropics, especially in Nigeria, the plant's root do not only serve as an essential source of calories but even more so as a major source of income for rural households. Cassava performs five main roles namely famine reserve crop, rural food staple, cash crop for urban consumption, industrial raw material, and foreign exchange earner [16]. This shows that cassava possesses the potential of eliminating food crisis and famine.

Nigeria is currently the largest producer of cassava in the world with an estimated annual output of 54 million metric tonnes [8] and its cassava transformation master plan the most advance in Africa. Cassava is also seen to have a high poverty-reduction potential for Nigeria due to its low production cost [17] hence cassava production is widespread across all regions of the country.

However, cassava just like other agricultural produce are highly perishable, hence most rural farmers do not get the desired reward for their work as most of their produce start deteriorating a day or two after harvest [4]. Consequent upon this, the National Root Crops Research Institute (NRCRI), Umudike which had the national mandate to research into root and tuber crops, developed some processing technologies of root and tuber

crops in order to curtail their perishability and add value to these crops.

The major processed forms of cassava roots fall into four general categories; meal, flour, chips and starch.

Meal forms include: *gari, fufu, lafun, tapioca, abacha,* cassava cock tail tit-bite, 30% cassava/wheat bread, cassava fritters, 10% cassava/wheat bread, cassava queen's cake, cassava croquette, grundi and other cassava based foods (non-confectionary) like cassava salad cream, cassava pizza, *ikpan iwa*, *megau* etc [4].

From 2005 till date training and workshops on the production of value added cassava products have been conducted for farmers in Abia state and its environs by staff of the institute [4].

The essence is to enable farmers to see how cassava can be put to wider uses in the home, for income generation and possibly for export purposes. However, the farmers have to decide on the form of value added products to produce.

Decision making is regarded as the cognitive process resulting in the selection of a belief or a course of action among several alternative possibilities based on the values and preferences of the decision maker [20].

Every decision making process produces a final choice that may or may not prompt action.

For the farmers, decision making regarding the addition of value to cassava products is based on the expected utility derivable which is also a function of the socioeconomic characteristics of the farmers.

Thus the study analyzed the determinants of farmers' decision making regarding addition of value to cassava products disseminated by the National Root Crops Research Institute (NRCRI), Umudike, Abia state, Nigeria.

The specific objectives are to: ascertain the various forms of value added cassava products produced; determine the factors that influence the respondents' decision to produce value added cassava products; and make recommendations based on findings of the study.

MATERIALS AND METHODS

Study Area

The study was carried out in Abia state, Nigeria. Abia state is one of the 36 states in Nigeria created in 1991 from part of Imo state. It is located in the south-east geopolitical zone of the country.

The state lies between Longitude 04^0 45' and 06^0 07' North and Latitude 07^0 00' and 08^0 10' East. It is bounded by Imo State on the West, Ebonyi and Enugu states on the North, Cross Rivers and Akwa Ibom states on the East and Rivers state on the South.

The state covers an area of about 5,243.7 square kilometer which is approximately 5.8 percent of the total land area of Nigeria. [11]. It has a population density of 580 persons per square kilometer and a population of 2,833,999 persons [14].

Administratively, it has 17 Local Government Areas (L.G.As), 3 Senatorial zones and 3 Agricultural zones with Umuahia as the state capital. The climate of the state is tropical with 2 distinct seasons namely rainy season which starts from March to October; and dry season which commences from November and ends in February. Agriculture is the major occupation of the people and subsistent agriculture is prevalent and about 70 percent of the population engage in it [2]. They produce crops like cassava, yam, cocoyam, sweet potato, ginger, rice and maize, while the cash crops include; oil palm, rubber, cocoa, banana, and various types of fruits. They also rear animals like pig, goat, sheep, several of types of domesticated birds, etc. Cassava however, is a major tuber crop produced by almost every household in the study area and hence the choice of the crop.

The inhabitants are predominantly Igbos, and practice Christianity and African Traditional Religions. Aba is regarded as the commercial centre of the state. The state is blessed with mineral resources such as lead, zinc, limestone, fine sand and petroleum. As regards tourism there are many tourist centers but the most outstanding are the: national war museum in Umuahia, the Azumini blue river at Ukwa east, and the long juju of Arochukwu [2].

Sampling technique

A multi-stage random sampling technique was used to select a sample size of 70 cassava farmers/processors from the study area. Firstly, three local government areas were randomly selected from the seventeen local government areas of Abia state. Thereafter, two autonomous communities were randomly selected from the each of the three local government areas to give a total of 6 communities. Finally, 11 cassava farmers/processors each were selected from 5 of the 6 selected communities, while 15 farmers/processors were selected from the remaining 1 community to give a total of 70 respondents that were used for the study.

Method of Data Collection

Primary data were generated through interview and well structured questionnaire administered to the respondents.

Method of Data Analysis

Objective (i) realized using descriptive statistics such as percentages, frequencies and mean. While, objective (ii) was analyzed using binary logit model.

Model Specification

Logistic regression analysis is part of a category of statistical model known as generalised linear models which consist of fitting a logistic regression model to an observed proportion in order to measure the relationship between the response variable and set of explanatory variables [13, 5].

The binary logistic model falls in the group of qualitative response models which have the dependent variable as an indicator of a discrete choice. The logistic regression model has been used in many applications due to its mathematical convenience. The Y = binary dependent variable, which represents the decision making index that takes the values of between 0 and 1[9].

The logistic regression model [10] is given by:

$$\pi(X) = \frac{1}{1+e^{X\beta}} \quad (1)$$

$\pi(X)$ = The success probability of value X.

$X\beta$ = Stands for

$$\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_n X_n \quad (2)$$

e = exponent or the base of the system of natural logarithms.

Its transformation generates:

$$\text{Odd} = \frac{1}{1-\pi} \quad (3)$$

The logistic regression model has a linear form for the logit of this probability.

$$\text{Logit}\ \{(X)\} = \log\{\frac{\pi(X)}{1-\pi(X)}\} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_n X_n \quad (4)$$

In this study, six components or products were identified. The total score per respondent for the number of products identified divided by the six and were expressed as an index of the overall score for the six products thus:

$$Y = \frac{x}{n}$$

Where: Y = index score

x = number of components or products produced by each respondent

n = total number of components identified

RESULTS AND DISCUSSIONS

Forms of Value Added Cassava Products Produced by the Respondents.

Table 1 shows the various forms of value added cassava products produced by cassava farmers/processors in the study area. The result is presented in order of their magnitude: Cassava root to *Fufu* (88.6%), Cassava root to Garri (82.9%), Cassava root to cassava tapioca (82.9%), Cassava root to cassava flour (48.6%), cassava root to cassava fritters (32.9%) and cassava bread (2.86%).

Table 1. Distribution of Respondents based on Forms of Value added Cassava Products Produced.

Forms of value addition	Frequency	Percentage
Fufu	62	88.6
Garri	58	82.9
Tapioca	58	82.9
Cassava Flour	34	48.6
Cassava Fritters	23	32.9
Cassava Bread	3	2.86

Source: Field Survey Data, 2014

From the result, it could be observed that cassava flour; cassava bread and cassava fritters recorded less than 50% production

against those of fufu, garri and tapioca. Due to the high cost of procuring processing equipment for the production of flour, bread and fritters, their production seems low compared to fufu, garri and tapioca which require less expensive equipments and are therefore within the reach of farmers.

Factors influencing cassava value addition by rural agribusiness entrepreneurs in Abia state, Nigeria

The result of the estimates of the factors influencing cassava value addition by rural agribusiness entrepreneurs in Abia state, Nigeria is presented in Table 2 below.

Table 2. Estimates of the factors influencing cassava value addition by rural agribusiness entrepreneurs

Variables	Coefficients (B)	S.E	Wald	Exp (B)
Age (X_1)	-0.014	0.021	0.428	0.987
Marital status(X_2)	0.131	0.410	0.103	1.140
Gender (X_3)	-0.110	0.071	2.385	0.896 **
Education (X_4)	0.686	0.205	11.198	1.089 ***
Income (X_5)	4.628	2.375	3.800	0.008 ***
Household size (X_6)	-0.006	0.004	2.337	0.994 **
Experience (X_7)	-0.493	0.397	1.538	0.611
Output (X_8)	0.001	0.001	3.120	1.001***
Constant	5.608	2.958	3.594	272.683***

Chi^2
Cox and Snell R^2
Nagelkereke R^2
Loglikelihood
Source: Field Survey Data, 2014
Note: ***, ** denotes 1% and 5% levels of significance respectively

The result of the binary logistic regression on the factors influencing cassava value addition by rural agribusiness entrepreneurs in Abia state, Nigeria, as presented in Table 2 above indicated that the coefficients of gender, education, income, household size and output were statistically significant. The coefficient of sex was significant at 5 percent level of probability but with a negative sign. This indicated that female gender were more involved in cassava value addition than their male counterparts. [7] had opined that overall; women tend to be less integrated in value chains than men. Their lack of mobility and thus lack of access to markets, as well as social norms, impede their interaction with value chain actors. However, the reason for the negative sign of sex being that men were not directly involved in processing and as such had low level of awareness of cassava value addition. This corroborate the findings of [18] who observed that the negative sign of sex implies that men were not directly involved in processing and as such had low level of awareness of sweet potato value addition.

Education of the respondents was statistically significant at 1 percent of probability level with a positive sign. This implied that as the education of the respondents increases, the probability of their decision to undertake value addition in cassava increases. Education is important and it has been found to influence other factors like management [15]. Similarly, formal education helps one to grasp issues better, anticipate, appreciate and respond to market needs. Given this, the result of the findings is plausible.

The coefficient of income was also positive and significant at 5 percent probability level. This meant that as the entrepreneurs' income increases, their likelihood of adding value to cassava products will increase. The economic status of an individual often times plays a significant role in decision making processes. This is especially true when it involves the purchase of new implements which will usually be dictated by individual financial capability.

The coefficient of household size posted a negative but statistically significant at 5 percent probability level. This meant that as household size increases, the decision to add value to cassava by the entrepreneurs reduces. Large family sizes have been associated with increased responsibilities, including consumption of food. Furthermore, cassava is one of the major staples in the area and therefore, the tendency for high self consumption for the large families is high. This result is expected and corroborates with [12].

The coefficient of output was positive and significant at 99 percent confidence level. This meant that with larger outputs, the probability of the entrepreneurs engaging in cassava value addition increases. It has been known that harvested cassava if not processed

after about two days will start deteriorating. Given this fact, entrepreneurs with large output will opt for adding value by processing into various other forms to at least extend shelf life of the harvested cassava.

The LR chi^2 was 98.73 which is significant at one percent probability level, while the pseudo R^2 was 0.6332 meaning the 63.32 percent of the variability has been explained in the equation.

CONCLUSIONS

The study has shown that the major value added cassava products produced in the study area are: Fufu, Garri and Tapioca; the major factors influencing entrepreneurs' decision to add value to cassava are: gender, educational attainment of the entrepreneurs, income, household size and output. The study therefore recommends that encouragement should be given to females to go into cassava value addition. This could be in the form of credits which will enable the female entrepreneurs acquire the necessary equipments required for their operations. High yielding varieties should also be made available to the entrepreneurs by the government and its agencies whose mandate is to do that. This will help boast their output thus, making way for value addition. This is especially important now that the market for these products is on the increase.

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THE PARADOX OF POVERTY AND INEQUALITY IN NIGERIA-INSIGHTS FOR A POST-2015 DEVELOPMENT AGENDA

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Abstract

Nigeria is perhaps the most blessed country in Africa, in terms of its abundant mineral resources, agricultural and forest resources, distinctively more favourable climatic conditions and highly diverse human resources. These factors, alongside its overwhelmingly increasing population for foreign investment potentially and strategically put the responsibility of economic development on Nigeria, with its citizens expected to live not below the average standard of living. It is paradoxical however, that most Nigerians are poor. This study reviewed trends in poverty level in Nigeria from 1980-2014, examined the causes of poverty and inequality in Nigeria, evaluated Nigeria's potentials for a post-2015 development agenda, evaluated the level of satisfaction with the implementation of Millennium Development Goals (MDGs), as well as the desirability level for the implementation of the Sustainable Development Goals (SDGs). The study found corruption, weak institution and poor governance; unemployment and underemployment; and high population growth as the major causes of poverty and inequality in Nigeria.

Key words*: development agenda, inequality, MDGs, paradox, poverty, SDGs*

INTRODUCTION

According to the International Monetary Fund World Outlook Database for 2013 [23], the 2013 ranking of countries from the richest to the poorest, using Gross Domestic Product (GDP) based on Purchasing Power Parity (PPP) per capita, African countries occupied the bottom with 9 of the last 10 places. The Democratic Republic of Congo was the poorest with a per-capita GDP (PPP) of $394. Zimbabwe ($590), Burundi ($649) and Liberia ($716) were poorest, following The Democratic Republic of Congo. Nigeria was the 44th of the poorest listed countries with less than $3000. The top of the table was occupied by Europe, a few Gulf States and North America. It is therefore, not out of place to say that, poverty is endemic to Africa. Although, GDP is not a perfect measure to describe the wellbeing and quality of life of populations, it is the most commonly accepted method of determining the wealth of countries and comparing generalized differences in living standards on a whole between nations, using GDP per capita on a PPP basis in current international dollars. The two mostly used poverty indicators are the aggregate headcount and the headcount ratio [22]. Other indexes are not in discordant tone with the GDP PPP. For instance, according to Human Development Index (HDI) of World Bank for the year 2011 [33], Nigeria occupied the 156th position among 177 countries as compared to the 151st position in 2002.

Poverty, inequality and high unemployment rates continue to be notable characteristics of the African continent. These and many other economic challenges continue to be on the increase rather than be abated in many African States despite aids and grants from the West and international development agenda like the Millennium Development Goals (MDGs). African countries have not utilised their resource riches: agriculture, forestry and wildlife as in Kenya, Malawi and Nigeria, mineral resources as in Angola, Niger, and Nigeria to close up the gap between the rich and the poor. Rather, the exploration of these resources has widened the wealth gaps.

One of the Millennium Development Goals (MDGs) is to end extreme poverty and hunger by 2015 [4, 29]. In the African Economic Outlook for the year 2014 [1], it is observed that countries like Cameroon, Egypt, Guinea

and Tunisia have already attained this goal. While countries like Senegal, The Gambia, Ghana, Mali, Mauritania, Niger, South Africa, Swaziland and Uganda were close to meeting the target, Nigeria and others which include Côte d'Ivoire, Kenya, Madagascar and Morocco were falling behind in attaining this goal.

Nigeria has unjustifiable increasing rate of poverty in the face of its recently rebased GDP which make it the largest economy in Africa. The economy is still characterized by high unemployment rate, high inequitable distribution of wealth, low quality human resources and high out migration in the face of high economic growth measured by GDP. In 2004, there were 68.7 million Nigerians regarded as poor. Only six years after, in 2010 the number of poor Nigerian sky-rocketed to 112.47 (65.7%) million in 2010 [18]. The NBS report warned that the trend would be on the increase, if the potential positive impacts of several anti-poverty and employment generation intervention programmes are not taken into account [18]

Nigeria's human poverty index (HPI) for 2009 was only 36.2% placing Nigeria at the 114th position and among the 7th poorest nations in the world while the ratio of the richest 10% to the poorest 10% was 16.3 with Gini index from 42.9 in 2004 to 44.7 in 2010 [18, 27]. This was against the fact that Nigeria ranked 6th and 7th as oil producer and exporter and ranks 10th as the most populous country in the world with a real GDP growth rate of 7.0 in the year 2009 which grew to 8.0 in 2010 but however dropped to 6.3 in the year 2013 [19]. In face of the enormous natural, mineral and human resources, it is only an economic paradox to still have most Nigerian living on less than $1 per day.

The Post 2015 Development Agenda and Sustainable Development Goals

The Post-2015 Development Agenda refers to a process led by the United Nations that aims to help define the future global development framework that will succeed the Millennium Developments (MDGs) [26, 28]. The MDGs encapsulate eight globally agreed goals in the areas of poverty alleviation, education, gender equality and empowerment of women, child and maternal health, environmental sustainability, reducing HIV/AIDS and communicable diseases, and building a global partnership for development. The MDGs' overall target date is 2015 [4, 28]. While many developed countries faired largely better in achieving the MDGs, the same could not be said for African nations holistically. Only a few have achieved some of the goals, considering their targets. At the UN Conference on Sustainable Development (Rio+20), held in Rio de Janeiro in June 2012, 192 UN member states agreed to establish an intergovernmental working group to design Sustainable Development Goals (SDGs) as a successor of the MDGs. More precisely the SDGs comprise 17 goals and 169 targets according to the Press Release by the United Nations General Assembly on 19th July, 2014 [26, 27].This study however, considered the first 10 SDGs which border on the issues of poverty and inequality in Nigeria. They are as follows:

(i)End poverty in all its forms everywhere

(ii)End hunger, achieve food security and improved nutrition and promote sustainable agriculture

(iii)Ensure healthy lives and promote well-being for all at all ages

(iv)Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

(v)Achieve gender equality and empower all women and girls

(vi)Ensure availability and sustainable management of water and sanitation for all

(vii)Ensure access to affordable, reliable, sustainable and modern energy for all

(viii)Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

(ix)Build resilient infrastructure, promote inclusive and sustainable industrialization and "foster innovation

(x)Reduce inequality within and among countries.

As the year 2015 target time for the achievement of the MDGs draws to an end, available statistics revealed poor performance of the many African countries including

Nigeria in achievement of the MDGs. In view of the above therefore, it very pertinent to have a critical look at the issue of poverty and inequality in Nigeria. Has Nigeria failed to achieve the MDG 1? Which is to eradicate extreme poverty and hunger. In fact, poverty during the period increased regardless of government posting of increased economic growth rates. As the international community again is set for another sets of development goals with a view to building on the lessons leant from the MDGs, ending poverty in all its forms everywhere is again the first of the new 17 SDGs. The questions are, what are the trends in poverty level in Nigeria from 1980-2014? What are the causes of poverty and inequality in Nigeria? What are Nigeria's potentials for a post-2015 development? What is the level of satisfaction for the implementation of the MDGs in Nigeria and what is the level of desirability for the implementation of SDGs in Nigeria? Taking premise from the above, this study looks at the following specific objectives which are to:

(i)Investigate the trends in poverty level in Nigeria from 1980 -2014

(ii)Investigate the causes of poverty and inequality in Nigeria

(iii)Evaluate Nigeria's potential for a post-2015 development

(iv)Evaluate the level of satisfaction for the implementation of MDGs in Nigeria

(v)Evaluate the level of desirability for the implementation of SDGs in Nigeria.

MATERIALS AND METHODS

The study area

The study was carried out in Lagos and Kano States, Nigeria. The duo are Nigeria's largest states, most diverse, in terms of economy (business activities), people, culture, and income distribution. Lagos State is located in the southwestern geopolitical zone of Nigeria. It is bounded by Ogun State on the North and East and in west by the Republic of Benin. Behind its southern borders lies the Atlantic Ocean. It is the smallest in area of all the 36 states [16] and still 22% of its 3,577 km^2 are lagoons and creeks [31]. Though small in size, it is the economic hub of the nation. Lagos in Lagos State is the nation's largest urban area. Lagos State is the home to several multinational companies, indigenous industries, financial institutions, residential estates, markets and religious grounds. Ajayi in [5] observed that Lagos is home to the largest agribusinesses in Nigeria. In 2014, Lagos State had a total GDP of $91 billion and a per capita of $4,333 [31]. Lagos is the most populous city in Lagos State and in Nigeria as a whole. It is the second fastest-growing city in Africa and the seventh in the world [10]. The population of Lagos city was approximately put at 15 million by the State Government in 2011 [15]

Kano State is located in North-Western Nigeria. Ibrahim [12]. Kano state shares borders with Katsina State to the north-west, Jigawa State to the north-east, Bauchi State to the south-east and Kaduna State to the south-west. Agriculture is mainstay of Kano State's economy. The food crops cultivated include millet, cowpeas, sorghum, maize, and rice for local consumption while groundnuts and cotton are produced for export and industrial purposes. Kano State was prominent for the groundnuts produced in the state which was a major foreign earner for the country during the colonial period and the early days of the country's independence. Kano State is a major producer of hides and skins, sesame, soybean, cotton, garlic, gum, Arabic and chili pepper [31]. Kano State is the second largest industrial center in Nigeria and the largest in Northern Nigeria with textile, tanning, footwear, cosmetics, plastics, enamelware, pharmaceuticals, ceramics, furniture and other industries [31]. Others include agricultural implements, soft drinks, food and beverages, dairy products, vegetable oil, animal feeds etc. Kano, a metropolis is the capital of Kano State. In 2007, Kano State had a total GDP of $12.39 billion and per capital of $1,288 [9].

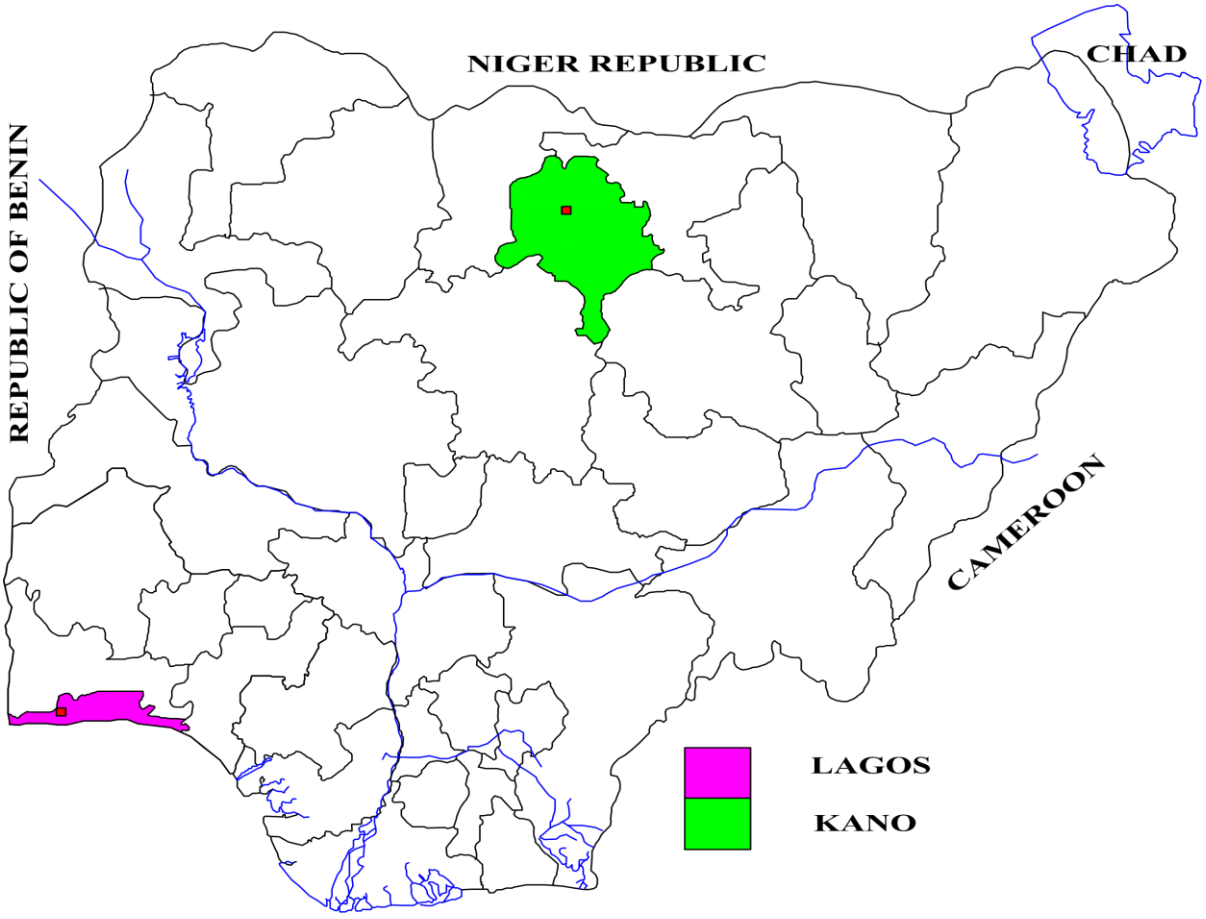

Fig. 1. Map of Nigeria showing Kano and Lagos States
Source: Authors' representation

Sampling technique, size and data collection

The study made use of both primary and secondary data. The secondary data covered a 34 year period on Relative Poverty Headcount from 1980-2014. These data were sourced from the National Bureau of Statistics and the World Bank. Descriptive statistics was employed in analysing data. The justification for using this period according to [14, 20] rests on the ground that the beginning of the second republic was October 1, 1979 (1979/1980) and prior to that, it was believed that the problem of Nigeria was not having cash but how to spend it. Over thirty years later, salaries are unpaid as at when due and pensioners who were probably starting their carriers in 1970s are not sure of getting their pensions [30]. The secondary data provided information for the analysis of trends in poverty level in Nigeria from 1980-2014.

For the primary data, a multistage sampling technique was used for the sampling. In the first stage, two states of Lagos and Kano were purposively selected for the study. The rationale for the purposive selection of the two states include their diversity in terms of economy (business activities), people, culture, and several strata of income distribution. In the second stage, Kano metropolis in Kano State and Lagos metropolis in Lagos State were purposively selected. The two metropolis were purposively selected for the same reasons as for their states. The two metropolis were stratified into six (6), making a total of twelve (12) strata for the study. Thirty six (36) respondents were randomly selected from each of the strata. This gave a total of Four hundred and thirty two (432) respondents for the study. The primary data provided information for investigating the causes of poverty and inequality in Nigeria,

evaluating Nigeria's potential for a post-2015 development, evaluating the level of satisfaction for the implementation of the MDGs in Nigeria and evaluating the level of desirability for the implementation of the SDGs in Nigeria.

Primary data were collected with the aid of questionnaire administration and interview schedule. A total of four hundred and thirty two (432) copies of well-structured questionnaire were administered to respondents in the study area. However, only four hundred (400) copies were returned completed. This indicated an approximated response rate of 93%. Field data collection was conducted between March and June, 2015

Data analysis

Descriptive statistics were used in the data analysis. The secondary data were analysed using tables and charts. The primary data collected from Lagos and Kano States were analysed using descriptive analysis which included, tables, chats and the Likert scales. The causes of poverty and inequality in the study area were analysed using frequencies and percentages. Respondents' satisfaction level on the implementation of the MDGs and their desirability level for the SDGs were also measured on a five-point Likert scale. Satisfaction level with mean scores of 4.50-5.00, 3.50-4.49, 2.50-3.49, 1.50-2.49 and less than 1.50 were rated 'extremely satisfied', 'very satisfied', 'moderately satisfied', 'slightly satisfied', 'not at all satisfied' respectively. In the same vein, desirability level with mean scores of 4.50-5.00, 3.50-4.49, 2.50-3.49, 1.50-2.49 and less than 1.50 were rated 'very desirable', 'desirable', neutral, 'undesirable', 'very undesirable' respectively. Both measures of levels of satisfaction and desirability for the MDGs and SDGs respectively are according to [25]. The total means for satisfaction level of the MDGs and desirability level of the SDGs are given as:

Satisfaction level of implementation of MDGs=

$\Sigma(MDGm_1+MDGm_2+.....MDGm_8)/MDGn$

Where $MDGm_1$ –$MDGm_8$= Mean scores of $MDGm_1$-$MDGm_8$

MDGn= number of MDGs=8

Desirability level of implementation of SDGs=

$\Sigma(SDGm_1+SDGm_2+.....SMDm_8)/SDGn$

Where $SDGm_1$-$SDGm_8$= Mean scores of $SDGm_1$-$SDGm_8$

SDGn= number of SDGs=10

RESULTS AND DISCUSSIONS

Trends in Poverty level in Nigeria 1980-2014

As reflected in table 1, poverty level was lowest during the period under review in 1980 with 27.20%. It however increased by 19.10% to 46.30% in 1985 only within a record time of 5 years. With marginal decline to 42.70% in 1992, poverty level rose by 22.90% which was the highest change to 65.60% in 1996. The coming of democracy in 1999 only managed to have it at 69.00% by the year 2010. In the year 2014, with only a year to the target time of the MDGs and more than three successful democratic governments, Nigeria witnessed a further decline in poverty level to 33.10%. However, this decline in poverty was not enough to put the country on path to achieving the MDG1 which seeks to eradicate extreme poverty and hunger [4].

A comparison of total population and population living in poverty in Nigeria over the period under review as reflected in figure 2, shows that both were increasing almost together from 1980 to 2010, expect a small decline in population in poverty while total population increased in 1992. This implication of this is that, the issue of poverty reduction and widening gaps in wealth did not receive enough attention by the subsequent governments during this period. Several factors could have been responsible which might include political instability and gross misrule by the military in the early period of the time under review.

Inibehe in [13] observed that population imposes a challenge on a country in terms of economic planning, by influencing the demand magnitude of the people for basic necessities of life. High population growth increases the country's demand for food, infrastructure, shelter, employment and other basic needs of life.

Table 1. Nigeria Poverty profile 1980-2014

Year	Poverty level	Total population	Population in poverty
1980	27.20	65.00	17.70
1985	46.30	75.00	34.70
1992	42.7	91.50	39.30
1996	65.60	102.30	67.10
2004	54.40	126.30	68.70
2010	69.00	163.00	112.47
2014	33.10	178.52	59.09

Source: NBS, various issues; World Bank, 2014

Consequently, rapid population growth that is not matched with continuous and rapid provision of resources is a challenge on economic growth [13, 32]. Other reports such as the [34, 35] also rated Nigeria low.

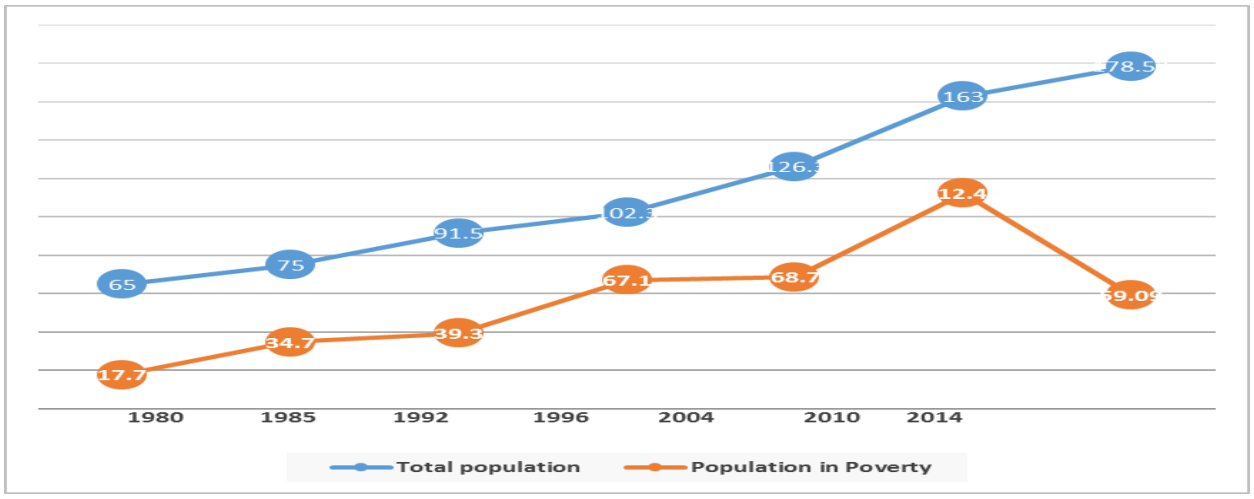

Fig. 2. Population in Poverty 1980-2014
Source: Computed from data from NBS, various issues; World Bank, 2014

Causes of Poverty and Inequality in Nigeria

The study further analysed the respondents' perceived causes of poverty and inequality in Nigeria as shown in Table 2. The literature has a plethora of poverty and inequality causes [2, 3, 6, 7, 8, 14, 21]. However, fifteen (15) categories of the causes were examined by this study with specific bearing to the Nigerian socio-economic, geo-political, cultural and environmental characteristics. Most of the respondents regarded corruption, weak institution and poor governance as the major cause of poverty and inequality. Other major causes are unemployment and underemployment; and high population growth. The very high percentage of corruption, weak institutions and poor governance is a testimony that the citizenry were aware that corruption had eaten deep into the fabrics of governance in Nigeria. This further asserts why revenue from petroleum-Nigeria's highest foreign exchange earner and the huge amount allotted to annual budgets end up in private pockets. The result of this finding corroborates the report of the Transparency International [24] which ranked Nigeria 144th among 177 countries rated in Corruption Perceptions Index for 2013. Corruption in Nigeria and by extension in other African countries remains the most important cause of poverty and inequality. It threatens economic, environment and social development for which the MDGs sought to achieve. Corruption in Nigeria affects ethnic groups in different ways, often creating few privileged ones and large excluded masses. Worst still, not many administrations have shown the political will, commitment and the needed financial resources to fight corruption and develop proper law enforcement agencies in Nigeria, despite having the Economic Financial Crimes Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC).

On the bright note however, the new administration which came into power on 29th of May, 2015 appears to be committed to fighting corruption and offers hope to reducing the wanton waste of the country's resources. It is however too early to evaluate that, the government's performance level

towards the achievement of the post-2015 development agenda encapsulated in the SDGs will provide appropriate benchmark.

Table 2. Causes of Poverty and Inequality in Nigeria

Causes of poverty and inequality	*Frequency	Percentage (%)	Rank
Corruption, weak institutions and poor governance	342	93.96	1st
Unemployment and underemployment	243	67.31	2nd
High population growth	231	63.46	3rd
Negligence and lack of political will	182	50.00	4th
Poor economic growth performance and underdevelopment	176	48.35	5th
Inadequacy or non-existence of social and welfare programmes	123	33.79	6th
Low human capital development and inadequate education	116	31.87	7th
Large families and high dependency ratio	118	32.42	8th
Low technological capacity	109	30.00	9th
Capital inadequacy	106	29.12	10th
Environmental degradation, disaster and climate change	67	18.41	11th
Debts	44	12.09	12th
Migration-emigration and capital flight	28	07.70	13th
Insecurity, insurgency and terrorism	27	07.42	14th
Health and outbreak of diseases	19	05.22	15th

*Multiple responses exist
Source: Computed from filed Survey, 2014

Evaluation of Nigeria' Potential for a Post-2015 Economic Development

Table 3 and 4 provide information on Nigeria's key economic indicators. Table 3 shows Nigeria Gross National Product (Current Prices) from 2010 to 2014 following a re-based GDP. Given an increasing percentage increase in the GDP, should it be sustained and the proceeds equitably distributed within the economy. The growth may bring about economic development. More also, a more consolidated oil sector and transparency will make more funds available for development project given that, the government is keen on blocking loopholes for siphoning the nations' oil wealth. For instance, Nigeria sold about 4 billion barrels of crude oil at an average rate of 1.5 million barrels per day from 2004 and 2010. The oil sale would have given the nation over ₦30 trillion, if one dollar exchanged for ₦120 and a barrel was sold for $70 [20]. Nevertheless, this oil wealth and many others have not really impacted on the economy to reducing poverty level and inequality, since they were grossly mismanaged on projects that did not have add to the quality of life of the citizens while significant proportions of the oil wealth ended up in privates pocket.

Table 3. Nigeria Gross National Product (Current Prices)

Year	2010	2011	2012	2013
	Million Naira (Million US$)			
Previous	33,984,754.13 ($226,112.80)	37,409,860.94 ($241,759.47)	40,544,099.94 ($258,555.58)	42,396,765.71 ($269,515.22)
New (re-estimates)	54,612,264.18 ($363,355.05)	62,980,397.22 ($407,007.86)	71,713,935.06 ($457,330.12)	80,092,563.38 ($509,146.50)
Percentage increase	60.70%	68.35%	76.88%	88.91%

Source: Nigeria Economic Report, World Bank, 2014

The diversification of the economy is being encouraged. This is giving impetus to either neglected sectors or sub-sectors of the economy. For instance, agriculture is being revamped with the deployment of information and telecommunication technology to it to boost production, enhance electronic distribution of subsidised inputs directly to

farmers without a third party arrangement thereby removing the long-term established sharp practices of middle men. This is done through a national framers' bio-data registration known as Growth Enhancement Scheme and the package called e-wallet through the Federal Ministry of Agriculture and Rural Development. The population of Nigeria also provides for large market and investment opportunities for several business activities. The mines sector is full of untapped resources. The list is inexhaustible.

Table 4: Selected Economic Indicators

	2011	2012	2013	2014
GDP (%)	5.30	4.20	5.50	7.40
Inflation Rate (CPI Dec/Dec. %)	10.30	12.00	8.00	7.50
General Government Budget (% of GDP)	-1.30	-1.10	-2.40	0.50
Federal Government Budget Balance (% of GDP)	-1.60	-1.40	-1.00	-1.00
Fiscal Reserves (ECA/SWF) US $b	4.60	8.60	3.00	6.00
Gross Monetary Reserve ($b)	32.60	46.00	43.60	40.00
Nominal Exchange Rate (N/US $b eop)	158.00	157.00	158.00	159.0
Sovereign Debts (% of GDP)	9.70	10.30	10.60	10.60
External	1.30	1.40	1.40	1.70
Domestic	8.40	8.90	9.20	8.90
Credit to Private Sector (% of GD)	1.50	15.00	14.00	16.00

Note: General Government Balance includes Federal, State, Local, Extra budget Funds, Fuel Subsidy, Net Change in ECA
*Projects
Note: Estimate as share of GDP use re-based GDP numbers
Source: Nigeria Economic Report, World Bank, 2014

Respondents' level of satisfaction with the implementation of the MGDs The study sought to analyse the level of satisfaction of Nigerians from their Government's implementation of the MDGs. The result of the analysis is as reflected in Table 5.

Nigerian were not at all satisfied with level of Government performance on eradicating extreme poverty and hunger. They were moderately satisfied with level of achievement in archiving universal primary education; promoting gender equality and empowering women; combating HIV/AIDS, malaria and other diseases; and developing a global partnership for development. They were however slightly satisfied with the level of achievement on ensuring environmental sustainability. Overall, they were moderately satisfied with the level of achievement of the eight MDGs. The result of this findings which revealed that Nigerians were not at all satisfied with the level of achievement on MDG 1, is in consonance with [1] AfDB, OEC and UNDP report in its African Economic Outlook for 2014. The finding also justified many of the international development data and reports: [23, 34].

Table 5. Level of satisfaction with the implementation of MGDs

	Millennium Development Goals	Mean	Decision
MDG 1	Eradicate extreme poverty and hunger	Mean	Decision
MDG 2	Achieve universal primary education	1.34	Not at all satisfied
MDG 3	Promote gender equality and empower Women	2.56	Moderately satisfied
MDG 4	Reduce child mortality	3.43	Moderately satisfied
MDG 5	Improve maternal health		
MDG 6	Combat HIV/AIDS, malaria and other Diseases	3.31	Moderately satisfied
MDG 7	Ensure environmental sustainability	2.44	Slightly satisfied
MDG 8	Develop a global Partnership for Development	3.39	Moderately satisfied
MDGs' Grand mean		2.68	Moderately satisfied

Source: Computed from field survey, 2015

They have all rated Nigeria low at efforts aimed at eradicating poverty despite Government's posting of high growth rates. In

essence, it means that the growth rates have not translated into meaningful impacts in reducing poverty and preventing inequality.

Respondents' level of desirability for the SDGs

The study measured and analysed the level of desirability for implementation of the first 10 SDGs bordering on poverty and inequality as reflected in Table 6. Seven (7) of the SDGs were very desirable by the respondents. These SDGs included ending poverty in all its ramifications and ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture. These SDGs 1 and 2 received the highest mean of 4.96.

Table 6. Desirability for implementation of SDGs by Nigerians

	Sustainable Development Goals	Mean	Decision
SDG 1	End poverty in all its forms everywhere	4.96	Very desirable
SDG 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	4.96	Very desirable
SDG 3	Ensure healthy lives and promote well-being for all at all ages	4.89	Very desirable
SDG 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	4.43	Desirable
SDG 5	Achieve gender equality and empower all women and girls	4.42	Desirable
SDG 6	Ensure availability and sustainable management of water and sanitation for all	4.86	Very desirable
SDG 7	Ensure access to affordable, reliable, sustainable and modern energy for all	4.88	Very desirable
SDG 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	4.89	Very desirable
SDG 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and "foster innovation	4.24	Desirable
SDG 10	Reduce inequality within and among countries	4.78	
Grand Mean		4.73	Very desirable

Source: Computed from field survey, 2015

The three remaining SDGs were desirable by the respondents. These SDGs include SDG 4 –ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. SDG 5-achieving gender equality and empowering women and girl. Holistically, the respondents were very desirable of the SDGs, given a response grand mean of 4.73.

CONCLUSIONS

On a final note therefore, the study has done a trend analysis in poverty level in Nigeria from 1980-2014, examined the causes of poverty and inequality in Nigeria, evaluated Nigeria's potentials for a post-2015 development agenda, evaluated the level of satisfaction with the implementation of Millennium Development Goals (MDGs), as well as the desirability level for the implementation of the Sustainable Development Goals (SDGs). The study found that poverty and inequality are still endemic in Nigeria. For Nigeria to tackle the issues of poverty and inequality therefore, corruption, weak institution and poor governance must be given priority by government and stakeholders. Strong political will, resources allocation to and empowerment of law enforcement and anti-corruption agencies are most needed. Also government must create new jobs and make the underemployed more comfortable with more incentives to tackle unemployment and underemployment. While Nigerians are very desirable to see their government implement the SDGs, they rated government low with the implementation of the MDGs. For a post-2015 development agenda however, Government is got to be more proactive, committed and result-oriented so that that citizenry can be free from poverty and inequality while strongly achieving the SDGs to ensure the much targeted development.

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NEW REQUIREMENTS IN THE CREATION OF VARIETIES OF VINE WITH THE ECONOMIC AND ECOLOGICAL EFFECT IN THE CONDITIONS OF CLIMATE CHANGE

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Abstract

Development of culture of the vine during of his evolution has multiple known methods to improve, such as the natural selection or directed (intraspecific, interspecific, clonal, genetic engineering, etc.). A desideratum of the wine world science and practice remains to be the getting of vines varieties for quality, absolutely resistant to attack by phylloxera (root and leaf). The process of obtaining distant hybrids, just like any cross varieties of Vitis vinifera L. with representatives from the donor species of qualities necessary (resistance to diseases and pests winter low temperatures etc.) can bring to the changing spectrum of chemical compounds and biochemical responsible for the aroma, color and taste of berries, juice and wine obtained. According to the European Union requirements in the production of the wine products, chemical composition of the raw material must meet certain strict requirements. Therefore, the current remain the problem of obtaining new varieties of vines agro-biological characters that meet the maximum requirements for table grapes using fresh consumption and for industrial processing to those intended (juices, concentrates, wines, spirits).

Key words**:** *anthocyanin, berry, diglucoside-3,5-malvidin, methyl anthranilate, methanol*

INTRODUCTION

World wine assortment, currently has about 12 000 species and varieties of vine, but so far not created the variety "ideal", that meets the most valuable features: *colour* – golden-pink-red; *flavors* – muscat, citron, rose petals etc.; *taste* – smooth and crunchy varieties for consumption at current, and balanced and juicy on the juice and wine. and balanced and juicy on the juice and wine. It is necessary that these varieties possess and resistance to biotic and abiotic factors of the environment, such as the low winter temperatures and the high arid summer drought, specific diseases of this culture - mildium, odium, gray mold and other as well as various pests. Therefore, the current remains the problem of obtaining new varieties of vines agro-biological characters fully satisfy the requirements of grapes for current consumption and those intended to industrial processing (juices, concentrates, wines, spirits). Vine during its evolution has multiple known breeding methods, such as natural selection or directed (intraspecific, interspecific, clonal, genetic engineering etc.). Today it is very necessary to obtain vine varieties productive and qualitative characters, and absolutely resistant to attack by *phylloxera* (root and leaf). Botanical Garden (Institute) of the Academy of Sciences of Moldova, together with other international scientific centers in this field works were carried out in distant hybridization of grapevine, by applying American vines spontaneous (*Muscadinia rotundifolia* Michx.), who has absolutely resistance to attack by phylloxera, but agro-biological characters of inferior quality in crossbreeding varieties in European species (*Vitis vinifera* L.), who do not possess resistance to attack by phylloxera, but agro-biological characters (productivity and quality) high. The resulting hybrids were created vine that combines these requirements [3, 4, 12, 13].

The process of obtaining hybrids of vines, as well as any cross varieties of *Vitis vinifera* L. with representatives from the donor species of qualities necessary (resistance to diseases and pests winter low temperatures etc.) can bring

to the changing spectrum chemical and biochemical compounds responsible for flavor, color and taste of berries, juice and wine obtained.

According to European Union requirements in the production of wine products, the chemical composition of the raw material must meet some strict requirements, for example diglucozid-3,5-malvidin not exceed the limit of 15 mg/dm^3. Recently the World Organisation of Vine and Wine discussed the issue of reducing the index wines at the limit of 5 mg/dm^3, which requires to be monitored in the selection of vines to try and approve only varieties with low content of this phenolic - diglucozid-3,5-malvidin.

Another important compound juice berries vine hybrids of any order, including the distance is methyl anthranilate (3,4-benzoxazole), which has the main role in the creation of taste and smell (aroma) of frame (naphthalene and / or phenol) [11].

Methyl anthranilate is a chemical compound benzoxazoles group, formed in grapes (especially direct producer hybrids) in amounts of 0,2 to 3,5 mg/dm^3 of must (juice). It is found in the wine with the same concentrations of volatile aromatic another chemical compound - ethyl isoamyl [11]. That is why this important chemical compound in the juice of berries new hybrids intraspecific selection requires determined, studied and taken as a criterion for selection.

International Organisation of Vine and Wine in 2004 established the methanol concentration limit of 250 ml/l for white wines and 400 ml/l for red wines.

Methanol is an alcohol which is synthesized by substituting the methane molecule an atom of hydrogen, with a group - OH (hydroxyl). In the fermentation process of the fruit can be formed by the decomposition of pectin's methanol. Consumption of methanol can cause severe poisoning, it may arise in particular by fractional distillation of alcohol.

MATERIALS AND METHODS

In this study were included grapevine distant hybrids (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.), created in the Botanical Garden (Institute) of the Academy of Sciences of Moldova, hybrids of vines with the green-yellow berries: DRX-M4-502; - 512; -571; - 578; -580; - 609; hybrids of vines with the red-violet berries: DRX-M3-3-1; -660. Varieties of vines by *Vitis vinifera* L.: "Feteasca alba" (with the green-yellow berries); "Rara neagra", "Feteasca neagra" and "Negru de Ialoveni" (with the red-violet berries) [2, 3, 4, 9, 21].

These new strains were tested for resistance to attack the root and the leaf *phylloxera*, as well as *mildium*, *oidium*, *botrytis*. Berries juice and the wine were tested on content: methyl anthranilate, diglucozide-3,5-malvidin and methanol [3, 4, 12, 13].

The study included ten varieties of vines created of the VCR (Vivai Cooperativi Rauscedo, Italy), including five varieties of grapes with white berries (Fleurtai (UD-34.111), Soreli (UD-34.113), Early Sauvignon (UD-76.026); Petit Sauvigon (UD-55.098); Sauvignon d´ore (UD-55.100) and five varieties of red berries with juice (Petit Cabernet (UD-58.083); Royal Cabernet (UD-32.078); Royal Merlot (UD-31.125); Petit Merlot (UD-31.122); Julius (UD-36.030) [1].

Varieties of vines created in Germany: Cabernet Jura, Zweigelt, Regent, Monarch and Cabernet Carbon [1].

For the quantitative and qualitative determination of diglucoside-3,5-malvidin, the quantitative and qualitative fluorimetric method was applied.

Qualitative determination (identification of diglucozid-3,5-malvidol). In an Erlenmeyer flask, 10 mL of control wine with 15 mg/L of diglucozid-3,5-malvidin, which have been treated with 1,5 mL of solution of acetic aldehyde, are taken. It is stirred about 20 minutes for combining free SO_2 in wine with acetic aldehyde. In a centrifuge tube with a capacity of 20 mL is introduced 1 mL of wine treated with acetic aldehyde, to which is added a drop of 1 M hydrochloric acid and 1 mL sodium nitrite solution. The tube content is stirred; it is expected for 2-5 minutes the oxidation-reduction reaction of malvin and then 10 mL of ammonia solution are added.

Under the same conditions, in another centrifuge tube, we treat 10 mL of the control wine containing 15 mg or 5 mg malvin/litre. It is stirred and then we wait 10 minutes and then centrifuge it.

We decant the clear liquids from the two centrifuge tubes, two calibrated tubes with ground glass stopper. The fluorescence of the analyzed sample of wine compared with the control sample is examined in UV light at 365 nm.

The wine samples which do not give fluorescence or their fluorescence is far below the control wine, are considered as lacking diglucoside-3,5-malvidin. In case of a slightly lower, equal or higher fluorescence in comparison with the control wine, the quantitative determination of diglucoside-3,5-malvidin is necessary [14, 15, 18, 19, 22, 23].

For determining the methyl anthranilate, the gas chromatographic method was applied. Extraction of methyl anthranilate was performed by absorption on a resin of the type Amberlite XAD-2, followed by elution with azeotropic mixture of pentam-dichloromethane solvent (2:1 ratio by volume). The organic extract is half concentration and injected into a chromatography capillary column of fused silica. When leaving the column the terpineols get into the mass spectrometer to be detected.

In the chromatography column are injected 2 μL of organic extract obtained from must or wine and 2 μL of each internal standard. The scanning area of the mass spectrometer is between 30 m/z and 300 m/z, at an interval of 1 sec./cycle. The spectrum obtained is compared with that of the internal standards of reference and the terpineols content is calculated. [12, 15, 18, 19, 22, 23] .

Distant hybrids of vine (*Vitis vinifera* L. x *M. rotundifolia* Michx.) served as study material.

Botanical description of distant hybrids was performed during all phases of the vegetative stages; the organs of the plants were studied from spring, at bud unfolding, until early autumn, at the fall of the leaves. The bio-morphological characteristics of the organs were studied at the stages of: - bud unfolding – leaf and shoot growth - blossoming – berries growth - grapes ripening, wood maturing and leaf drop. [2, 3, 4, 5]

RESULTS AND DISCUSSIONS

For the cultivation of plants multiannual it is necessary to weigh consider the specifics of at regional level agro-climatic resources. The more so that the climatic conditions are changing.

Territory of the Republic of Moldova is located at the northern limit for the some thermophilic multiannual crops, including for vineyard.

Taking into account that some varieties are very susceptible and vulnerable to determining climate conditions, their knowledge could contribute significantly to enhancing agricultural productivity, especially in the conditions multiannual approval for new plant varieties.

Improving of the vine consists not only in creating the productive of vines variety rights and quality traits, but also resistant to biotic and abiotic factors of the environment.

In contemporary agro biological science are the achievements of the vine selection made, since the second half of the XX century resulted in obtaining new varieties with increased resistance to biotic and abiotic factors of the environment, and acceptable qualities such as those in Germany (Soliaris, Hibernal-GM), Hungary (Bianca), Moldova (Viorica, Legenda, Reton, Luminiţa, Alb de Ialoveni, Negru de Ialoveni and others, for juices and wines; Apiren alb, Apiren roz, Negru de Grozeşti, Kiş-miş moldovenesc, Kiş-miş lucistâi, for fresh consumption and for industrial processing: Moldova, Guzun, Suruceni alb, Leana, Ialoveni rezistent, Codreanca, Tudor etc.).

Has the appreciated achievements National Selection Scientific Center (Institute for Winegrowing and Winemaking "V.Tairov") in Odessa, Ukraine, which varieties or spread throughout in the space of ex-URSS: varieties and forms for fresh consumption (Arkadia, Vostok, Gherkules, Dnestrovschii rozovîi, Zolotistîi ustoicivîi, Kiş-miş tairovschii, Muscat jemciujnîi, Muscat tairovschii şi altele); varieties and forms for industrial processing (Aromatnîi, Golubok, Iliciovschii

rannii, Muscat odesschii, Odesschii Ciornîi, Ovidiopolschii, Rubin tairovschii, Suholimanschii belîi etc.).

Achievements well known in large scale CIS belong Vine and Wine Institute "Magaraci" (Yalta, Ukraine), Federal Institute of Vine and Wine in Russia, established in Novocercask, one in Krasnodar – of the North Caucasus Institute for Horticulture and Viticulture, well as Viticultural Experiment Station in Anapa.

Appreciating the true value of these achievements with concrete agrobiological characters of varieties obtained, it should be noted that the cultivation of these varieties require mandatory grafting vines their North American (resistant to *phylloxera*), which significantly raises the cost of planting material production and the establishment unit - plantation of vines. In addition most of the above mentioned varieties are relatively resistant to the main contaminants during the growing season (*mildium, oidium, botrytis*), and lately is observed sensitivity to *Agrobacterium tumefacium* and *Flovecence d'Or*.

It is encouraging increased resistance to low temperatures this winter varieties, which allow them to grow on trellises and fertile buds diminish losses in years with cold winters. Some of these varieties, however, in some years, are attacked by phylloxera leaf, under which the crop matures weak and immature shoots enters hibernation.

A new research has been carried out successfully since 2006 by the Italian selection of Udine and Milan Universities and Institute of Experimental Genomics in Italy, in collaboration with wine experts from VCR (Cooperative Vivai Rauscedo).

The results were obtained, studied and introduced in the National Catalogue of vine culture in Italy, and in 2015 temporarily included in the register of plant varieties approved in the Republic of Moldova (with limited right of multiplication and planting) ten varieties, of which: five varieties of grapes with white berries (Fleurtai (UD-34.111), Soreli (UD-34.113), Early Sauvignon (UD-76.026); Petit Sauvignon (UD-55.098), Sauvignon d´ore (UD-55.100) and five varieties of red berries with juice (Petit Cabernet (UD-58.083), Cabernet Royal (UD-32.078), Merlot Royal (UD-31.125), Merlot Petit (UD-31.122), Julius (UD-36.030) [1].

Among agrobiologic remarkable characters of these varieties, planted and grown in five wine regions of Italy, Slovenia and Moldova are given early and middle technological maturation of the grapes, high yield stocks, good resistance to *mildium* and *oidium*, and normal sensitivity to *Botrytis cinerea*. Tests for resistance to low temperatures showed that red and white varieties of this new direction vine selection withstand temperatures of minus 22° C - - 24ºC, which allows cultivation with minimum risk of these varieties and in the northern border areas of viticulture in Europe and other growing areas in the world.

Agrobiologic characters analysis of new varieties of vines, obtained by crossbreeding the original of *Vitis vinifera* L. varieties of hybrids intraspecific attests to a similarity with the classic varieties of grapes and yield afternoon (productivity) in a unit area (1 ha). Similarly, the physical and chemical index (oenological criteria) varies between corresponding European red varieties grown in traditional wine-growing regions of Northern Italy (Friuli). And yet, a concentration of anthocyanins 1267 mg/l in berries of the variety of Cabernet Royal and 1133 mg/l in the Petit Merlot and polyphenol content of 4300 mg/l at Royal Cabernet and 4203 mg/l in berries of the variety of Royal Merlot admits, that these new varieties have enormous potential, high reserves of important compounds of organoleptic qualities [11, 16].

An important indicator of the quality wines is the methanol content that accumulate in wine as a result of hydrolytic action of the enzyme pectin-methyl-esterase (PME) on the methoxylated pectin molecules, which contain morphological structures inside the berries.

The methanol concentration is dependent on many factors (the peculiarities of varieties, the content of pectin's, the degree of etherification, PME activity, duration of contact of the liquid with the solid fraction, the temperature of the soaking process, the

concentration of ethyl alcohol and sulphur dioxide, etc.), but the fact is that the closer we get to the origin of the *Vitis vinifera* L, the value of this biotechnology index is reduced in comparison with analogue remote of varieties of the *Vitis amurenzis, Vitis labrusca, Muscadinia rotundifolia* Michx. etc.
The purpose of breeding work of the vine consists in selecting new forms, taking account of the concentration of methanol in wines from these new varieties, along with characters such as precious biological agriculture increased resistance to biotic and abiotic factors of the environment. Once this index has a noxious character he is limited by competent international institutions (World Health Organisation, World Trade Organisation, the World Organisation of Vine and Wine) in this area under special medical investigations. This objective is concerned with ensuring the safety of products uvologice [14, 20].

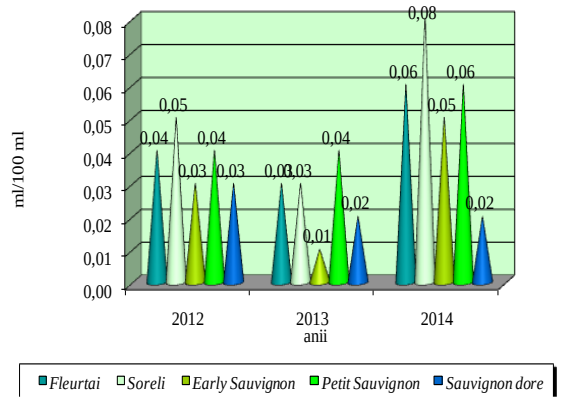

Fig. 1. The concentration of methanol in varieties of vines with white berry.

International Organisation of Vine and Wine in 2004 established the methanol concentration limit of 250 ml/l for white wines and 400 ml/l for red wines (Sheet regulatory OIVV concentration 19/2004).
According to Italian legislation (Law No.82 of 20.02/2006) limit concentration of methanol in white wines is 0.20 ml/100 ml, and for red 0.25 ml/100 ml.
Obtaining varieties of vines of *Vitis vinifera* L. and species donor of the necessary qualities (disease resistance and harmful at low temperatures of winter etc.) can make to changing spectrum of chemical compounds and biochemical responsible for aroma, colour and taste of berries, juice and wine obtained.
European wine-growing practice has started to determine a limit to component-test, a violet-blue anthocyan, chemical name - diglucozid-3,5-malvidin. He is a natural component harmless, clean and do not have harmful properties.

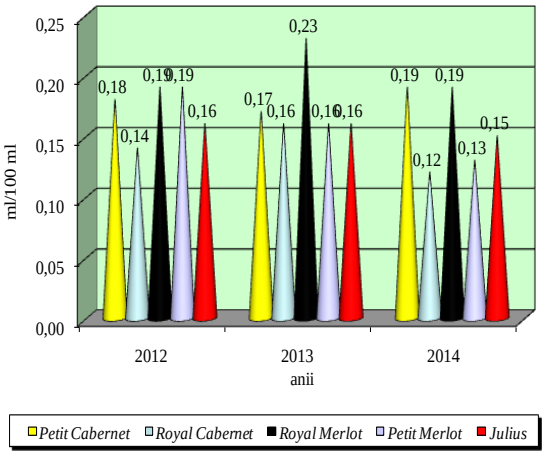

Fig. 2. The concentration methanol in varieties of vines with red berry.

In accordance with legislation of the European Union, concentration of diglucozid-3,5-malvidin in the berries juice should not exceed the limit of 15 mg/l.

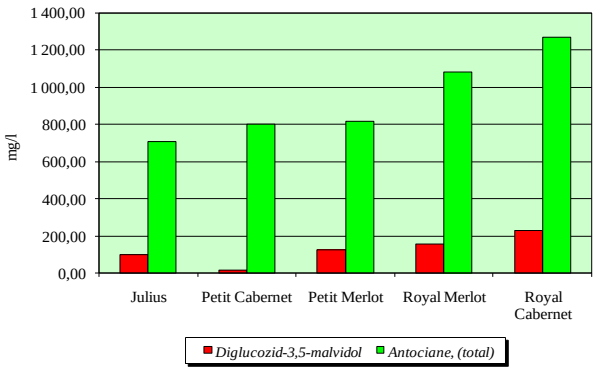

Fig. 3. The concentration of diglucozid-3,5-malvidin and the total anthocyanins.

From the results of present in the Fig. 3. shows that only new variety Petit Cabernet concentration diglucozid-3,5-malvidin not exceed the limits set by 15 mg/l, following so the cluster varieties of the *Vitis vinifera* L.
As varieties of the Julius, Petit Cabernet, Petit Merlot, Royal Merlot, Royal Cabernet showed

an increased concentration of this anthocyanins harmless and curative, but can currently only create obstacles to their approval in some European Union countries. Nutritionists say that the human body in its evolution has created sufficient enzyme systems recovery, anthocyanins metabolism and turning them into other compounds derived necessary and useful [14, 15, 17, 20].

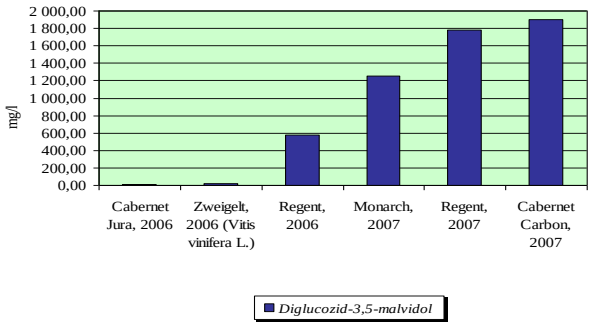

Fig. 4. The concentration of diglucozid-3,5-malvidin juice of red berries vine varieties created in Germany

Interesting results in terms uvologic and oenological were obtained by selecting vine of new varieties in Germany, which demonstrates that the selection of intra-specific can get character agrobiologic important (resistance, productivity and quality), but with a content high in diglucozid-3,5-malvidin (580 mg/l in the wine variety Regent and 1900 mg/l in wine Cabernet Carbon). Of course compared to varieties of *Vitis vinifera* L., Cabernet (Jura, France) and Zweigelt (Rhein, Germany) investigated index do not exceed 15 mg/l, established by specialized international organizations.

In order to create vines with a high resistance to phylloxera root and the leaf, it started to cross *Vitis vinifera* L. x *Muscadinia rotundifolia* Michx., resulting in the creation of new varieties of vine [3, 21].

Studying the physicochemical and biochemical indices of juice berries vine varieties (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.), to determine spacers or similarity with the classic varieties of *Vitis vinifera* L.

The test results show that in the fresh juice of berries distant hybrid diglucozidul-3,5-malvidol varies between 7,7 mg/l - 9.3 mg/l (DRX-M4-660; DRX-M3-3-1), but the variety Rară neagră, only 4,9 mg/l of diglucozid-3,5-malvidin.

The concentration of anthocyanins in the varieties of berries colored not show a difference essential difference between hybrids distant and varieties classic Rară neagră and Feteasca albă from 513 mg/l to 640 mg/l for hybrids distant vineyards and content of the 469 mg/l at Rară neagră and 737 mg/l to Fetească neagră - both in group of the *Vitis vinifera* L.

Table 1. The content of methyl anthranilate, diglucoside-3,5-malvidin and anthocyanins in grapes of distant hybrids of grapevine (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.)

Form	The content of the compounds, mg/dm^3		
	Methyl anthranilate	Diglucoside-3,5-malvidin	Anthocyanins
Distant hybrids of grapevine (V.vinifera L. x M.rotundifolia Michx.)			
DRX-M4-502	0,08	-	-
DRX-M4-580	0,09	-	-
DRX-M4-512	0,13	-	-
DRX-M4-578	0,15	-	-
DRX-M4-609	0,16	-	-
DRX-M4-571	0,17	-	-
DRX-M4-660	0,21	7,7	640
DRX-M3-3-1	0,24	9,3	513
Varieties of the Vitis vinifera L.			
Feteasca albă	0,11	-	-
Feteasca neagra	0,19	7,4	737
Rară neagră	0,27	4,9	469
Negru de Ialoveni	0,49	74,0	861

The studies found that obtaining distant hybrids are transmitted through hereditary traits - typical direct producer hybrids, whose index methyl anthranilate concentration ranging from 0,30 mg/l of juice to 3,6 mg/l [11, 23].

Hybrids distant with green-yellow berries possess a concentration of methyl anthralinate limits of 0,08 mg/l – 0,17 mg/l. Variety vine classic "Fetesaca alba" with yellow-green berries has a concentration of 0,11 mg/l.

This allows to conclude a resemblance of the distant hybrids of vine DRX-M4-502; -571; -578; -609 in the content of methyl anthranilate with classic grape variety ”Feteasca alba” of *Vitis vinifera* L. (Tab. No. 1.)

Hybrids distant DRX-M4-660 and DRX-M3-3-1 to red-violet berries content of methyl anthranilate is present in the range of 0,21 mg/l – 0,24 mg/l. Vine varieties "Rare neagră" and "Feteasca neagră" of *Vitis vinifera* L., accumulated fresh juice of berries 0,27 mg/l – 0,19 mg/l. methyl anthranilate. (Tab. No.1.)

Based on previous studies we found that the variety of the vine "Negru de Ialoveni" based on gas phase chromatographic method was determined an increased concentration of methyl anthranilate 0,49 mg/l.

CONCLUSIONS

Creating vine varieties with resistance to *phylloxera* root and foliar *mildium* to powdery mildew, botrytis and other biotic and a high resistance to low temperatures in winter and drought, will allow for truly tackling consumer grapes production and for industrial processing biological (ecological). Due to their high agro biological properties, these varieties treated during the season - moderate and limited (strictly in accordance with European legislation "bio") will allow to ensure high hygiene and curativitate berries and grapes.

Uvological and oenological requirements of the new varieties obtained refers to the high quality of grapes fresh for current consumption and those for industrial processing and their use in the production of wines, juices, concentrates (ecological) and distillates.

Uvological and organoleptic requirements berries of new varieties of grape vines consumer include: commercial aspect flawless golden-yellow, pink or red (pomegranate, cherry) colour and blue-violet exceptions, glucose-fructose ratio optimal, which together ensure harmony glucides concentration highly appreciated by consumers, crisp taste and sensations of balance of acidity - the concentration of glucides - astringency.

The new varieties must be early ripening period of the grapes to ensure planting and cultivation their northern border of vine growing on different continents, while ensuring plant and maturing strings for a successful winter, allowing their cultivation trellis medium and high strain to mechanize and automate processes to the maximum possible cutting agro tied, sprayed manually or mechanically with combine harvesting etc.

It is desirable that the varieties of grape vines Consumer possess high transportability to export them from great distances, and the technical - a low capacity to absorb oxygen from the air and protection of berries, juice and wine oxidation (redox low reductive processes). These requirements correspond to the F4 distant hybrids obtained at the Botanical Garden (Institute) of Academy of Sciences of Moldova and new varieties created by scientists coach in Italy (Universities of Udine and Milan, VCR - Rauscedo).

It is necessary to take account of the concentration limits of berries and juice constituents of the wine: diglucozid-3,5-malvidol (= <15 mg/l), methyl anthranilate (= <0.2 mg/l), which they are not harmful, but dislikes.

There is welcome, according to scientists oenologists, increased content in the juice of berries and wines produced cis and trans compounds derived the hexenal and hexanal (less than 0,,2 mg/l) and flavored furaniol hybrids - the direct producer (less than 30 mg/l). They are strictly regulated and limited concentrations of methanol in the juice berries less than 10 mg/l, and the wines produced less than 250 ml/l for white wines and 400 ml/l for red wines (Regulations of the European Union).

Selection of new varieties of grape vines for current consumption puts the onus fructose-glucose ratio that is optimal for fructose value of 1,1 - 1,3 and the ratio of tartaric and malic acid indices within 1,0 – 1,4.

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GENOMIC DEOXYRIBONUCLEIC ACID (DNA) OF THE DISTANT HYBRIDS OF VINE (*VITIS VINIFERA* L. x *MUSCADINIA ROTUNDIFOLIA* MICHX.)

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Abstract

For the isolation of the genomic deoxyribonucleic acid (DNA) from vine leaves of distant hybrids (Vitis vinifera L. x Muscadinia rotundifolia Michx.), the DNA isolation protocol based on CTAB method was used. The grouping of distant hybrids in the obtained dendrogram shows that at the DNA level there are some differences between them, differences sometimes unnoticeable at the level of ampelographic characterization. As a result, in the characterization of varieties and hybrids of vines, the ampelographic analysis needs to be supplemented by an analysis at the molecular level, based on DNA amplification techniques. As a result of distant hybrids grouping based on the size of alleles, it was found that there are two distinct main groups denoted by A and B, each having secondary branches. The hybrid F_4 BC_3 DRX-M_4-541 1 is closely akin to the variety Chasellas dóre. Also, the two samples of Vitis vylvestris Gmel. have been found to be genetically different, being placed in different subgroups. The hybrid F_4 BC_3 DRX-M_4-536 is genetically close to the male specimen of Vitis sylvestris Gmel. The distant hybrid DRX-M_4-660, which proved to have larger differences at the molecular level, isn't grouped in a cluster with any other hybrid.

Keywords: *alleles, distant hybrids, DNA, leaves, primers*

INTRODUCTION

SSR (Simple Sequence Repeats) genetic fingerprinting technique can be used successfully in the determination of phylogeny relationships in the biological material analyzed. The representation of the number and size of alleles using the barcode technique gives a clear view of the molecular similarities and differences that occur between hybrids and reference varieties analyzed.

MATERIALS AND METHODS

The distant hybrids of vine (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.): BC1 - DRX-55 (prob. 1); BC4 - DRX-M4-536 (prob. 2), DRX-M4-578 (prob. 3), DRX-M4-545 (prob. 4), DRX-M4-604 (prob. 5), DRX-M4-508 (prob. 6), DRX-M4-660 (prob. 7); BC2 – DRX-M3-3-1 (prob. 8); - Vitis sylvestris Gmel. (♀) (prob. 9); - *Vitis sylvestris* Gmel. (♂) (prob. 10); BC3 - DRX-M4-580 (prob. 11), DRX-M4-541 (prob. 12), DRX-M4-507 (prob. 13), DRX-M4-537 (prob. 14) served as study material [1, 2, 3,15].

For the isolation of genomic deoxyribonucleic acid (DNA) from vine leaves of distant hybrids (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.), the specimens of *Vitis sylvestris* Gmel. and the two international varieties taken as reference, it was used the DNA isolation protocol, based on CTAB method (the protocol of Lodhi et al., 1997, modified by Rodica Pop et al., 2003). The quantification of the quality and quantity of deoxyribonucleic acid (DNA) was performed using Nanodrop ND-1000 Spectropho - tometer (Thermo Scientific) [4, 5, 6, 7, 8, 10]. Each sample has been subjected to three readings using Nanodrop with the aim of obtaining an average value used for the dilutions required for PCR amplification. It was used a concentration of DNA of 20 ng/μL. [11, 12, 13, 14, 15, 16]

PCR amplification was performed in thermocycler type Palm Cycler (Corbett Research) under the conditions of touch down. The primers used were VVS2, MD5, MD7, MD27, ZAG 62 and ZAG 79,

synthesized by the company IDT (USA). The selection of primers was done taking into consideration the recommendations of the gene bank European Vitis Database [17, 18]. The characteristics of the used primers are shown in Table 1.

Table 1. Characteristics of the used primers

No crt	Name of the primer	Nucleotide sequence	Tm (melting temperature)	Type of fluorochrome for marking
1	vvs2 forward	5'-CAGCCCGTAAATGTATCCATC-3'	53.3	5' Well Red D2
2	vvs2 reverse	5'-AAATTCAAAATTCTAATTCAACTGG-3'	48.9	-
3	MD5 forward	5'-CTAGAGCTACGCCAATCCA-3'	53.9	5' Well Red D3
4	MD 5 reverse	5'- TATACCAAAAATCATATTCCTAAA-3'	45.9	-
5	MD7 forward	5'-AGAGTTGCGGAGAACAGGAT-3'	56	5' Well Red D4
6	MD 7 reverse	5'-CGAACCTTCACACGCTTGAT-3'	55.6	
7	MD27 forward	5'- CCCCAAGGCTCTGAAAACAAT-3'	55.8	5' Well Red D4
8	MD 27 reverse	5'-ACGGGTATAGAGCAAACGGTGT-3'	58.3	-
9	ZAG 62 forward	5'-ACGGTGTGCCTCTCATTGTCATTGAC-3'	64.7	5' Well Red D4
10	ZAG 62 reverse	5'- CCATGTCTCTCCTCAGTTCTCAGT-3'	57.7	-
11	ZAG 79 forward	5'-AGATTGTGGAGGAGGGAACAAACCG-3'	60.8	5' Well Red D2
12	ZAG 79 reverse	5'- TGCCCATTTTCAAACTCCCTTCC-3'	58.0	-

Improving the amplification protocol consisted in using Touchdown PCR amplification so that the truthfulness of the final results was consistent with the specialized literature. It is worth mentioning that after the optimization of all amplification protocols, all the used primers generated amplification products, which were studied with the help of the genetic analyzer CEQ 8800^{TM} capillary DNA analysis system (Beckman Coulter, Fullerton, CA, USA) in the next stage of experimentation, in order to determine the number of alleles and their size.
In order to identify the optimum temperature of attaching primers, there was performed a heat shock that exceeded by about five degrees Celsius the melting temperature of the forward primer, then the temperature gradually decreased with about one degree Celsius at each amplification cycle until it was reached the temperature at which primers attachment could be more specific.
The optimization of the amplification protocol is important because it helps to avoid obtaining non-specific amplification products. It was also found that the attachment optimum temperature depends on the melting temperature of the most unstable primer, from thermal point of view, of the primer pair.

In Table 2 there are presented the PCR amplification programs which were optimized and used in order to study the migration of the reaction products in the genetic analyzer.

Table 2. Amplification protocol of vine samples analyzed with the primers vvs2, MD5, MD7, MD27, ZAG 62, ZAG 79

No. crt.	Name of the primer	PCR condition	The composition and the volume (µL) of the PCR reaction mixture	DNA quantity used\sample (µL)
1	vvs2	1. 95 ^{0}C - 0:30 min (1 cycle of amplification) 2. 95 ^{0}C – 0:30 min (1 cycle of amplification) 57 ^{0}C - 51 ^{0}C – 1:00 min (by one cycle of amplification touchdown) 72 ^{0}C – 1:00 min 3. 95 ^{0}C – 0:30 min 50 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycles of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3
2	MD5	1. 95 ^{0}C – 0 :30 min (1 cycle of amplification) 2. 95 ^{0}C – 0:30 min (1 ciclu de amplificare) 58 ^{0}C - 56 ^{0}C – 1 :00 min (by one cycle of amplification touchdown) 72 ^{0}C – 1:00 min 3. 95 ^{0}C – 0:30 min 52 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycles of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3
3	MD7	1. 95 ^{0}C – 0 :30 min (1 cycle of amplification) 2. 95 ^{0}C – 0:30 min (1 cycle of amplification) 60 ^{0}C - 56 ^{0}C – 1 :00 min (by one cycle of amplification touchdown) 3. 95 ^{0}C – 0:30 min 55 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycles of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3
4	MD27	1. 95 ^{0}C – 0 :30 min (1 cycle of amplification) 2. 95 ^{0}C – 0:30 min (1 cycle of amplification) 59 ^{0}C - 56 ^{0}C – 1 :00 min (by one cycle of amplification touchdown) 72 ^{0}C – 1:00 min 3. 95 ^{0}C – 0:30 min 55 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycle of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3
5	ZAG 62	1. 95 ^{0}C – 0 :30 min (1 cycle of amplification) 2. 95 ^{0}C – 0:30 min (1 cycle of amplification) 65, 64, 63, 60, 57, 55, 53^{0}C - 1 :00 min (by one cycle of amplification touchdown) 72 ^{0}C – 1:00 min 3. 95 ^{0}C – 0:30 min 55 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycles of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3
6	ZAG 79	1. 95 ^{0}C - 0:30 min (1 cycle of amplification) 2. 95 ^{0}C - 0:30 min (1 cycle of amplification) 62 ^{0}C - 56 ^{0}C - 1 :00 min (by one cycle of amplification touchdown) 72 ^{0}C – 1:00 min 3. 95 ^{0}C – 0:30 min 55 ^{0}C – 1:00 min 72 ^{0}C – 1:00 min (25 cycle of amplification) 4. 72 ^{0}C – 5 min 4 ^{0}C – 99 min	$H_2$0- 4 $MgCl_2$- 1.2 dNTP mix – 0.6 Buffer – 4 Primer R – 1 Primer F – 1 Taq Pol. 0.2	3

PCR amplification products obtained after using the 6 SSR primers mentioned above were verified by migration in agarose gel 1.4 % (1.4 g agarose LE Analytical Grade, Promega in 100 ml solution TAE). In Figure 1 there are shown the PCR amplification products obtained with primers pair MD5 and migrated in agarose gel and the ladder of 100 bp used [19, 20, 21].
Optimal dilutions of PCR products were obtained by probing and we found that satisfactory results concerning the migration

conditions were recorded at the following dilutions:
- PCR products amplified with the primer ss2 were diluted at a ratio of 1:5 and then a volume of 1μL was used for migration;

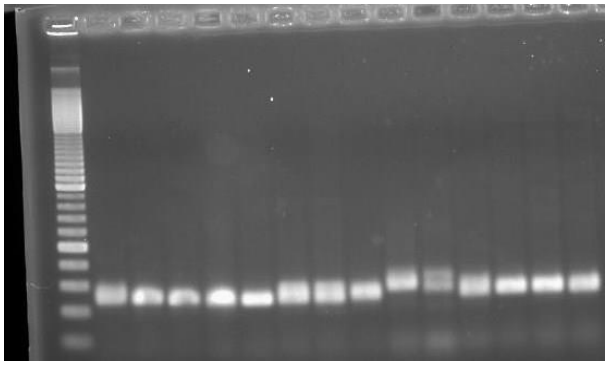

Fig. 1. The image of agarose gel with the PCR products resulting from amplification with the pair of primers MD5 and visualized with the help of the picture-taking system UPV. L-ladder Mass Ruler 100 bp (Promega)-molecular weight marker.

- PCR products amplified with the primer md5 were diluted at a ratio of 1:20 and then a volume of 1μL was used for migration;
- PCR products amplified with the primer md7 were diluted at a ratio of 1:40 and then a volume of 1μL was used for migration;
- PCR products amplified with the primer md27 were diluted at a ratio of 1:40 and then a volume of 1μL was used for migration;
- PCR products amplified with the primer ZAG 62 were diluted at a ratio of 1:40 and then a volume of 1μL was used for migration;
- PCR products amplified with the primer ZAG 79 were diluted at a ratio of 1:5 and then a volume of 1μL was used for migration;

The PCR products obtained with the help of the six primers were migrated in the genetic analyzer Ceq TM 8800 (Beckman Coulter), using a volume of 0,25 μL standard 400 bp from Beckman Coulter and solution for migration -38,3 μL SLS (sample loading solution).
In order to analyze more accurately the results, there were used for comparison two international vine varieties, Sauvignon Blanc and Chasellas Dóre, whose size and number of alleles are given in the literature.
The determination of the number and size of alleles at the analyzed varieties was performed automatically with the help of the software used for data interpretation included in the genetic analyzer CEQ 8800$^{TM\ from}$ Beckman Coulter Company.
The dendrogram on the way of grouping of hybrids was done with the help of the programs PAST and FIG. TREE using the EUCLIDEAN method.

RESULTS AND DISCUSSIONS

Results on DNA isolation
The amount of DNA (ng/μL) and its purity (expressed through the values of the ratio 260/280) obtained from the analyzed vines samples are shown in the images from below:

Sample ID	User ID	Date	Time	ng/ul	A260	A280	260/280	260/230	Constant	Cursor Pos.	Cursor abs.	340 raw
v 1.2	Default	3/4/2013	1:26 PM	520.64	10.413	5.780	1.80	1.93	50.00	230	5.395	0.824
v 1.2	Default	3/4/2013	1:26 PM	518.40	10.368	5.773	1.80	1.91	50.00	230	5.422	0.842
v 1.2	Default	3/4/2013	1:26 PM	534.74	10.695	5.981	1.79	1.88	50.00	230	5.700	0.906
v 2.1	Default	3/4/2013	1:28 PM	624.02	12.480	6.063	2.06	1.95	50.00	230	6.388	0.474
v 2.1	Default	3/4/2013	1:28 PM	615.58	12.312	5.920	2.08	1.95	50.00	230	6.325	0.539
v 2.1	Default	3/4/2013	1:28 PM	609.27	12.185	5.871	2.08	1.93	50.00	230	6.309	0.637
v 3.1	Default	3/4/2013	1:29 PM	2325.09	46.502	22.112	2.10	2.08	50.00	230	22.318	0.882
v 3.1	Default	3/4/2013	1:29 PM	2282.99	45.660	21.767	2.10	2.07	50.00	230	22.010	1.038
v 3.1	Default	3/4/2013	1:29 PM	2241.85	44.837	21.268	2.11	2.07	50.00	230	21.649	0.932
v 4.1	Default	3/4/2013	1:30 PM	2261.95	45.239	21.194	2.13	2.16	50.00	230	20.975	0.784
v 4.1	Default	3/4/2013	1:30 PM	2240.66	44.813	21.002	2.13	2.15	50.00	230	20.808	0.881
v 4.1	Default	3/4/2013	1:31 PM	2956.71	59.134	28.177	2.10	2.12	50.00	230	27.834	3.209
v 5.1	Default	3/4/2013	1:31 PM	2142.19	42.844	20.260	2.11	2.06	50.00	230	20.802	1.020
v 5.1	Default	3/4/2013	1:32 PM	2082.33	41.647	19.688	2.12	2.05	50.00	230	20.315	1.061
v 5.1	Default	3/4/2013	1:32 PM	2769.71	55.394	26.483	2.09	2.04	50.00	230	27.206	1.488
v 6.1	Default	3/4/2013	1:34 PM	1918.78	38.376	18.366	2.09	2.05	50.00	230	18.749	0.504
v 6.1	Default	3/4/2013	1:34 PM	1892.10	37.842	18.118	2.09	2.04	50.00	230	18.513	0.534
v 6.1	Default	3/4/2013	1:34 PM	1868.42	37.368	17.870	2.09	2.04	50.00	230	18.315	0.613
v 7.2	Default	3/4/2013	1:35 PM	2030.90	40.618	19.420	2.09	2.01	50.00	230	20.181	0.837
v 7.2	Default	3/4/2013	1:35 PM	2013.89	40.278	19.261	2.09	2.01	50.00	230	20.054	0.865
v 7.2	Default	3/4/2013	1:36 PM	2179.73	43.595	20.923	2.08	2.01	50.00	230	21.673	0.967
v 8.1	Default	3/4/2013	1:36 PM	1555.29	31.106	15.152	2.05	2.00	50.00	230	15.559	0.885
v 8.1	Default	3/4/2013	1:37 PM	1541.12	30.822	15.003	2.05	1.99	50.00	230	15.505	0.980
v 8.1	Default	3/4/2013	1:37 PM	1577.18	31.544	15.353	2.05	1.99	50.00	230	15.813	1.040
v 9.1	Default	3/4/2013	1:38 PM	4532.00	90.640	46.849	1.93	1.96	50.00	230	46.170	1.143

Fig. 2. Centralizing table generated by Nanodrop on the results of DNA quantification at the analyzed vine hybrids (9 samples)

Sample ID	User ID	Date	Time	ng/ul	A260	A280	260/280	260/230	Constant	Cursor Pos.	Cursor abs.	340 raw
v 6.1	Default	3/4/2013	1:34 PM	1868.42	37.368	17.870	2.09	2.04	50.00	230	18.315	0.613
v 7.2	Default	3/4/2013	1:35 PM	2030.90	40.618	19.420	2.09	2.01	50.00	230	20.181	0.837
v 7.2	Default	3/4/2013	1:35 PM	2013.89	40.278	19.261	2.09	2.01	50.00	230	20.054	0.865
v 7.2	Default	3/4/2013	1:36 PM	2179.73	43.595	20.923	2.08	2.01	50.00	230	21.673	0.967
v 8.1	Default	3/4/2013	1:36 PM	1555.29	31.106	15.152	2.05	2.00	50.00	230	15.559	0.885
v 8.1	Default	3/4/2013	1:37 PM	1541.12	30.822	15.003	2.05	1.99	50.00	230	15.505	0.980
v 8.1	Default	3/4/2013	1:37 PM	1577.18	31.544	15.353	2.05	1.99	50.00	230	15.813	1.040
v 9.1	Default	3/4/2013	1:38 PM	4532.00	90.640	46.849	1.93	1.96	50.00	230	46.170	1.143
v 9.1	Default	3/4/2013	1:38 PM	4481.90	89.638	46.307	1.94	1.96	50.00	230	45.819	1.276
v 9.1	Default	3/4/2013	1:39 PM	4477.20	89.544	46.064	1.94	1.97	50.00	230	45.491	1.316
v 10.2	Default	3/4/2013	1:39 PM	4659.17	93.184	49.161	1.90	1.95	50.00	230	47.892	1.574
v 10.2	Default	3/4/2013	1:40 PM	4686.44	93.729	49.168	1.91	1.95	50.00	230	48.011	1.670
v 10.2	Default	3/4/2013	1:40 PM	4657.66	93.153	49.039	1.90	1.95	50.00	230	47.846	1.626
v 11.2	Default	3/4/2013	1:41 PM	1486.59	29.732	14.317	2.08	1.98	50.00	230	15.012	0.697
v 11.2	Default	3/4/2013	1:41 PM	1477.64	29.553	14.260	2.07	1.97	50.00	230	14.964	0.741
v 11.2	Default	3/4/2013	1:41 PM	1467.66	29.353	14.187	2.07	1.97	50.00	230	14.874	0.711
v 12.1	Default	3/4/2013	1:42 PM	2589.12	51.782	24.903	2.08	2.09	50.00	230	24.749	0.662
v 12.1	Default	3/4/2013	1:42 PM	2827.31	56.546	27.354	2.07	2.09	50.00	230	27.096	0.818
v 12.1	Default	3/4/2013	1:43 PM	3139.08	62.782	30.655	2.05	2.07	50.00	230	30.266	0.843
v 13.1	Default	3/4/2013	1:43 PM	3724.60	74.492	36.437	2.04	2.06	50.00	230	36.145	0.715
v 13.1	Default	3/4/2013	1:44 PM	3705.13	74.103	36.205	2.05	2.06	50.00	230	36.001	0.733
v 13.1	Default	3/4/2013	1:44 PM	3688.85	73.777	36.051	2.05	2.06	50.00	230	35.895	0.724
v 14.1	Default	3/4/2013	1:45 PM	3604.78	72.096	34.926	2.06	2.08	50.00	230	34.658	0.725
v 14.1	Default	3/4/2013	1:45 PM	3626.94	72.539	35.253	2.06	2.08	50.00	230	34.875	0.725
v 14.1	Default	3/4/2013	1:46 PM	3611.90	72.220	35.037	2.06	2.08	50.00	230	34.754	0.772

Fig. 3. Centralizing table generated by Nanodrop on the results of DNA quantification at the analyzed vine hybrids (9 samples)

After quantification of the samples, DNA dilutions were made so that all the samples used for migration to have a concentration of 20 ng/μL. In Table 4 there are shown the average values of the samples of DNA, and the values of the dilution factor and the volumes of DNA stock and those of sterile double-distilled

water used for samples dilution.

Table 3. Summarizing table on stock samples of DNA dilutions in order to achieve PCR amplification

Proba	cantitate ng/µL	Puritate 260/280	Suma	Media	Fdilutie	DNA	Apa	
1	520,64	1,8	1573,78	524,59	26,23	3,8	96,2	
	518,4							
	534,74							
2	624,02	2,08	1848,87	616,29	30,81	3,2	96,8	
	615,58							
	609,27							
3	2325,09	2,1	6849,93	2283,31	114,17	0,9	99,1	
	2282,99							
	2241,85							
4	2261,95	2,13	7459,32	2486,44	124,32	0,8	99,2	
	2240,66							
	2956,71							
5	2142,19	2,1	6994,23	2331,41	116,57	0,9	99,1	
	2082,33							
	2769,71							
6	1918,78	2,09	5679,3	1893,10	94,66	1,1	98,9	
	1892,1							
	1868,42							
7	2030,9	2,09	6224,52	2074,84	103,74	1,0	99,0	
	2013,89							
	2179,73							
8	1555,29	1,98	4673,59	1557,86	77,89	1,3	98,7	
	1541,12							
	1577,18							
9	4532	1,94	13491,1	4497,03	224,85	0,4	99,6	
	4481,9							
	4477,2							
10	4659,17	1,9	14003,27	4667,76	233,39	0,4	99,6	
	4686,44							
	4657,66							
11	1486,59	2,07	4431,89	1477,30	73,86	1,4	98,6	
	1477,64							
	1467,66							
12	2589,12	2,07	8555,51	2851,84	142,59	0,7	99,3	
	2827,31							
	3139,08							
13	3724,6	2,05	11118,58	3706,19	185,31	0,5	99,5	
	3705,13							
	3688,85							
14	3604,78	2,08	10842,72	3614,24	180,71	0,6	99,4	
	3626,94							
	3611							

The results obtained concerning the number and size of alleles and are shown in Table 5:

Table 4. The analyzed number and size of the obtained alleles of the local and newly created varieties (the red colour indicates the international varieties used as reference in this study)

Denumirea probei	ss2		md5		md27		md7		zag 62		zag 79	
	129-155 bp		226-246 bp		173-194 bp		233-263 bp		185-203 bp		236-260 bp	
F2 BC1 DRX 55	137	149	233	239	184	190	244	244	188	204	251	261
F3 BC2 DRX M3 31	137	137	239	239	184	184	244	260	186	194	255	261
F4 BC3 DRX M4 536	139	139	239	239	190	190	226	244	186	204	241	261
F4 BC3 DRX M4 578	149	149	239	239	180	190	252	252	194	204	261	261
F4 BC3 DRX M4 545	139	139	239	239	180	190	244	252	188	204	255	261
F4 BC3 DRX M4 604	137	153	229	239	180	190	240	248	188	204	255	261
F4 BC3 DRX M4 508	137	137	233	233	180	190	248	248	188	204	261	261
F4 BC3 DRX M4 660	139	149	233	239	180	180	268	268	188	194	261	261
F4 BC3 DRX M4 580	137	153	227	237	180	190	244	244	192	204	255	261
F4 BC3 DRX M4 541	137	149	239	239	180	190	244	252	194	204	247	255
F4 BC3 DRX M4 507	149	149	239	265	180	190	252	252	188	194	261	261
F4 BC3 DRX M4 537	137	137	233	263	180	190	250	250	188	204	255	261
Vitis sylvestris female	139	149	233	233	190	206	240	240	190	204	255	255
Vitis sylvestris male	147	147	233	239	196	196	226	260	198	204	255	255
Sauvignon blanc	137	155	233	237	180	190	240	248	194	204	245	247
Chasellas dóre	137	147	229	239	176	190	240	258	194	204	251	257

Data grouping was done using the program "Excel" (Table 5), establishing the time of identification of alleles' size so that it could include all the values obtained after the migration of the samples analyzed in the genetic analyzer Beckman Coulter Ceq 8800 TM.

The migration of PCR products was performed in the genetic Analyzer Beckman Coulter Ceq 8800 TM in order to identify the number and size of alleles of vine varieties using the SSR technique. In the figures 4 and 5 are shown some migrated samples so that the heterozygous (at the same locus, allele, Figure 4.) or homozygous state (Fig. 5, sample 2 - F3 BC2 - DRX-M3-3-1) may be highlighted.

Table 5. The representation of the numberand size of alleles of the distant hybridsanalyzed by DNA barcode

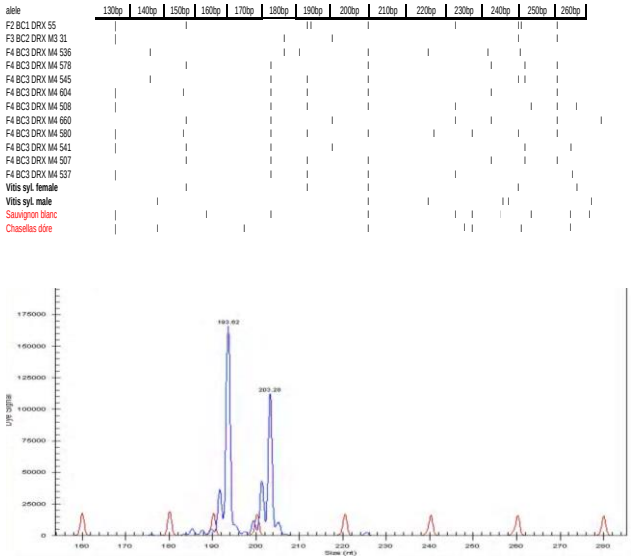

Fig. 4. Migration in the genetic Analyzer Beckman Coulter Ceq 8800 TM in order to identifythe number and size of alleles of vine varieties using the technique SSR with the primer ZAG 62.

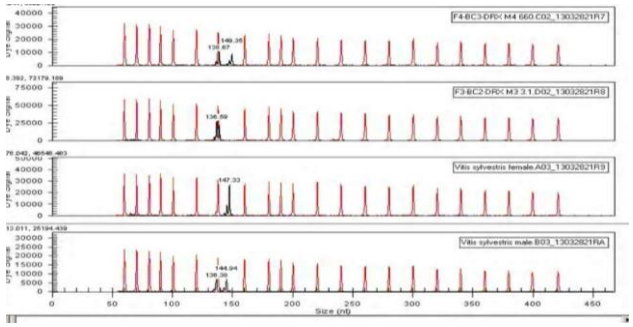

Fig. 5. Migration in the genetic Analyzer Beckman Coulter Ceq 8800 TM in order to identify the number and size of alleles of vine varieties using the technique SSR with the primer VVS2

Grouping distant hybrids based on the size of the alleles identified using SSR technique was performed in order to determine their type of genetic similarity/difference (Fig. 6).

Thus, it can be seen that there were formed two different main groups denoted by A and B, each of them having some secondary ramifications. It is worth mentioning the fact that the hybrid F4 BC3 DRX-M4-541 is very akin to the variety Chasellas dóre and it is possible that the latter may have contributed to the formation of the hybrid mentioned

above.

Also, the two samples of *Vitis sylvestris* Gmel. were found to be genetically different, being placed in separate subgroups. The hybrid F4 BC3 DRX-M4-536 is genetically close to the male specimen of *Vitis sylvestris* Gmel., and it may have contributed to the formation of the hybrid.

Among the hybrids F4 BC3, DRX-M4-660 stands out, because it has proved to have more differences at the molecular level, being unable to be grouped in a cluster with any other hybrid.

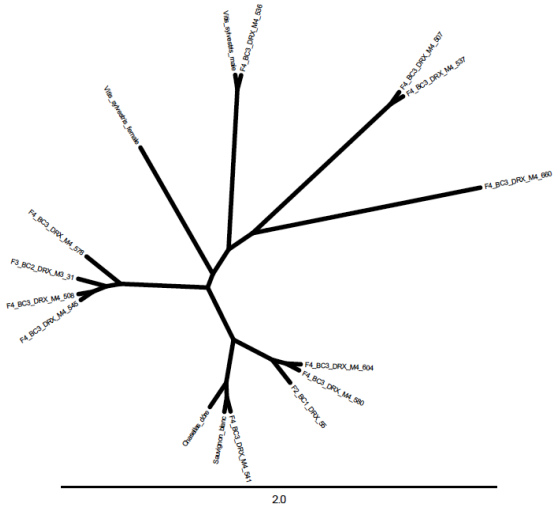

Fig. 6. The dendrogram, drawn up according to the Euclidean method, on the backcross hybrids and the reference varieties analyzed.

CONCLUSIONS

1. SSR (Simple Sequence Repeats) genetic fingerprinting technique can be used successfully in the determination of phylogeny relationships in the biological material analyzed.

2. The representation of the number and size of alleles using the barcode technique gives a clear view of the molecular similarities and differences that occur between the hybrids and the reference varieties analyzed.

3. The grouping of hybrids in the generated dendrogram shows that there are some differences between them at DNA level, differences sometimes unnoticeable at the level of ampelographic characterization. As a result, the characterization of varieties and hybrids of vine requires the ampelographic analysis to be completed by an analysis at the molecular level, based on DNA amplification techniques.

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TENDENCIES REGARDING TRADE WITH OLEAGINOUS SEEDS OF ROMANIA

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Abstract

UE 28 became the number 1 world export with agricultural products and agro-foods in the year 2013. Romania's trade balance with this category of products became positive in the same year. Fruits and seeds from oleaginous plants is the second group of agro-food products, due to that we had competitive advantages and we managed to surplus for the commercial balance of agro-food products in 2013 and 2014. This paper proposes an analysis of foreign trade with oleaginous seeds in the period 2007-2014. By conducting different trade indicators, like the Grubel Lloyd indicator, the imports coverage degree by exports, but also the territorial concentration index, we could observe the commercial evolution of the oleaginous in the last few years. The high demands for oleaginous will lead to increasing production and trading.

Key words**:** *Balassa, evolution, Grubel Lloyd, oilseeds, Romania, trade*

INTRODUCTION

The analysis of the foreign trade activity is, like in the case of the other economical branches, of a major importance for establishing efficiency, identifying trades and the justification of specific decisions in this activity. [2] Oleaginous plants are those plants with a high content in fat within in seeds. The top oilseeds producers are USA, China, Brazil, India, Argentina and the European Union. E have to keep in mind that oilseeds are highly traded on the global market. [8] The highly increased demands on oilseeds occurs as a result of the processing them in vegetable oils, due to the augmentation of the population, but also of forage purposes or for processing into bio fuels. [9] In the year 2013 the value of the agricultural output for UE 28 was unchanged in the real terms. Higher production volumes were recorded, but for cereals and oleaginous, with about 6% each, the crop production prices have dropped substantially. [1] Romania has a higher capacity of production, and exports of agro-food products are based, mainly, on raw materials, lesser processed products. [7]

MATERIALS AND METHODS

The data processed in this article were obtained from the Ministry of Agriculture and Rural Development. To characterize the evolution of foreign trade in perspective of parallel evolution of two streams of goods it uses the imports coverage degree by exports.
Proportional development of the economy requires that between export and import has to be a balanced report, that results in the circulation of goods from outside the country, and vice versa, to present a surplus balance. The imports coverage degree by exports characterized such cases, being able to show an extent in which the balance is not achieved. The imports coverage degree by exports is an indicator of economic competitiveness and is calculated by the following formula: [3]

$$G_a = \frac{E}{M} x100$$

$G_a$represents the imports coverage degree by exports;
E – values of exports; M – values of imports.
Grubel – Lloyd indicator, which is denoted as "GL", expresses the intensity of trade in a branch. This indicator helps to determine the place that occupies a country's foreign trade in

the economic branch by highlighting exports and imports of a product category by total imports and exports of the country. [6]

This indicator is calculated using the following formula: [5]

$$GL=\frac{\sum_{i=1}^{n}|X_i+M_i|-\sum_{i=1}^{n}|X_i-M_i|}{\sum_{i=1}^{n}|X_i+M_i|}=1-\frac{\sum_{i=1}^{n}|X_i-M_i|}{\sum_{i=1}^{n}|X_i+M_i|}$$

where:

X_i = exports from *i* class products;

M_i = imports from *i* class products;

Grubel – Lloyd indicator can have any value between 1 and 0, and as the branch trade is closer to 1, it is considered more significant.

The Balassa Indicator, (IB), the branch trade flows is determined by the relationship:

$$IB=\frac{X_i-M_i}{X_i+M_i}$$

where: X_i indicates the *i* branch exports; M_i indicates the *i* branch imports.

The indicator can have values between -1, in which case the country performs only imports, and +1, when only exports are achieved, the maximum intensity of internal branch is performed when the indicator is zero. [4]

RESULTS AND DISCUSSIONS

The imports coverage degree by exports for the oleaginous seeds and fruits is represented in Fig.1. As it can be seen, the exports represent 175.52% out of the imports in the year 2007, slightly increase in 2008 and decreases in 2012, and in 2014 knows a value of 334.56%.

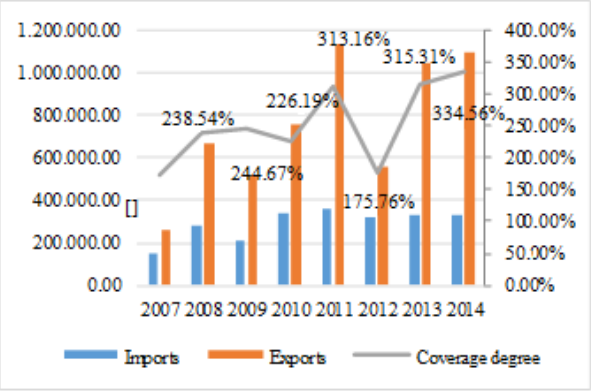

Fig. 1. The imports coverage degree by exports of the oleaginous seeds and fruits group in the period of 2007 – 2014

Source: MADR and own calculations

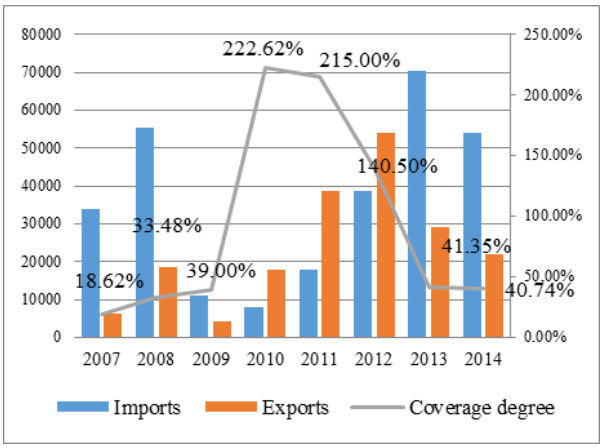

Fig. 2. The imports coverage degree by exports for soya beans, whether or not crushed in the period of 2007 – 2014

Source: MADR and own calculations

Figure 2 presents the imports coverage degree by exports for soya beans. It can be seen that the value of exports is only 0.42% in 2007, 0.87% in 2008, 0.44% in 2009, 2.29% in 2010, 0.29% in 2011 and 0.64% in 2012, increasing in the last two years at 19.48% and 13.16%.

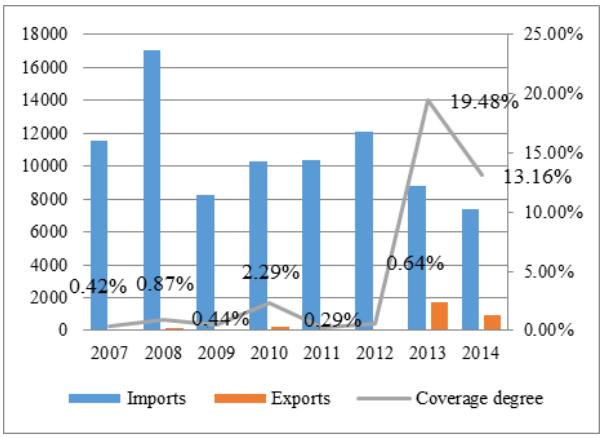

Fig. 3. The imports coverage degree by exports for ground nuts, not roasted or otherwise cooked, whether or not shelled or crushed in the period of 2007 – 2014

Source: MADR and own calculations

Figure 3 shows the indicator calculated for ground nuts. It can be observed that only in a few years there is a surplus in the period of 2007 - 2014. Exports represents 18.62% out of the imports value in 2007, fluctuating over the years and reaching 222.62% in 2010, declining after and becoming 40.74% in 2014.

As shown in Fig. 4, copra is marketed only in a few years in the period of study. The highest imports coverage degree by exports is found in the year 2009, when it's 35.57%.

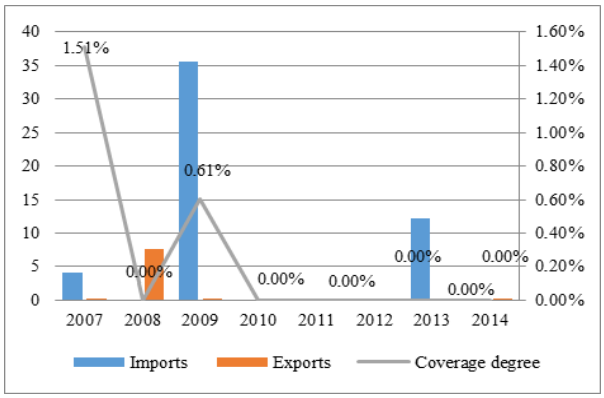

Fig. 4. The imports coverage degree by exports for copra in the period of 2007 – 2014
Source: MADR and own calculations

When discussing linseed, we notice in Figure 5 that trade increased strongly compared to the first two years, when the balance is lacking. The imports coverage degree by exports is maintained since 2009 at 190%.

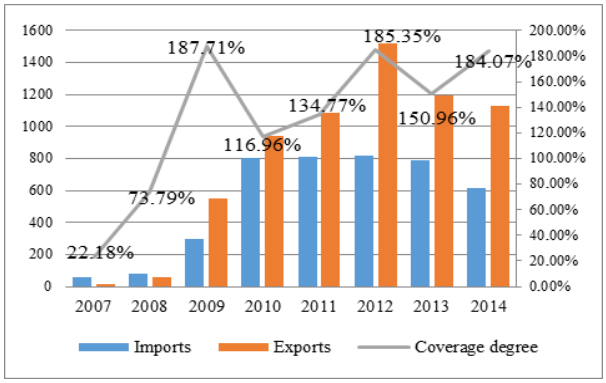

Fig. 5. The imports coverage degree by exports for linseeds, whether or not crushed in the period of 2007 – 2014
Source: MADR and own calculations

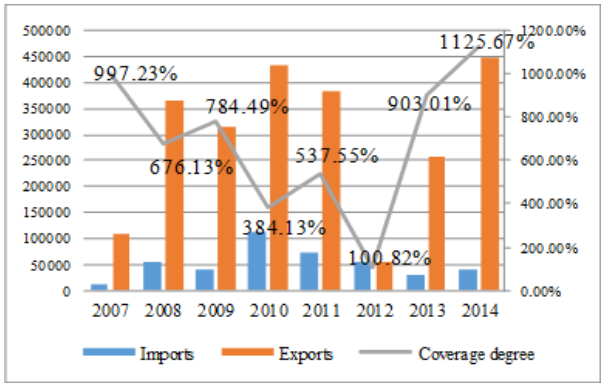

Fig. 6. The imports coverage degree by exports for colza seeds, whether or not crushed in the period of 2007 – 2014
Source: MADR and own calculations

Figure 6 illustrates the imports coverage degree by exports for colza seeds. Except for the year 2012, when trade is highly low compared to the rest of the analyzed period, the coverage is 100.82%, the exports value covering in the year 2014 is 1,125.67% out of imports value.

The indicator for sunflower seeds is shown in Figure 7. The product is the main in the oleaginous seeds and fruits category in which we surplus. The imports coverage degree by exports varies from 332.49% in 2007 to 189.28% in 2009 to 545.63% in 2013 and 439% in 2014.

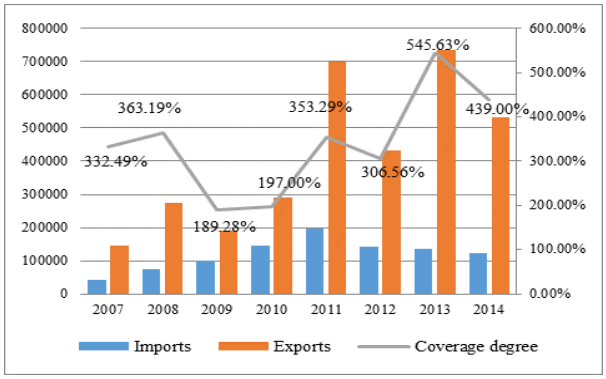

Fig. 7. The imports coverage degree by exports for sunflower seeds, whether or not crushed in the period of 2007 – 2014
Source: MADR and own calculations

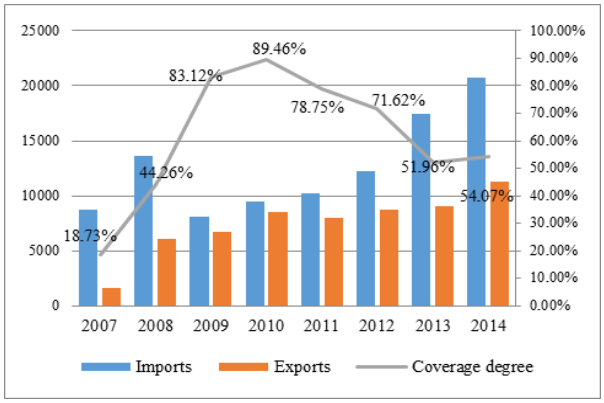

Fig. 8. The imports coverage degree by exports for other oleaginous fruits and seeds, whether or not crushed in the period of 2007 – 2014
Source: MADR and own calculations

The trade for other oleaginous seeds and fruits remain at approximately the same level, as can be seen in the figure below. The exports represent only 18.73% out of the imports in the year 2007, the coverage degree increases until the year 2010, when it's 89.46%, and then again suffers a decrease until it reaches an equal to 54.07% in the tear 2014.

The indicator for flour and semolina from oleaginous seeds and fruits is represented in

figure 9. As can be seen the value of imports is higher than that of the exports, the imports coverage degree by exports being 6.98% in 2007, 7.18% in 2008, 16.34% in 2009 and becoming 88.89% in 2010. In 2012 the value of exports covers 16.67% out of the imports value, and in 2014, 11.60%.

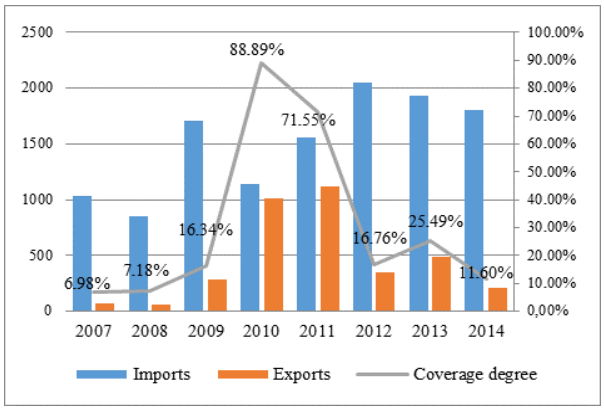

Fig. 9. The imports coverage degree by exports for flour and semolina from oleaginous fruits and seeds in the period of 2007 – 2014
Source: MADR and own calculations

Figure 10 shows us the imports coverage degree by exports for seeds, fruits and spores, of a kind, used for sowing, where it can be seen very low valued of the exported products. The indicator fluctuates between 2007 and 2014 from 3.02% to 11.90%.

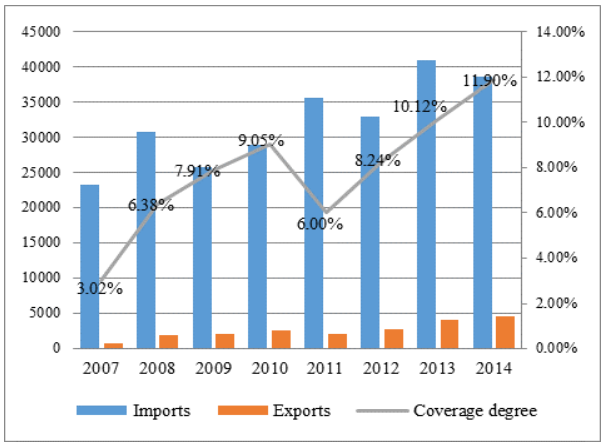

Fig. 10. The imports coverage degree by exports for seeds, fruits and spores, of a kind, used for sowing in the period of 2007 – 2014
Source: MADR and own calculations

Hop cones, fresh or dries, have the indicator calculated, illustrated in figure 11. As we can see the highest value is the coverage in 2007, is 2.59% in 2009, 2013, 2014 Romania did not realize hop exports.

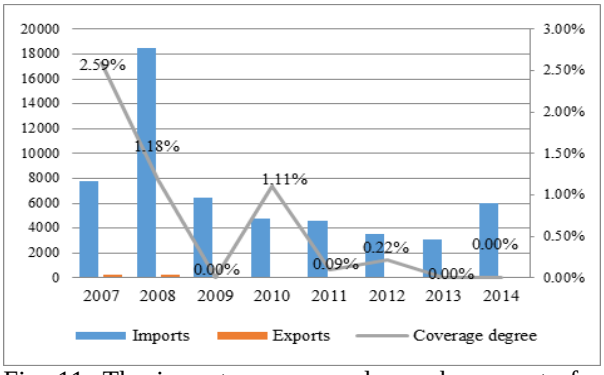

Fig. 11. The imports coverage degree by exports for hop cones, fresh or dries, whether or not ground, powdered or in the form of pallets, poppies in the period of 2007 – 2014
Source: MADR and own calculations

The group of plants and parts of plants has the imports coverage degree by exports represented in Fig. 12. It can be noted that trade deficits throughout the period, with the lowest coverage in 2010 of 36.48% and the highest in 2014, of 76.53%.

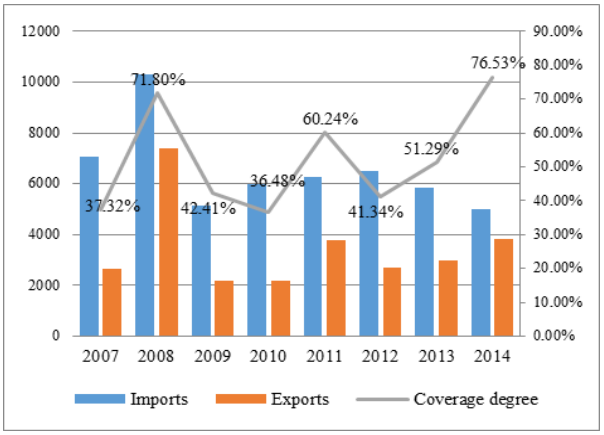

Fig. 12. The imports coverage degree by exports for plants and parts of plants in the period of 2007 – 2014
Source: MADR and own calculations

Figure 13 represents the imports coverage degree by exports for locust beans, seaweeds, sugar beet and sugar cane, a group of products inserted in the year 2013. It is noted that the indicator acknowledges a descendent trend from 9.11% in 2013 to 5.90% in 2014.
The only year in which the group of thatch and chaff of gross grains is surplus is 2011, when the value of exports covers 221.35% of the value of imports.

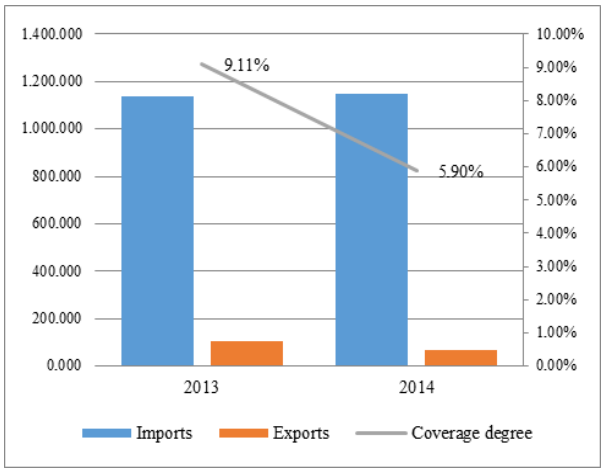

Fig. 13. The imports coverage degree by exports for locust beans, seaweeds, sugar beet and sugar cane, fresh in the period of 2007 – 2014
Source: MADR and own calculations

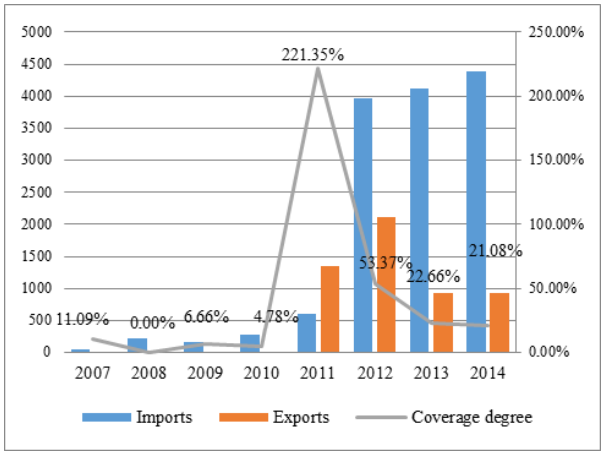

Fig. 14. The imports coverage degree by exports for thatch and chaff of gross grains, whether or not chopped, ground in the period of 2007 – 2014
Source: MADR and own calculations

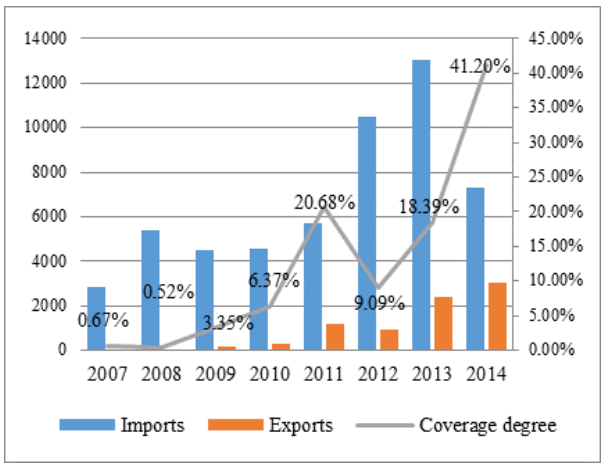

Fig. 15. The imports coverage degree by exports for foddered kohlrabi, foddered beet, foddered roots, hay, alfalfa in the period of 2007 – 2014
Source: MADR and own calculations

We note that in 2008 we did not export at all, and the indicator is low for the period of 2007-2010, the coverage degree being 53.37% in 2012 and around the value of 20% in 2013 and 2014.

The imports coverage degree by exports for foddered kohlrabi, foddered beet, foddered roots, hay and alfalfa is illustrated in figure 15. It can be noted that the export is almost nonexistent in 2007 and 2008, and the export value covers most of the import value in 2014, 41.20%.

In table 1, the Grubel – Lloyd indicator for oleaginous seeds and fruits is calculated. It can be observed that trade with fruits and oilseeds are significant, with values of over 0.46. We can see a significant trade of colza in 2008, when the indicator is 1, and also, the indicator is significant for linseed, other oleaginous seeds and fruits. Very low values, significantly in a less specific trade, insignificant even, we can observe in the case of hop cones, also for seeds, fruits and spores, of a kind, used for sowing and ground nuts, not roasted or otherwise cooked.

Balassa Indicator for the oleaginous fruits and seeds, where we can see that it is negative for most products, which shows that most products from the oleaginous group are imported and we surplus thanks to linseed, rapeseed, sunflower, which are sold in large quantities. Ground nuts are a category of products that we basically import only, along colza, seeds, fruits and spores, of a kind, used for sowing. (Table 2).

Romania's main trading partners for exports with soybeans are Germany, with almost 40%, Italy with 21.27%, Austria, Hungary, Greece, Serbia, the Netherlands, but also other countries with which trade are not as significant, including Portugal, Bulgaria, Switzerland, Slovenia, Moldova, United Kingdom, France, and Spain. In exchange, as can be seen in Figure 17 we import from Argentina, Ukraine, Moldova, Brazil, Canada, Bulgaria and other countries.

Table 1. Grubel – Lloyd indicator for oleaginous seeds and fruits

	2007	2008	2009	2010	2011	2012	2013	2014
Oleaginous fruits and seeds	0.73	0.59	0.58	0.61	0.48	0.73	0.48	0.46
Soya beans, whether or not crushed	0.31	0.50	0.56	0.62	0.63	0.83	0.59	0.58
Ground nuts, not roasted or otherwise cooked	0.01	0.02	0.01	0.04	0.01	0.01	0.33	0.23
Copra	0.03	0.00	0.01	-	-	-	0.00	0.00
Linseeds, whether or not crushed	0.36	0.85	0.70	0.92	0.85	0.70	0.80	0.70
Colza seeds, whether or not crushed	0.18	0.26	0.23	0.41	0.31	1.00	0.20	0.16
Sunflower seeds, whether or not crushed	0.46	0.43	0.69	0.67	0.44	0.49	0.31	0.37
Other oleaginous fruits and seeds, whether or not crushed	0.32	0.61	0.91	0.94	0.88	0.83	0.68	0.70
Flour and semolina from oleaginous fruits and seeds	0.13	0.13	0.28	0.94	0.83	0.29	0.41	0.21
Seeds, fruits and spores, of a kind, used for sowing	0.06	0.12	0.15	0.17	0.11	0.15	0.18	0.21
Hop cones, fresh or dries, whether or not ground, powdered or in the form of pallets, poppies	0.05	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Plants and parts of plants	0.54	0.84	0.60	0.53	0.75	0.59	0.68	0.87
Locust beans, seaweeds, sugar beet and sugar cane, fresh	-	-	-	-	-	-	0.17	0.11
Thatch and chaff of gross grains, whether or not chopped, ground	0.20	0.00	0.12	0.09	0.62	0.70	0.37	0.35
Foddered kohlrabi, foddered beet, foddered roots, hay, alfalfa	0.01	0.01	0.06	0.12	0.34	0.17	0.31	0.58

Table 2. Balassa Indicator for the oleaginous fruits and seeds

	2007	2008	2009	2010	2011	2012	2013	2014
Oleaginous fruits and seeds	0.266	0.409	0.420	0.387	0.516	0.275	0.518	0.540
Soya beans, whether or not crushed	-0.686	-0.498	-0.439	0.380	0.365	0.168	-0.415	-0.421
Ground nuts, not roasted or otherwise cooked	-0.992	-0.983	-0.991	-0.955	-0.994	-0.987	-0.674	-0.767
Copra	-0.970	1.000	-0.988	-	-	-	-1.000	1.000
Linseeds, whether or not crushed	-0.637	-0.151	0.305	0.078	0.148	0.299	0.203	0.296
Colza seeds, whether or not crushed	0.818	0.742	0.774	0.587	0.686	0.004	0.801	0.837
Sunflower seeds, whether or not crushed	0.538	0.568	0.309	0.327	0.559	0.508	0.690	0.629
Other oleaginous fruits and seeds, whether or not crushed	-0.684	-0.386	-0.092	-0.056	-0.119	-0.165	-0.316	-0.298
Flour and semolina from oleaginous fruits and seeds	-0.869	-0.866	-0.719	-0.059	-0.166	-0.713	-0.594	-0.792
Seeds, fruits and spores, of a kind, used for sowing	-0.941	-0.880	-0.853	-0.834	-0.887	-0.848	-0.816	-0.787
Hop cones, fresh or dries, whether or not ground, powdered or in the form of pallets, poppies	-0.950	-0.977	-1.000	-0.978	-0.998	-0.996	-1.000	-1.000
Plants and parts of plants	-0.456	-0.164	-0.404	-0.465	-0.248	-0.415	-0.322	-0.133
Locust beans, seaweeds, sugar beet and sugar cane, fresh	-	-	-	-	-	-	-0.833	-0.889
Thatch and chaff of gross grains, whether or not chopped, ground	-0.800	-1.000	-0.875	-0.909	0.378	-0.304	-0.630	-0.652
Foddered kohlrabi, foddered beet, foddered roots, hay, alfalfa	-0.987	-0.990	-0.935	-0.880	-0.657	-0.833	-0.689	-0.416

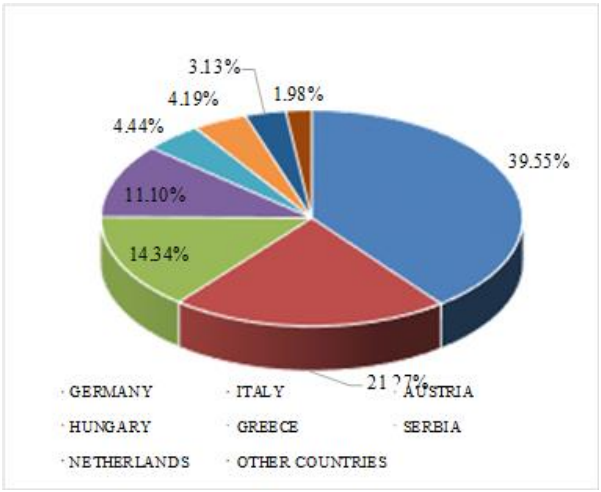

Fig. 16. Soya beans exports
Source: Own calculations based on MADR data

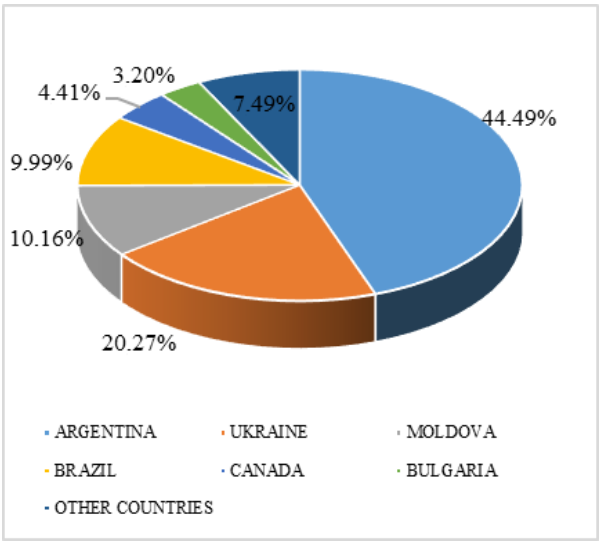

Fig. 17. Imports with soya beans
Source: Own calculations based on MADR data

Linseeds are exported in proportion of 41.37% in Italy and 40.04% in Germany, but also in smaller proportions in Austria, the Netherlands, and also in Hungary and the United Kingdom.

Imports take place in many countries of the world, among which Ukraine, Poland, Germany, Hungary and other countries.

Trading partners for the export with rapeseed are more numerous, among the most important listing: Belgium, the Netherlands, Pakistan, Turkey, United Arab Emirates, and also other countries, as it can be seen in Fig. 20.

Instead we import rapeseed from only a few countries, among which France in proportion of 32.23%, Bulgaria 29.80%, Germany 22.07% and other courtiers.

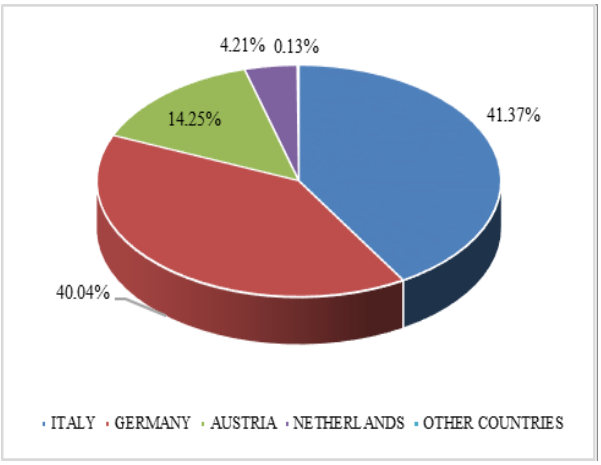

Fig. 18. Exports with linseeds
Source: Own calculations based on MADR data

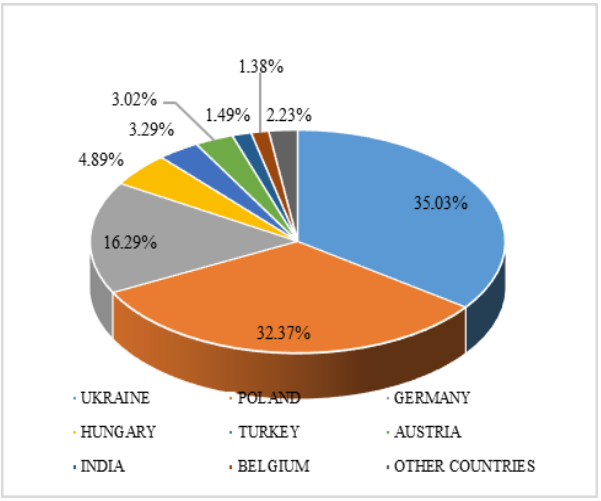

Fig. 19. Imports with linseeds
Source: Own calculations based on MADR data

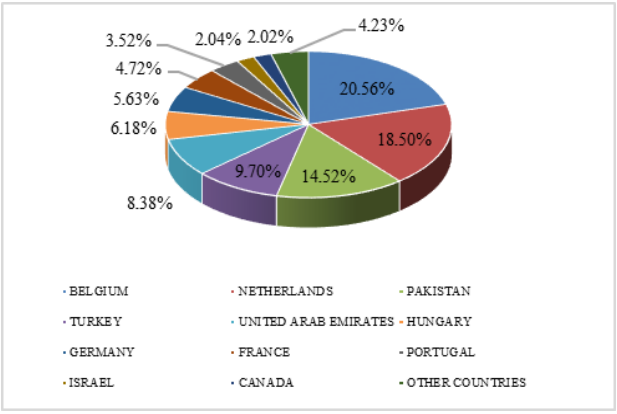

Fig. 20. Exports with rapeseeds
Source: Own calculations based on MADR data

The year 2013 was characterized by an increase in production by 83% from 2008. [8]

It can be observed that the trade with sunflower seeds in 2014 is achieved by a variety of partners both EU member states, and external countries.

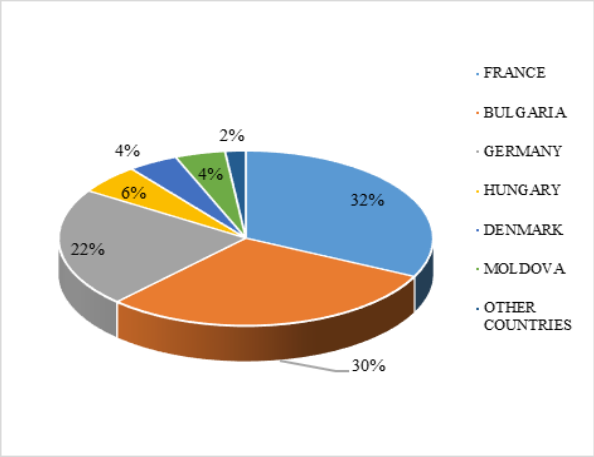

Fig. 21. Imports with rapeseeds
Source: Own calculations based on MADR data

Among the most important, as can be seen in Figure 22, are France, Turkey, Pakistan, the Netherlands, Hungary, Spain, Italy, Portugal, South Africa, Bulgaria, and other countries.

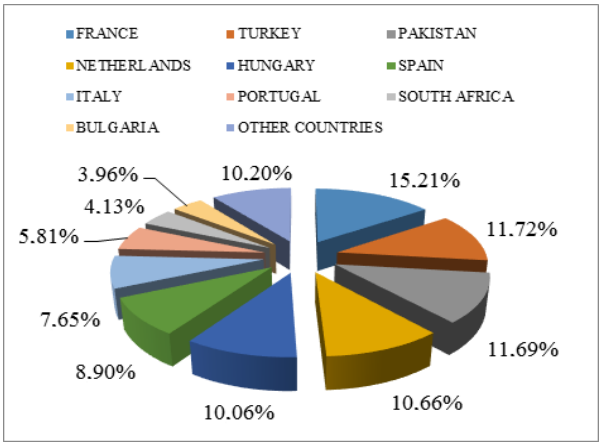

Fig. 22. Exports with sunflower seeds
Source: Own calculations based on MADR data

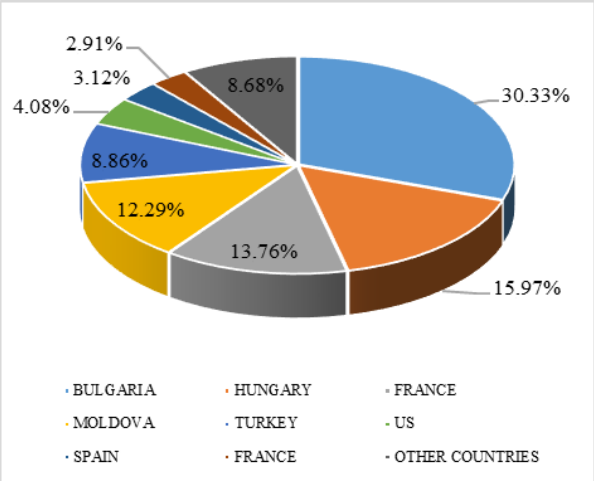

Fig. 23. Imports with sunflower seeds
Source: Own calculations based on MADR data

Romania imports sunflower seeds mainly from Bulgaria, Hungary, France, Moldova, Turkey, and other countries, as shown in Fig. 23.

CONCLUSIONS

Romania's trade with agro-food products has exceeded in the last two years. The oleaginous fruits and seeds group is one of the main reasons we register surplus.

By using the commercial indicators Grubel – Lloyd, Balassa, the imports coverage degree by exports, we could observe the evolution of the trade with oleaginous in Romania. The value of exports exceeds that of the imports during the analysis period, knowing the peak of the imports coverage degree by exports in 2014, of 334.56%. The soya beans are usually imported, and the exports cover only a little amount or even a non-existent value of them.

Ground nuts known a fluctuating dynamic, only in the years of 2010, 2011, 2012 were characterized by a positive balance.

Copra is marketed only in a few years in Romania during the analyzed period and is usually imported.

Linseeds know a deficiency only in 2007, the value of exports covering the imports in the rest of the years with a minimum of 16.96% and a maximum of 87.71%.

If we study the imports coverage degree by exports for colza seeds, we can see a very low value in 2012 and in 2014 a maximum of 1125.67%.

Sunflower is also a product from the oleaginous group that we trade strongly.

From the oleaginous group, a surplus is in the case of thatch and chaff of gross grains in the year 2011, the rest of the agricultural products registers a negative trend.

Romania's main trading partners in trade with oilseeds are the EU States members, but also we can observe that we import soya beans from Argentina, Brazil and Canada, linseeds from Turkey, India and we export sunflower in South Africa and Pakistan.

Due to the increased demands for oilseeds we can see a boost of the trade with them in the last years.

AKNOWLEDGEMENTS

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CORRELATIONS BETWEEN MIGRATION AND EMPLOYMENT AMONG YOUNG PEOPLE

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Abstract

Irrespective if of temporary or permanent nature, the phenomenon of youths' migration is more and more an integral part of contemporary life. Globalisation, together with market liberalisation and global economic integration encourages a mobile workforce but, also, underpins the increase of the standard of living gap between the developed and the developing world. Even if youths migration has a positive impact both for the country receiving the human capital (diminishment of the labour force deficit, production increase, slowing down the process of active population ageing, etc.), and for the country of origin (free jobs, diminishment of the unemployment rate, consistent remittances, improvement of the living standard for the families of those who migrate), still if not properly managed this phenomenon can generate unfavourable effects in particular in the area of countries supplying human capital to the other countries. The negative effects of this phenomenon are diverse from the ones regarding their demographic nature, to the ones of human capital value and competences' nature that can contribute to economic growth, or fiscal losses because of the state investment in training the human capital that migrates subsequently, thus no longer contributing to the payment of any taxes and duties to the state of origin. The present paper presents a brief analysis of the developments of the youths' labour market at the European Union level and in Romania and of the youths' migration for jobs.

Key words**:** *youth, youth's employment rate, youth's unemployment rate, youth's labour migration*

INTRODUCTION

Under the conditions of the globalisation, international migration is a symbol in the increase of interdependencies. International migration underwent a constant increase in time, and in the last years, youth migration represents a relatively high weight in total migration flows with a significant impact on the countries of origin, transit countries, and on the countries of destination.

According to the most recent estimates of the United Nations Organisation [14], at world level, in the year 2013 there were 232 million migrants, representing 3.2% from the total population of Earth. From among these, 35 million migrants were under the age of 20 years (on increase by 4 million individuals against 2000) and 40 million migrants with ages between 20 and 29 years of age.

The existing data regarding the size and structure of migration flows for a certain period of time are less reliable. The motivations of the youths to migrate are very often related to searching sustainable living means, jobs, decent working conditions, and the poor economic perspectives in their countries of origin. Continuing education, family reunification, or vocational training, as well as escaping regions affected by war, persecution, crises or natural disasters are also important factors leading to the increase in the size of migration flows among youths.

Migration flows shaped by youths are not homogenous. They come from various socio-economic environments and represent a wide range of profiles and competences.

The unemployment rate among youths at world level reached in 2013 to 13.1% that is almost three times higher than the unemployment rate among adults. The regions that are most affected are in the Middle East and North Africa, and in some regions of Latin America and the Caribbean's and in Southern Europe.

The sizes of youths' labour force employment and their migration turn into stringent challenges in the last years, both for

governments and for the sustainable development.

MATERIALS AND METHODS

The methodology used in paper aims to ensure the achievement of its objectives. *Descriptive statistical analysis* (charts, tables) was used in particular for viewing and summarizing the information detached from a set of data. *The classification analysis* was used to establish a typology of youth employment and unemployment by creating groups of countries with similar labour market characteristics of youth and their vulnerability. *The factorial analysis* was used to identify the vulnerabilities of young people in the labour market, the effects of long-term unemployment among them, the effect of migration on the labour market vulnerability. In the analyzes carried were used the data published in Annual Reports (2008-2014) of the National Labour Force Employment Agency, the TEMPO-Online database of the National Institute of Statistics of Romania, studies and statistics of the European Commission, the World Youth Report published by the United Nations, studies and statistics on migration conducted by the Organisation for Economic Co-operation and Development (OECD) and other international organization, specialized works published in the country and abroad.

The European Union which generates about 20% of the world economic output has still not managed to identify a balance between austerity and economic growth after a decade of out of control public expenditures which concluded, apparently, with a W-shaped recession.

Only five countries with developed economies registered during the last five years an increase in the number of employees: Austria, Germany, Luxemburg, Malta and Poland.

The estimates realised at the European Union level indicate that this percentage could be even higher if youths are taken into account who either gave up job searching, or decided to prolong their period of studies because of the extremely unfavourable conditions on the labour force market.

The analyses performed by the International Labour Organisation highlights that the number of young unemployed shall not decrease, at least until 2016. An additional pressure on the unemployment rate is expected when those extending their period of studies because of the limited period in finding a job, shall finally enter the labour force market.

Especially, of concern are the youths who are neither employed, nor in education or training, known under the acronym of NEET in many countries, and as the "disconnected youths" in the United States and as the "neither-nor" youths in Spanish speaking countries.

The economic-financial crisis reflects a strong interdependence between the change in the economic conditions and the development of unemployment among youths. In several studies are approached the issues generated by the current economic cycle on the youths [2] – [5]. Still, the differences between the unemployment level among youths and the unemployment intensity in various countries cannot be regarded as being only the effects of the current economic recession.

These statements are supported by the statistics for a longer period of time regarding the unemployment level among youths and by the relationship between the unemployment rate among youths and the unemployment rate for adults.

Initially, from the analysis of unemployment among youths, special emphasis was laid on the structural components (structural changes in industries, non-matching skills with respect to market requirements, specific characteristics of the youths' categories, etc.) [4]. At the beginning of this century, in approaching the unemployment rates also the effects of the economic and institutional cycles started to be taken into account, as well.

Authors such as Blanchflower and Freeman [4], Jimeneo and Rodriguez-Palenzuela [9] have shown that the effects of the economic cycles are more marked for the unemployment among youths than for the one among adult individuals.

Gangl analysed the impact of labour force market institutions on the labour force specific to each country and of the measures and policies of social protection on youths' unemployment [7].

Lacking length of service, the specific of the human capital within the company, the labour force market experience of the youths [10], the higher probability of working within the company for a determined period of time and other employment forms under precarious conditions are but a few of the factors leading to the increase in the number of unemployed among youths.

Under such circumstances, the transition from school to labour tends to become a chain of temporary training, education, military or civil compulsory service series, or of other activities, also only for some periods of time, which are very often in an institutional framework characterised in its turn, more often than not by set entry dates, outside the market and that does not take into account the requirements of the labour force market. Under these conditions, the youths accumulate less experience in searching for a job and do not develop a clear image about the job and/or incomes that would satisfy them. To these is added also the fact that in some countries the youths have fewer resources than older workers, while in others they have a stronger financial attachment to the family, which makes them less mobile in their searching for a job.

RESULTS AND DISCUSSIONS

In the year 2013, **the employment rate** of youths with ages between 15-24 years of age at EU-28 level was of 33.3%, on decrease by 8.7 pp. against the year 2008 [6].

Also in the year 2013, in the vast majority of member-states **the long-term unemployment rate** among youths continued to increase, the highest values being registered in Greece (30.5%), Spain (21.9%), Italy (21%) and Slovakia (20.6%). In Romania, the long-term unemployment rate among youths was of 9.3%, on decrease by – 0.5 pp against the preceding year.

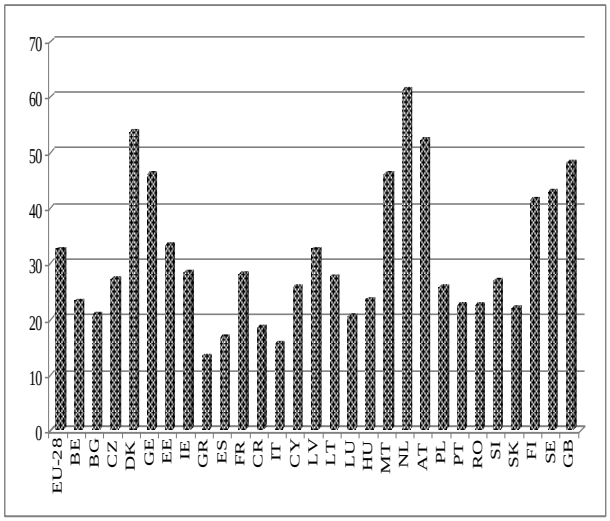

Fig. 1. Employment rate development for youths with ages between 15-24 years of age in the European Union
Source: Eurostat Statistics, www.eu.europa.eu

In most member-states, the employment rate of youths with ages between 15 and 24 years of age was higher for men, save for Ireland, Denmark, the Netherlands, Finland and Sweden (Fig.1).

The **unemployment rate** for the age segment under 25 years of age was of 23.5% in the year 2013, on increase by 7.7 pp against the year 2008 (Fig.2).

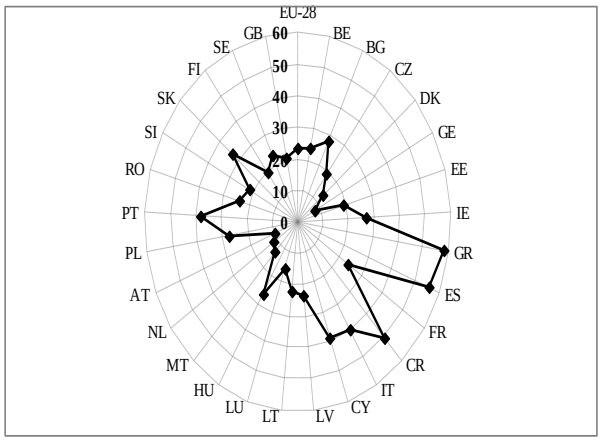

Fig. 2. Unemployment rate for youths with ages between 15 and 24 years of age in EU-28 countries
Source: Eurostat Statistics, www.eu.europa.eu

Also in the year 2013, in the vast majority of member-states **the long-term unemployment rate** among youths continued to increase, the highest values being registered in Greece (30.5%), Spain (21.9%), Italy (21%) and Slovakia (20.6%).

In Romania, the long-term unemployment rate

among youths was of 9.3%, on decrease by –0.5 pp against the preceding year.

The **unemployment rate among youths is also dependent on their training level**. By and large, the highest unemployment is recorded among youths with pre-school, primary and lower secondary education (ISCED levels 0-2). Save for Greece, where the unemployment rate among youths with higher education (ISCED levels 5 and 6) was by approximately 6 pp higher than the one registered for youths with pre-school, primary and lower secondary educations (ISCED 0-2), Romania and Cyprus where the difference between the unemployment rate for youths with higher education and the youths with education corresponding to the ISCED levels 0-2 or 3-4 are significant.

According to the data supplied by the National Institute of Statistics from Romania [1], the **unemployment rate in Romania** for individuals with ages between 15-19 years of age, and 20 to 24 years of age, in the year 2013, reached a share of 31.5%, respectively 22.1%.

The evolution of the main macroeconomic indicators reflecting the situation of youths on labour market in Romania for the transition period does not highlight positive developments for individuals with ages between 15 and 24 years of age. Nevertheless, the few jobs existing in the country were fully put to good use, fact that cannot be said for several member countries of the European Union.

One of the issues facing Romania is the continuing population ageing which adds pressure to the social security system, to the pensions' fund, and to the educational system.

The data supplied by the National Labour Force Employment Agency [11] indicate that the unemployment structure on age groups by the end of the year 2014 was:: 78185 unemployed under 25 years of age, 39024 unemployed with ages between 25 and 29 years of age, 102188 unemployed between 30 and 39 years of age; 129554 unemployed between 40 and 49 de years of age; 60679 unemployed between 50 and 55 years of age; 68708 unemployed over 55 years of age. Unemployed with upper secondary and post-upper secondary education represented 19.27% from total registered unemployed, and unemployed with higher-education 6.05% (Fig.3).

The analysis of the statistics regarding unemployment development indicates that the structure of the number of registered unemployed on age groups maintained the same development as in the period 2008-2013, with periodical increases, the crisis period exerting no influence on this structure.

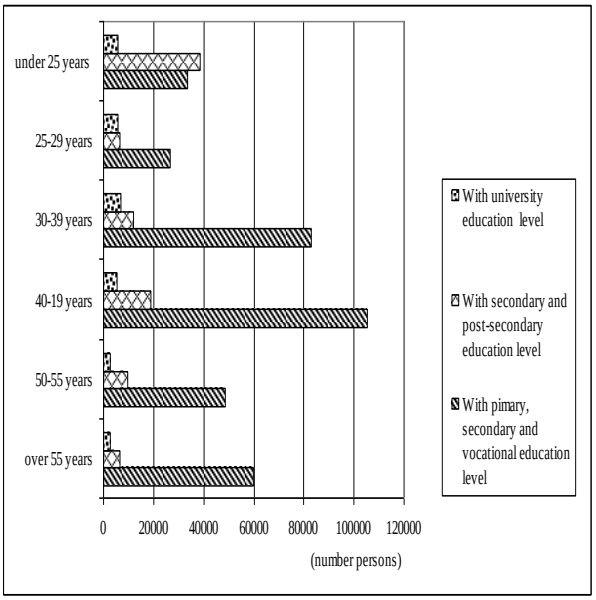

Fig. 3. Distribution of unemployed under 25 years of age, according to educational level, in the year 2014
Source: Unemployment situation on 31 December 2014, ANOFM, www.anofm.ro

With respect to long-term unemployment, by the end of December 2014, in the NLFEA [11], [12] were registered 20226 young individuals under 25 years of age in unemployment for over 6 months (which represents 25.87% from total unemployed less than 25 years of age).

Unemployment and youth unemployment rate are strongly related to the **labour force market participation of the youths**. The transition from school to work, the average age at which youths enter the labour market depend on the skills and the national systems of general interest and/or in the education and vocational training. The extended period of education in a certain country has as consequence the increase in the average age of the new entries on the labour market in time.

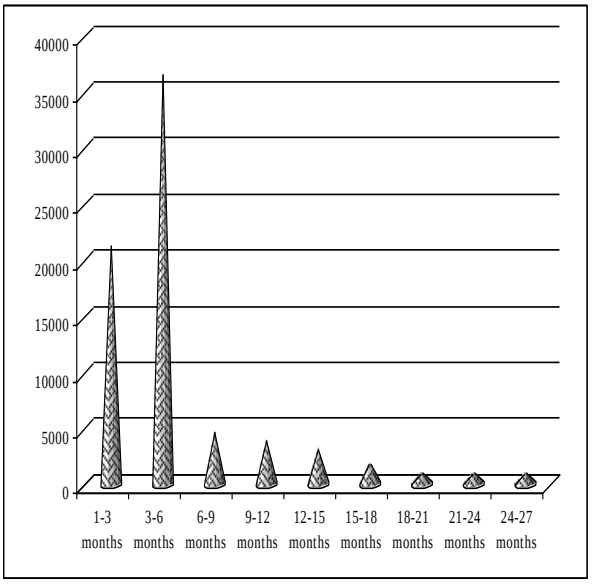

Fig. 4. Young unemployed distributions according to unemployment duration in the year 2014
Source: Unemployment situation on 31 December 2014, ANOFM, www.anofm.ro

From the viewpoint of labour market participation, the amplitude and dynamics of the unemployment among youths was changing between the European countries for the last two decades.

The outcomes of the statistical analyses performed at European Union level indicate the presence of some measures adopted at national level for diminishing the unemployment rate among youths, such as extending education or returning to school, inter-regional mobility, etc.

The unprecedented development of new technologies, the socio-demographic and political circumstances are just a part of the factors leading to increased mobility of capital, goods, services, technologies, knowledge and individuals.

The data supplied by various analyses on youths' migration indicate that to their vast majority the youths migrate searching for decent jobs to financially support themselves and their families. In many cases, this motivation is not still a priority, the youths migrating for increasing their education level, for personal development possibilities and opportunities.

The migration reasons of the youths vary from personal considerations, socio-economic circumstances to the political situation in the country of origin. Most of the times, the main driving force in the migration decision of youths is the perceived level of inequality with respect to the opportunities on the labour force market, the incomes, human rights and standards of living between the countries of origin and the countries of destination. In general, the probability of migration is higher among youths with at least secondary education.

The information and communication technology (ICT) plays an important role in youths' migration. Youths with access to information about the opportunities from other regions of the Earth are more likely to take advantage of them. Also, it can be said that ICT changed the nature of transnational communication and, to a certain extent, the cultural experience of migration allowing young migrants to remain connected to those in the country of origin, and to face easier the adjustment challenges in the destination country.

Also, in the migration process an important role is played by social networks. These have a role in the migration decision, in the communication within the Diaspora communities, allowing for virtual contact with friends and family members in the country of origin and for supplying information and assistance to potential young migrants. Additionally, by means of ICT, the knowledge and skills gained in the destination country can be transferred to the communities from Diaspora or from the country of origin, thus contributing to the development process of the country of origin.

The youths' migration generates both *positive effects* and also negative ones in the country of origin, or in the destination country. Thus, among the positive effects of youths migration can be reminded:

- Migration can offer for youths work opportunities that they would not have had in the country of origin, and their leaving contributes to diminishing internal pressures on the labour force market;
- For young girls, migration for education or for labour allows for postponing early age marriage;
- The remittances flow that young migrants

send to families in the country of origin can contribute to economic growth and diminishing poverty in their countries;
- Diaspora can be a transfer source for technology, investments, and capital for the countries of origin;
- The actual or "virtual" return of young skilled workers leads to increasing the level of the domestic human capital, of knowledge-transfer skills.

Next to the positive effects, youths' migration has also *negative effects*, that is:
- Very often, youths' migration leads to high-skills loss of workers as result of the requirements on the labour market;
- In the country of origin, the absence of parents can increase the vulnerability of children left at home and teenagers frequently have difficulties in their social relationships;
- The leaving of young parents can lead to increases in school abandon;
- Migration can expose youths, in particular young women migrants to higher abuse risks, to discrimination and exploitation. A high number of young migrant women from developing countries are employed in household activities.

For many young immigrants, finding a job is the main priority, but this can prove difficult to achieve. Their knowledge of the language from the country of destination, their skills and their educational level, the work experience before immigration are but a few of the determinant factors for the insertion of young migrants in the labour market from the country of destination. Young migrants that come from countries with poor economies and who have less skills and lower educational levels are, generally, those who remain frequently unemployed or who are forced to take jobs under difficult conditions, in the so-called "3Ds" (demeaning, dangerous, dirty).

Youths with average or superior skills, with higher-education level and who speak the language of the country of destination and, sometimes, even have prior labour market experience before migrating have better chances to find a decent job after emigration.

Depending on the labour force market from the countries of destination, young migrants, even consistently educated and with higher skills level can be sometimes compelled to accept jobs that are not corresponding to their skills' level. The lacking match between educational level and skills of the young migrants and the employment opportunities in the destination countries are due to the requirements on the respective markets, but also due to lacking recognition of the foreign skills by the bodies of the host-country.

During the last years, as result of the economic-financial crisis, a diminishment was registered in the employment rate among youths and a decrease in the employment opportunities among young migrants and, in some areas, the discontent of the non-native residents were even intensified. During the economic recession, the probability for young migrants to lose their jobs is higher than for other workers due to their education level, to the prior work experience before migration, and to the working language competencies, etc., but also due to the fact that very often they are employed in activity sectors that are correlated with the economic cycles or are of the seasonal type. This fact is ascertained by the unemployment rate among migrant workers as compared with the unemployment rate for the domestic population, computed at the level of some countries.

Even if the impact on the various categories is not linear and varies from one country to another, it is a fact that migrant workers were hit harder by the deterioration of the economic situation than the domestic employees. Also, it could be mentioned that a clear differentiations occurs in the way in which the crisis is felt by the workers inside the EU member-states and the ones in the countries outside the EU. While the unemployment rate for migrants from the EU increased in average by approximately 3% during the period 2008-2012, for migrants from outside the EU this rate increased by about 6%, and one of the possible explanations could be the higher propensity of migrants from EU member-states to return in the country of origin when they lose their jobs.

The OECD reports [8] or the ones of other international bodies prove that previous

economic recessions, from the one in the years 1973-74, 1981-82, and up to the Asian crisis in 1997, did not hinder the increasing trend of labour migration, people continuing to migrate and find jobs outside the borders of their countries also in these periods. The Eurostat statistics [6] indicate that all in all, as of the outbreak of the economic crisis in the year 2007, the net migration flows remained positive at the level of the European Union, the main destinations for migrants being in the year 2012, Germany and Great Britain.

In Romania, even though up to date there is no institution with a clear record of the number of Romanians who left the country and work abroad, it is estimated that a number of about 3 million Next to the high number of citizens choosing to work in other countries, an important issue is represented by the young intellectuals opting to emigrate [13]. According to the data supplied by the National Institute of Statistics, from total young emigrants with ages between 25 and 34 years of age leaving Romania in the year 2009, a percentage of 46.7% from among them were higher-education graduates, their numbers being on constant increase for the last years.

A study developed by the Romanian Institute for Evaluation and Strategies at the beginning of the year 2014 reveals that 51.6% from the young individuals with ages between 18 and 35 years of age intend to work abroad. The same answer was given also by 75% from the respondents with higher education from all age categories, which emphasises the fact that many of those intending to emigrate are young and higher educated citizens.

Among the most important negative consequences that this phenomenon can have on Romania are counted:

-unrecoverable investments in education and vocational training of migrants;

-loss of budget contributions, represented by taxes and duties that these youths paid;

-speeding up the population ageing process;

-diminishment in the quality of education and research services, because this type of labour force is necessary for working in research, development and innovation fields;

The positive consequences that the high-skilled young migrants feel with respect to labour, or to involvement in migration and/or to graduating a higher-education level abroad are:

-gaining specialisation in accordance with the requirements of the labour market;

-international increased employment opportunities as result of graduating a recognised university at international level;

-obtaining higher wage incomes;

-the opportunity of developing working knowledge, competences and skills;

-gaining new social and cultural experiences;

-professional development;

-access to high-tech;

-working in an attractive and creative environment;

-obtaining a higher standard of living.

By creating development opportunities for career and/or professional advancement, for facilitating/encouraging youths' participation in collective research and development projects both at national and international level, where they can successfully make use of gained skills, by increasing the standard of living in Romania, and by developing those university specialisations that are in accordance with the requirements/exigencies of the labour force market, but also through other measures, the decision factors from Romania could diminish the number of young migrants.

CONCLUSIONS

The world historical development indicates that migration was an essential element of economic growth and of development in many countries and regions. In a globalising world and under the conditions of the information society, labour force migration shall be increasingly important for the entire world. Countries in the whole world must reformulate the migration regime for ensuring a high level of the employment rate on their labour markets, and for making sure that all participants in the labour market, including young migrants have the right to a decent job.

Migration flows shaped by young migrants are defined and differentiated depending on their socio-economic level, on education and

on the competences and nationality profiles.

The migration motivations among youths are not significantly different from the ones of the adults; still, youths are more flexible with respect to their labour migration: temporary, against the long-term one.

The youths have the tendency to assume higher risks, they can emigrate even if the opportunity of a job is (not) certain and are several times motivated not only by the economic gain, but also by the wish for personal development.

Depending on the demands of the labour force market in the countries of destination, a young migrant that is highly educated or with a high skills level can obtain or not a job corresponding to the level of training.

Youths who graduated abroad a university education form, or who migrated for work return to their country of origin firstly to be "closer to the family" and if their countries of origin would ensure development opportunities for their career and/or of professional advancement, if the job would be corresponding to the training gained abroad, if the evaluation would be made based on objective criteria, and based exclusively on quality and performance, and if the developed activity would allow for using their skills/knowledge gained abroad, and if the advancement/promotion criteria would comply with the principle of competence.

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STUDIES ON THE DEGREE OF RADIOACTIVE CONTAMINATION OF POULTRY EGGS

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Abstract

The natural sources of radiation represent the cause of the minimal contamination of the environment, including air, water, soil and generate the level of radioactivity detected in vegetal or animal food, under normal conditions. Of artificial radio nuclides which pollute the environment and food, the object of this study is 134 Caesium and 137 Caesium (134 Cs and 137 Cs), both because of their particularity to own a chemical structure similar to potassium (K^+), the prevalence in food of animal origin and total and rapid solubility in the body, and because of the usual measurements made in our country in order to detect the levels of radioactive contamination of food, aiming mainly the two mentioned isotopes of Caesium (134 Caesium and 137 Caesium). Given the fact that the eggs and egg products are not included in Romania in a strategic plan for monitoring the level of radioactive pollution, this study in dynamics, aims at recording the level of the two isotopes of Caesium, in the mentioned food products and at verifying if the detected values, are according to the rules laid down by the national and international norms. Thus, the comparative evaluation of the radioactive pollution in a year was aimed, at eggs collected from hens grown in particular, extensive, traditional system, compared to the eggs collected in the same period of time, in trade, from authorised units, from hens exploited in intensive system.

***Key words*:** *Caesium, food safety, radioactive pollution, spectrometry*

INTRODUCTION

The food safety is also known as hygienic quality. The exposure to high doses of radiation causes radioactive pollution by passing the heavy metals in the composition of food, which are dangerous both for the human body and also for the environment.
The sources of radioactive pollution can come from the industrial emissions of radioactive nuclear waste, nuclear weapons testing, and medical and scientific research with radioactive substances such as 137 Cs, that come through precipitation in the landscape and it is strongly absorbed by soil particles, limiting its movement through chemical and biological processes occurring in soil [11]. The most common radioactive form of Caesium is represented by 137 Caesium. Another radioisotope quite common is 134 Caesium, but 137 Caesium, is much more aggressive for the environment than 134 Caesium [9].
The concentrations of 137 Caesium of about 22 Bq kg^{-1}, were detected in species of plants, in different locations, following the accident of Chernobyl in April 1986 [2], [1].
Caesium is taken up by plants through the leaves, which can reach the food of the poultry which produce eggs [14], [12].
Considering the half-life of Caesium of approximately 30 years, It is long enough that the objects and regions contaminated with 137 Caesium, remain dangerous for humans for a generation or more, where relatively small amounts of 137 Caesium release dangerous doses of radiation (specific radioactivity is of 3.2×1012 Bq g^{-1} [8], [6].
That is why, the control of the radioactive content of food in natural radio nuclides represent today a curret [4]. Radiations represent a potential danger for humans even if there are many beneficial uses (in medicine for diagnoses or therapeutic purposes, in

industry for producing some consume products, in producing electrical power using nuclear reactors etc.) [13], [10].

Foods of animal origin likely to be contaminated are eggs and milk [3]. Regular monitoring of food hygiene and strict implementation of the national health standards are the main methods of food control regarding the content of radioactive substances and compliance within the admitted range. In order to obtain safe food for human consumption, that will not affect the consumer's health, it is needed to assess the pollutant load (including 134 Caesium and 137 Caesium) of feed that the poultry consume to produce eggs.

MATERIALS AND METHODS

The study was conducted on eggs, for 1 year and the samples needed for the present research were obtained from hens grown in the traditional, extensive system, from private households located in Bucharest region and from hens exploited in intensive system, eggs were collected in this case from trade.

Groups of 10 samples were formed, of eggs from private households and those from trade, by sampling within ten intervals, within a calendar year. These intervals were established on the basis of the average production of eggs, from hens exploited in extensive, traditional system, in an area with a temperate climate.

Variations in egg production by certain factors, as well the hybrid type used by different breeders, the influence of environment factors specific to geographic regions chosen, and the amount of administered fodder, were eliminated by establishing indicatively an average production of 180 eggs/hen, during a calendar year.

Considering by approximation, based on the same factors of variation of egg production, the period between March and November, as the annual period for obtaining eggs from this category of hens, the respective months were considered in the study, as the first 9 periods for sampling (March - sample 1 April - sample 2, May - sample 3 etc.). Months January, February and December were the 10 - the sampling period, given that, depending on the feed quality and type of hybrid, a certain percentage of hens exploited in traditional system, continues egg lying at a minimum level, including this season. Thus, we identified situations in which, in some households, in December and January, breeders obtained, from a group of 20 hens, three eggs/week.

Under these conditions, the eggs collected in each of the ten periods, represented one sample numbered from 1 to 10, so that the tests were carried out on groups of ten samples, for each of the two established categories, as regards the hens derived from private households and from units with extensive operating system.

Each sample consisted of 30 eggs, totalling 300 eggs for each category (trade and private households) and a total of 600 eggs, for this study. The results presented for each sample represents the average values obtained from processing of the 30 eggs that constitute a sample.

In order to determine the radioactivity, eggs are subject as the rest of the types of eggs, to some preliminary processing, with the following purposes:

- Bringing the sample in a form appropriate to make measurements;
- Increase of specific activity, so that the radio nuclides present can be measured accurately;
- Bringing the sample in the most convenient form for subsequent radio-chemical separation;
- Long-term preservation of sample.

The preliminary processing involved the following steps:

Sample weighing: after removing the shell, each egg is subject to weighting, because in the end, the results are expressed as Bq/fresh product.

Sample Drying: is carried out at a temperature of 125˚C in order to reduce the volume to be examined; it is carried out in an oven with adjustable temperature; the solid samples are crushed in advance.

The destruction of organic matter (calcination), is performed at 150-250˚C for eggs and egg products, given the avoidance of

exceeding 425˚C temperature, for 134 Cs and 137 Cs; following the calcination of 1 kg of eggs, ≈ 10 g ash is obtained, while it is sufficient a quantity of 0.2 kg of powder egg, in order to obtain the same amount of ash.

Weighing after calcination

The products thus prepared were subject to measurements in order to detect the level of 134 Cs and 137 Cs, by the method of gamma spectrometry, which is based on the concomitant registration of the gamma radiation emitted by the mixture of nuclides range of the sample, followed by the identification of each component based on the energy of corresponding drip and the content of nuclide range in the sample is calculated. The measuring box with the sample is placed on the detector according to the geometry of measurement used and the sample spectrum is recorded in the analyzer.

The spectrum obtained is analyzed, determining the order numbers of the appropriate channels of drip maxim. It is identified, with the calibration curve in energy, the energy corresponding to each photo drip, then the isotope corresponding to the respective energy is determined and gamma nuclides activity is calculated, expressed in becquereli ($Bq = 1s^{-1}$).

Finally, the obtained results were compared with the maximum admitted limits, established both in our country and at international level.

RESULTS AND DISCUSSIONS

After analyzing the samples of eggs from hens grown in the traditional system, in households in Bucharest region (Table 1), higher values of maximum admitted limit were not detected, established in our country by Regulation 2073, Annex 1 [5].

The values obtained were variable in insignificant limits for the sampling periods, being impossible to establish a correlation between certain levels of radioactive pollution and seasonal period.

The above mentioned situation was similar to the results obtained for the eggs collected from trade (Table 2), except that the values of the level of radioactivity, identified for this category of eggs were lower than those detected for the first group, which may be associated causally to the exposure of hens grown in the traditional system, to some higher amounts of natural radiation, compared with those exploited in intensive system [15].

Table 1. Level of radioactive pollution of the eggs collected from hens grown in traditional, extensive level.

Sample		134 Cs + 137 Cs ($Bq\ kg^{-1}$)
Number	Month	
1	March	11,3
2	April	14,5
3	May	13,4
4	June	12,7
5	July	13,8
6	August	10,8
7	September	15,3
8	October	8,5
9	November	14
10	December, Ianuary, February	15,8
Maximum values for eggs, ($Bq\ kg^{-1}$) according to law		600
AIEA* ($Bq\ kg^{-1}$)		1000

** International Standards of Basic Radioprotection [7].*

Table 2. Level of radioactive pollution of eggs collected from hens grown in intensive system (eggs bought from commerce)

Sample		134 Cs + 137 Cs ($Bq\ kg^{-1}$)
Number	Month	
1	March	8,4
2	April	11,2
3	May	9,3
4	June	13,2
5	July	10,4
6	August	15,1
7	September	12,4
8	October	7,6
9	November	9,5
10	December, Ianuary, February	10,1
Maximum values for eggs, ($Bq\ kg^{-1}$) according to law		600
AIEA* ($Bq\ kg^{-1}$)		1000

** International Standards of Basic Radioprotection [7].*

Regarding the values of contamination with Cs -134 and Cs -137 from the analyzed egg

powder, the situation is similar for the two groups of analyzed eggs (Table 3), noting that the values are closer to those detected for the eggs collected from commerce.

Table 3. Level of radioactive pollution of egg powder

Sample		134 Cs + 137 Cs (Bq kg^{-1})
Number	Month	
1	March - April	10,2
2	May - June	11,4
3	July - August	8,9
4	September - October	12,7
5	November - December	11,8
6	Ianuary - February	11,1
7	March- April	12,5
8	May - June	12,4
9	July - August	10,3
10	September - October	12
Eggs (Bq kg^{-1})		600
AIEA* (Bq kg^{-1})		1000

** International Standards of Basic Radioprotection [7].*

CONCLUSIONS

After analyzing the samples of eggs from hens grown in the traditional system, in households in Bucharest region, higher values of maximum admitted limit were not detected.

By analyzing the samples of eggs from hens grown in traditional system, higher values than the maximum admitted limit were not detected, the values obtained are varying in insignificant limits for the sampling periods, without a correlation between certain levels of radioactive pollution and seasonal period.

For the eggs collected from trade (from hens exploited in intensive system), the level of radioactivity values were lower than those detected for the first group, which may be causally associated with higher exposure to natural radiation.

At any of the categories of samples analyzed, values of 134 Cs and 137 Cs located above the admitted maximum limits, were not recorded.

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STRUCTURAL CHANGES AND LABOUR INPUT IN POLISH AGRICULTURE AFTER THE ACCESSION TO THE EUROPEAN UNION

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Abstract

This article aims to show structural changes in Polish agriculture in the years 2002-2013, and to define labour input on farms. Despite the positive changes in the Polish area structure, it continues to be one of the worst area structures in the European Union. Another problem is the amount of labour input per 100 ha of arable land. On average, this amount is two times higher than in European Union countries. The high level of labour input is the result of overemployment, especially on small farms. This directly translates into reduction of productivity in Polish agriculture. At the same time, you should also bear in mind that the high unemployment rates in Poland lead to limited job opportunities outside agriculture.

Key words**:** *area structure, structural policy, Poland*

INTRODUCTION

Polish accession to the European Union in 2004 was associated with numerous changes and the need for adjustment of economic operators throughout the economy, including agriculture. Polish economy faced a significant challenge of joining the single European market, the necessary legal adjustments or opportunities to benefit from EU aid funds. On the one hand, there were great new opportunities for improving the competitiveness of the Polish economy. On the other hand, questions were raised whether or not Polish economic operators were able to adjust to the new principles of operation and manage in the new economic reality, and whether or not in a few years, we would be able to conclude that Polish integration with the European Union had brought positive effects. In agriculture, governed by the Common Agricultural Policy, in a situation where Polish farms had to adopt to EU regulations, including those related to environmental protection, the question of changes after the integration has become even more significant. At the same time, agriculture was facing huge opportunities for assistance and support, not only through the system of direct payments but also within the framework of the Rural Development Programme, where such measures as Modernisation of Agricultural Holdings enjoyed the greatest popularity among the beneficiaries.

MATERIALS AND METHODS

This article aims to present structural changes in Polish agriculture and attempts to evaluate the impact of Polish integration with the European Union in terms of changes in the area structure of agricultural holdings. According to Ciepielewska, the concept of agricultural structures is defined broadly, and includes both structural features of agriculture itself (including agrarian structure, production factors and management system) and its immediate economic environment (including trade and agri-food industry) as well as spatial environment (in regional terms) [6]. In turn, the New Encyclopaedia of PWN defines the concept of structure of agricultural holdings as a classification of farms in spatial terms, according to a specific criterion, usually the area of the land and arable land. Most often, the area characteristics of agricultural holdings are complemented by the criterion of

diversity of their economic size [10]. Agrarian structure is one of the factors that determine the development of agriculture. It influences the optimum utilisation of production aspects, economic situation of agricultural population and competitiveness of farms [4]. According to Babiak [1], diversification of farms in terms of agrarian structure results from natural conditions and the level of advancement of structural transformations. Of course, structural transformations may be supported and changes in the agrarian structure may become objectives of agricultural policy, as exemplified by the EU's structural policy [9].

In this article, the author focused on changes in the agrarian structure in Poland in the years 2003-2013, emphasising their importance for the functioning of agriculture as a whole. After the Polish accession to the European Union, in 2014, there were two possible scenarios of transformations in the area structure of Polish farms. On the one hand, the relatively easy acquisition of direct payments by Polish farmers, after the accession to the EU, could have resulted in the maintenance of the existing agrarian structure and lack of willingness to change on the part of farm owners. Especially, in the case of small and unprofitable farms, such payments often serve as social support and are used for current purchases, not always related to the functioning of the farm, or even treated as money for consumption purposes [5]. Such payments may even preserve the existing agrarian structure of farms, given the fact that Poland is dominated by small agricultural holdings. There were also cases of informal leases, under which the owner of the land received payments per arable land and a rent under the informal lease, agreed upon with another farmer, while the lessee generated profits from production on the leased land [10]. According to Poczta [13], the limits of support granted to a particular entity for modernisation of farms may result in their formal division, and thus negatively influence the agrarian structure. On the other hand, we are aware of the fact that concentration of land and increase in the size of farms is a perfectly natural process for entities involved in agriculture. For farmers focused on agricultural production, generating profits mainly from agricultural produce, it has become clear that they should strive to increase the size of their holding. In some parts of Poland there are problems associated with purchase of land, which has an obvious influence on the price of land in the region. In the case of large agricultural holdings, direct payments are used for different purposes than in the case of small farms, and these include investment purposes, which in turn contributes to the development of the farm as a whole.

Bearing in mind the foregoing evidence of possible structural changes after Polish integration with the EU, the author has decided to look more closely at this issue. The author formulated the following research questions:

(i)Did the area structure of farms change in the period after Polish integration with the European Union?

(ii)How did agricultural labour input change after Polish integration with the European Union?

The article uses the data provided by Eurostat and the Central Statistical Office for the years 2002-2013. The data for 2002 and 2010 are census data, obtained as a result of the Common Agricultural Census. However, you shall also bear in mind that due to the application of changes in the methodology of agricultural studies in 2010, aimed at its adjustment to the methodology applied in EU countries, there has been a change in the definition of agricultural holding. In accordance with the currently applicable definition, agricultural farms do not include holders of arable land who are not involved in agricultural production or holders of arable land of less than 1 ha who are involved in agricultural activity on a small scale. Any farm with arable land of less than 1 ha may still qualify as an agricultural holding only if it is involved in special agricultural production or production of the so-called significant scale, e.g. fruit trees, fruit bushes, vegetables or ground strawberries [7, 14]. Due to the large share of part-time or seasonal work, labour input in agriculture was

presented as annual work units. Annual work unit is an equivalent of full-time employment on a farm, which – according to the methodology of Eurostat – amounts to 1,800 hours. However, the national legislation in many EU Member States may provide otherwise, e.g. in Poland, the equivalent of full-time employment, i.e. annual work unit, is 2,120 hours.

RESULTS AND DISCUSSIONS

In analysing the structural changes in agriculture, we should also compare the area structure of Polish farms against the background of other EU countries. In 2010, in EU there were 12 014.7 thousand agricultural holdings involved in agricultural activity. In Poland, agricultural activity was conducted by more than 1500 thousand agricultural holdings. When comparing the years 2002-2010, we can observe a prominent decrease in the number of farms, from 2 172.2 thousand to 1506,6 thousand, i.e. by 30.6%. The reduction of the number of agricultural holdings is a continuous process – in 2013, the number dropped further to 1 429 thousand. If you compare 2013 and 2002, the number of agricultural holdings decreased by 34%.

Table 1. Number of agricultural holdings by area groups of arable land in the years 2002-2013

Itemisation [x]	Year			Percentage of agricultural holdings in 2013
	2002	2010	2013	
Total (in thousands)	2,172.2	1,509.2	1,429.0	100
0-5	1,444.8	831.4	767.2	53.7
5-10	372.5	335.0	315.2	22.1
10-20	246.7	218.5	211.5	14.8
20-50	90.3	95.3	103.3	7.2
> 50	17.9	26.5	31.8	2.2

[x] left-closed and right-open intervals were used in area groups

Source: Eurostat, Statistical Yearbook of Agriculture, GUS, Warsaw 2014, page 113

Changes related to individual area groups of agricultural holdings are of key importance. The largest decrease in the number of such holdings pertained to the group of farms with arable land between 0 and 5 ha, and amounted to 47%. Such a decrease is observed in all groups of agricultural holdings with arable land of up to 20 ha. On the other hand, in the years 2002-2013, there was an increase in the number of the largest holdings with arable land in excess of 20 ha, i.e. between 20-50 ha – by 13 thousand, and above 50 ha - by 13.9 thousand. The decrease in the number of the smallest farms and increase in the number of the largest farms contributed to the increase in the average area of agricultural holdings in Poland, namely from 6.5 ha of arable land in 2002 to 9.6 ha in 2010 and 10.22 ha in 2013.

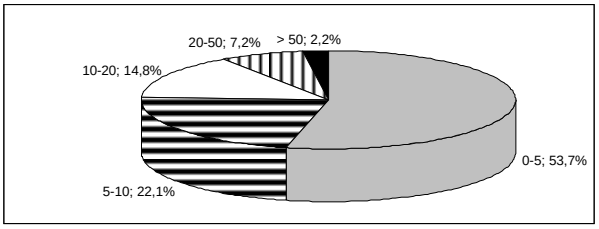

Fig. 1. Structure of agricultural holdings in Poland in 2013

Source: Author's own calculations on the basis of GUS [Central Statistical Office] data

Despite the positive changes, Poland continues to have one of the worst area structures of agricultural holdings in the European Union [16]. Farm area, due to the dual role of land in the agricultural production process (production and production area factors), limits the use of other production factors, and thus determines the size of production potential and the scale of production of the farm [15].

The so-called concentration index, developed by Corrido Gini, was used to determine the degree of concentration of arable land [2]. The value of this index may vary from 0 to 1. In the case of even distribution, the index equals 0, while in the case of total concentration of the value in one unit, the index equals 1. Weak concentration occurs if the index equals 0-30%, visible concentration for indexes between 30%-60%, and strong concentration for indexes in excess of 60%. The following formula has been applied in calculations:

$$Gx = 1 - \sum_{j=1}^{k} [(cj - cj\text{-}1)(uj + uj\text{-}1)]$$

where

cj is the cumulative part of the variable, calculated by dividing the cumulative amount by the total number of cases - n,

uj - is the cumulative share of the total value of the variable.

Table 2. Gini Index for the number of agricultural holdings by area groups of arable land

Itemisation [x]	Year		
	2002	2010	2013
Gini Index	0.60	0.49	0.47

Source: Author's own calculations

Based on the Gini index, we can conclude that in the case of farm concentration we are dealing with the so-called visible concentration. In 2002, this index amounted to 0.60, and in 2013 – 0.47 – with regard to concentration of small farms, i.e. with an area of up to 5 ha.

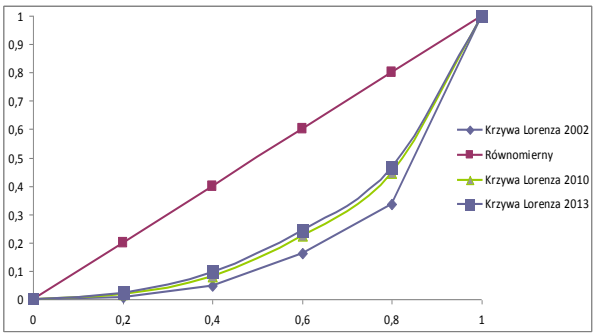

Fig. 2. Lorenz Curve for the concentration of the number of agricultural holdings by area groups of arable land in the years 2002, 2010 and 2013
Source: Author's own calculations on the basis of Eurostat and Statistical Yearbook data
[Legend: from top to bottom: Lorenz Curve 2002; Even (distribution); Lorenz Curve 2010; Lorenz Curve 2013]

Lorenz Curve has been used for the purpose of graphic presentation of the uneven distribution of the quality, i.e. the number of farms in each area group. The curve will be closer to the diagonal with the more even distribution of the value of the quality between the intervals, and vice versa, i.e. the curve will move further from the diagonal with the increase of concentration of the value of the quality in a small number of intervals.
Figure 2 shows a relatively large concentration of the number of farms.
Another characteristic feature of Polish agriculture is unfavourable structure of land use. Namely, in 2013, farms with an area of up to 5 ha of arable land used 13.1% of all arable land in Poland, and they represented almost 53% in the total number of farms. Reduction of the area of arable land in the years 2002 – 2010, was visible in farms with an area of up to 20 ha.

Table 3. Arable land in individual area groups of farms in the years 2002-2010

Itemisation	Year			share (%) of arable land in area groups of farms in 2013
	2002	2010	2013	
Total (in thousands)	14 426.3	14 447.3	14 609.2	100
0-5	2 309	2 004	1 910.6	13.1
5-10	2 657	2 387	2 228.3	15.3
10-20	3 389	3 011	2 916.8	20.0
20-50	2 562	2 779	3 052.9	20.9
> 50	3 510	4 266	4 500.6	30.8

Source: http://ec.europa.eu/agriculture/statistics/agricultural/2012/index_en.htm, Statistical Yearbook of Agriculture, GUS, Warsaw 2014, page 113

On the other hand, farms with an area exceeding 20 ha showed a visible increase in the land use, and in 2013 such farms used more than 50% of all arable land. To sum it up, we can conclude that both types of changes, i.e. changes in the area structure of farms and land use, are positive. After the Polish accession to the European Union, there was a significant decrease in the number of agricultural holdings in Poland, and increase in farms with an area of 20 ha. In addition, the structure of land use improved as well. Similar conclusions can be drawn with regard to specialised farms, e.g. in terms of orchard production. Nevertheless, if you compare Poland to other EU countries, its position is visibly worse [14]. Undoubtedly, the low concentration of arable land translates into less economic strength.

Labour Input

In accordance with the methodology of Eurostat, labour input relates to annual work units, i.e. the equivalent of full-time employment in an agricultural holding - 1800 hours. Based on the analysis of labour input, the table below presents the amount of total labour input and labour input per 100 ha of arable land.
In the analysed period, there was a decrease in labour input in agricultural holdings. The number of AWUs in Polish agriculture in 2002 amounted to more than 2 190 thousand units, while in 2010 it dropped to app. 1890 thousand units. The number of AWUs in 2010 corresponded to 19.5% of labour input in 27

EU Member States. Of all the European Union countries, only in Romanian agriculture labour input was comparable to Poland [14].

Table 4. Labour input (AWU) in Polish agriculture

Year	Itemisation	
	AWU (in thousands)	AWU/100 ha of arable land
2002	2 190.9	15.2
2010	1 897.2	13.1
2013	x	x

x no data available
Source:
http://ec.europa.eu/agriculture/statistics/agricultural/2012/index_en.htm, (15.03.2015)

The amount of labour input in agricultural holdings varies between individual area groups of farms. The highest amount, i.e. approximately 43% of total labour input is incurred on farms with an area of up to 5 ha. On farms with an area in excess of 20 ha, the engagement of labour input amounts to 11% of AWUs, and on farms with an area in excess of 50 ha – 6.2% [14]. The number of AWUs per 100 ha of arable land is also a significant indicator. In 2010, in Polish agricultural holdings, the average value of this indicator was 13.1, while in 27 EU Member States, in 2010, it amounted to 5.7. In the smallest agricultural holdings in Poland, this indicator amounted to app. 42 AWUs per 100 ha, while in those with an area in excess of 20 ha – it was only 2.8.
The large labour input in the small agricultural holdings in Poland is mostly associated with overemployment in such entities, which has a negative effect on the level of labour productivity in Polish agriculture. This aspect has also been emphasised in the studies of large-scale farms, which concluded that the slow pace of structural changes contributed to the low level of labour productivity and low dynamics of changes [7].

CONCLUSIONS

To sum it up, it should be noted that over the last ten years there have been some positive changes in the area structure of farms. The biggest decrease in the number of farms pertained to the area group of farms with arable land of up to 5 ha, while there was an increase in the number of the largest farms, i.e. with arable land exceeding 20 ha. However, despite the positive changes, Polish agriculture continues to have one of the worst agricultural area structures in EU countries. The Gini Index points out to concentration which is visible with regard to the number of farms in individual area groups. However, such concentration only relates to small farms, i.e. those with an area of up to 5 ha. The existing agrarian structure exerts significant impact on the economic situation of agricultural holdings. The area of the farm is not the only factor affecting the production potential of agriculture or its economic strength, but still, it is of essence. Especially, if we compare the area structure of Polish farms with that of other EU countries with similar production structure. Another important indicator which may be used to compare the situation in agriculture is labour input per 100 ha of arable land. In 2013, in Poland, labour input amounted to 13 AWUs, while in 27 EU countries, on average, it amounted to app. 6 AWUs. The large labour input in the small agricultural holdings in Poland is mostly associated with overemployment in such entities, which has a negative effect on the level of labour productivity.

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THE LEVEL OF INFORMATION OF THE ROMANIAN CONSUMER REGARDING THE ORGANIC PRODUCTS

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Abstract

Organic agriculture is an area in full process of development and the market for organic products is increasing rapidly in recent years, both worldwide and in Romania. However, there is limited research that are scientifically fundamented with regard to the Romanian market. Starting from this premise, we conducted a study that aims getting an overview about the level of knowledge that the Romanian consumers have about organic products. The study has three main objectives. They refer to the way how the Romanian consumers evaluate their knowledge about organic products and the objective level of information that consumers in Romania have on organic products. In addition, we proposed to find out what is an organic product for the Romanian consumer or, more precisely, how does the Romanian consumer define the organic products. The results of the research are nationally representative for the urban population.

Key words**:** *consumption, organic products, Romania*

INTRODUCTION

The organic market is growing rapidly worldwide. In more developed countries in this regard, such as Denmark, the United States and Austria, at least for some categories of products, it has already surpassed the niche stage [8] [9].The same can be said about the Romanian market [1] [3], especially in the last decade, during which time both the number of registered producers in organic farming and the consumption of organic products increased steadily [10]. However, in present, there is a limited number of studies regarding the Romanian consumer of organic products. Several authors have tried lately to "know" better the Romanian consumer of organic products. At the moment, there is some information concerning the buying behavior and consumption of organic products [3], socio demographic profile of the Romanian buyer of organic products [4] [6], perception upon prices or the level of confidence that the Romanian consumers have in organic products [2].

A less considered feature in recent researches is related to the Romanian consumer awareness about organic products. It is known that, at least in Romania, organic agriculture can still be considered a new field. The first certified organic farms are recorded in the late 90s, the number of operators in organic farming at the beginning of the last decade being extremely low [5]. However, the organic sector has grown rapidly, the market seemed being interested in organic products, particularly in response to the "invasion" of unhealthy food and cosmetics. Also, organic products have been widely publicized in the last decade.

In this context, we consider useful and interesting to know which is the level of the Romanian consumer awareness about organic products. The main objectives of this study are to identify the percentage of the population that consider to know what organic products are, identifying the key characteristics of organic products in the Romanian consumer vision and objective testing of their knowledge on organic products.

MATERIALS AND METHODS

The purpose of the study is to assess the awareness of Romanian consumers about organic products. For this, there were used

primary data obtained through a broader quantitative research, conducted in January-June 2014 among Romanian consumers. The research is a type survey and covers a sample of 1,000 people, nationally representative for the urban population.

The sampling is a structured one, ensuring representation by age, sex and type of place of residence.

In order of a more accurate description of the organic products market, there were identified three age categories (corresponding to young people, the middle-aged and elderly) and 3 categories of towns of residence (large cities with over 200,000 inhabitants, towns, Bucharest under 200,000 inhabitants and Bucharest).

The method of data collection is represented by telephone questionnaire.

In terms of data analysis, for closed questions was used the statistical analysis software SPSS. For the open questions was used content analysis method.

RESULTS AND DISCUSSIONS

To get a clear picture over the awareness of Romanian consumers of organic products, we considered two perspectives, corresponding to two distinct approaches:

i. Knowledge and information self assessment, of the respondents

ii. Objective assessment of consumer awareness, using two open questions which during the research we considered as "control" ones.

In addition, it can be considered a third approach, namely how the Romanian consumer defines organic products. Specifically, what an organic product means for the Romanian consumers, which are its main attributes.

The level of information regarding the organic products from the respondents perspective

The vast majority of the urban population of Romania considers that it knows what organic products are [1]. Thus, over 83% of respondents say that they know what organic

In terms of awareness, most of the respondents consider themselves being medium-informed about organic products.

products are, while only 13% of them say they do not know and about 3% are unsure (Figure 1)

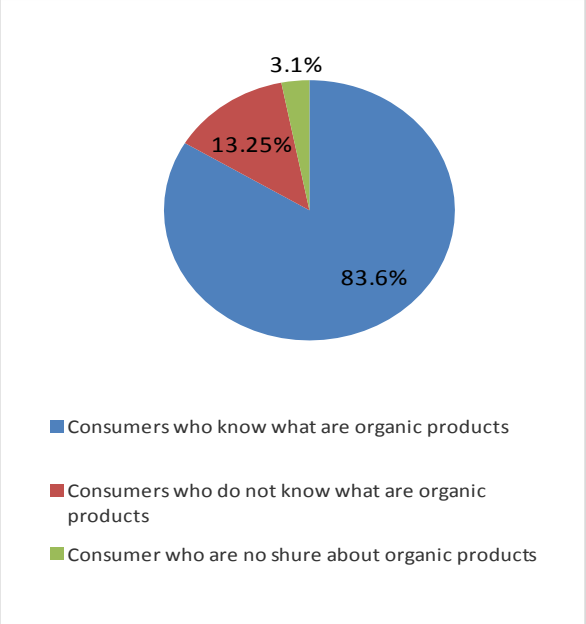

Fig. 1. Responses distribution to the question "Do you know what are organic products?"

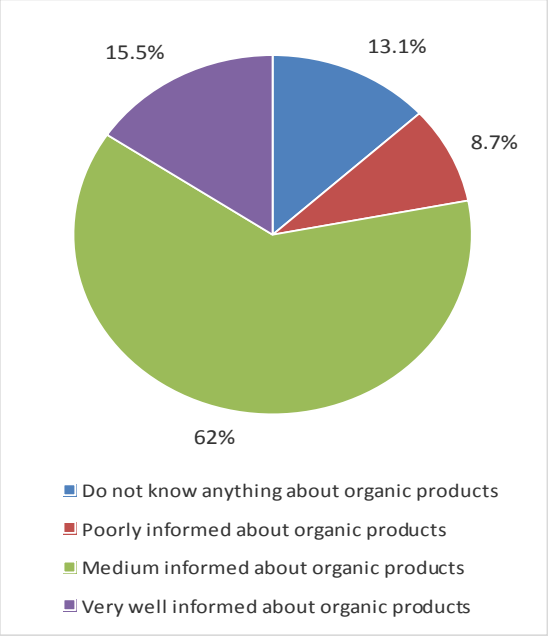

Fig. 2. How much informed do the Romanian consumers consider themselves to be regarding the organic products.

Having recorded the answers on a scale from 1 to 10, where 1 means very poor and 10 very well informed, the medium has a value of

6.75 and the median and modal group have value 7, corresponding to medium information.

15.5% of the total urban population given scores of 9 and 10, corresponding to a very good level of information on organic products, while 13.1% do not know at all what they are. Scores between 5 and 8 may be considered as a medium level of information, these adding up over 62% of all respondents. Scores between 1 and 4, equivalent to a low level of information, scores 8.7 percent (Fig. 2)

The real level of knowledge of Romanian consumers about organic products

To assess in a way as much objective as possible the real degree of Romanian consumer information on organic products, we took into consideration two open questions. One concerns how respondents differentiate organic products of similar conventional products in the moment of buying. The other one offers a richer level of information and refers to how consumers define organic products. More precisely, what exactly does an organic product means for the Romanian consumer.

When asked "How do you differentiate the organic products from the regular one in the moment of buying?".

Table 1. Distribution of answers to the question "How do you differentiate the organic products from the regular one in the moment of buying?"

Answer	Frequency (%)
By the label	49.9
By the aspect and other organoleptic features	32.1
By the certification/logo/organic label	9.1
By the seller/producer. Confidence in the seller/producer.	8.5
I read the information regarding the product	8.4
They can be found in special organized sections, dedicated to organic products/specialized shops	3.1
By the price. Are more expensive.	2.9
By the wrapping	2.7
Don't know. Cannot distinguish them	5.6
In another way	11.4

Following the content analysis, we obtained the following categories of responses as mentioned in Table 1.

About half of the respondents mentioned the label as a way to identify the organic products when buying. This answer does not provide objective information and represents one of the limits of this research. In the absence of relevant researches on the subject, when designing the study has not been taken into account such a possibility. The respondents do not in any way explain how do they differentiate the organic products, those who mention that they read the product information being conceptualized in a different category.

It may be noted that organic certification or other similar answers are mentioned by only 9.1% of respondents, most of the Romanian consumers seemed to have significant difficulties in distinguishing organic products by the conventional ones.

For the open question "How do you define organic products? What does an organic product represent for you?", following the analysis of content, we could conceptualize a number of features that, for Romanian consumers, are specific to organic products (Table 2).

According to the results presented in Table 2, we can say that for the Romanian consumer the organic product is a natural one, without added synthetic chemicals and that do not harm human health and the environment.

The organic products' most common features, as mentioned by respondents, are lack of chemical synthesis and naturalness of the product, with an almost equal share (42-44% of the respondents mentioned these features in their definition). About 20% of Romanian consumers believe that one of the most important features is that organic products are healthier or can improve the quality of life. Just 7% of the respondents mentions that organic products are environmentally friendly. An interesting aspect to mention, resulted from a quantitative analysis, is that many consumers identify organic product with a natural product.

Table 2. The main characteristics of the organic products, in the vision of the Romanian consumer

CHARACTERISTIC	PROCENTAGE (of respondents)
Natural	**35,5%**
As natural as possible; closest to his natural state	**6,2%**
Clean; pure	0,9
Healthy; not bad for the organism	**17,4%**
Helps the health status; improves the quality and/or the life line	2,6%
Good, of good quality	5,1%
Tasty, flavored	1,2%
Nice product, good aspect	0,9%
Hygienic product, fresh	1,1%
Developed with very little involvement of the human hand	0,9%
Developed with minimum technological intervention; handmade	0,6%
Tradition product, "how it was done on the old times"	1,1%
Environmentally friendly; not damaging to the environment	**4,1%**
No pollutant	**2,3%**
Biodegradable, recyclable	0,9%
No chemicals; no chemical substances (synthetic) added	**34,3%**
No E-s	**10,4%**
No additives	4,8%
No preservatives	2,1%
No food additives	8,5%
No toxic substances	2,4%
No herbicides, pesticides, insecticides, etc.; No substances splashed	3,8%
No chemical fertilizers	7,3%
No growth stimulants	1,7%
Not polluted; safe from pollution	2,3%
Not modified genetically	1,7%
No hormones	0,6%
Animals and plants raised on clean fields/converted to organic agriculture	2%
Plants and animals ground raised/in open spaces	1,1%
Animals feed with natural food/organic	0,5%
Produced in ecological conditions/ realized from organic materials	2,7%
Products specifically labeled	0,8%
Product that fulfills the ecological certification	0,6%
Doesn't know/Cannot answer	2,6%

Specifically, 17.7% of respondents say that the organic product is a natural product, without giving further explanations. In a subsequent development of national research intended to clarify the issue, the focus group method, the result that more than half of the participants can not make any difference between natural and organic products. This discussion is not, however, currently under study.

Taking as its starting point the answers given by the respondents and the features organic products, as they are defined in legislation [11] and scientific literature [4], we proposed to group the respondents into several categories, depending on respondents' actual extent of knowledge about organic products. In this regard, we developed an evaluation tool which takes into account four categories of respondents:

• those who are not able to say anything about organic products,
• respondents about we are unable determine to what extent they know what are organic products,
• respondents who know, generally, what are organic products,
• respondents who are well informed about organic products

In order to achieve this objective, we have grouped the main features of organic products into two general categories, as can be seen in Table 3.

By "defining characteristics" we consider those properties of organic products, sufficiently specific and broad applicability, whereby organic products can be easily differentiated from conventional ones. After analyzing the content of the answers provided, we have identified five such features. Also, after content analysis, we included in the assessment instrument a number of other 15 characteristics of organic products, specific to them, but with a more limited scope. For example, "products treated with herbicides, pesticides, insecticides, etc." specific feature just for vegetal organic products, which is not relevant for other organic products, such as animal or processed products.

Regarding the 4 levels of information that we have conceptualized, the evaluation criteria of the answers can be found in Table 4.

Table 3. Knowledge Assessment Tool, depending on the main features of organic products

Defining characteristics of the organic products	**Product that fulfills the organic certification**
	Produced in ecological conditions/ realized from organic materials
	Products specifically labeled
	Without added synthetic chemicals
	Animals and plants raised on clean fields/converted to organic agriculture
Other features of the organic products	Natural product
	Clean; pure product
	Healthy product; does not harm the organism
	Environmentally friendly product; not damaging to the environment
	No pollutant; biodegradable, recyclable product
	Product developed with very little involvement of the human hand
	No E-s, No additives, No preservatives
	No toxic substances
	No herbicides, pesticides, insecticides, etc.
	No chemical fertilizers
	No growth stimulents
	Not modified genetically
	Plants and animals ground raised/in open spaces
	Animals feed with natural food/organic
	Not poulluted product; safe from pullution

Table 4. Appropriate evaluation criteria of respondents awareness about organic products

Information level	**Includes respondents who:**
1.Respondents who are not able to say anything about organic products	Can not answer at all
	Provides answers that have no connection with organic products
2.Respondents about we are unable determine to what extent they know what are organic products	Provides unclear or confusing answers
	It merely defines natural products as organic products
	It provides answers that include real features of organic products and also features that have nothing to do with this kind of products
	Merely indicate one single feature of organic products, insufficient to define such products
3.Respondents who know, generally, what are organic products	Provides at least two real characteristics of organic products
	Present at least one of the defining characteristics of organic products, as they were established in this study
4.Respondents who are well informed about organic products	Mention three characteristics of organic products, of which at least one defining
	Mention sufficiently clear the legal standards in certification and ecolabelling

The results of the evaluation model application can be found in Fig. 3. It should be noted that only the respondents who, at the beginning of the questionnaire, said they know what they are organic products, were asked those filter questions. Consequently, the 13 percent of respondents who said they do not know what are the organic products do not appear in the results below.

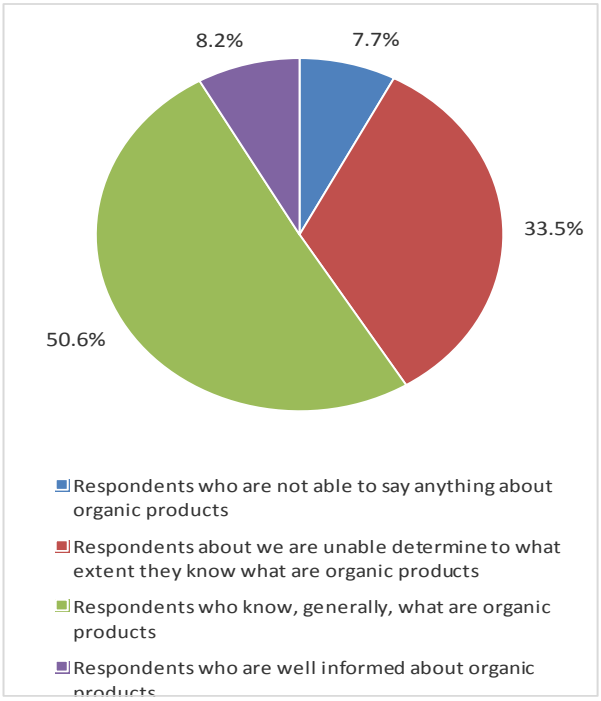

Fig. 3. The real level of information regarding organic products, among Romanian consumers

CONCLUSIONS

Through this study, we have decided to get an overview about the level of information of the Romanian consumer awareness about organic products. The sample used is representative nationwide, for urban environment, which allows the extension of the results in a relevant way, upon the entire urban population of Romania. The consumers from rural areas were not considered in this study due to low purchasing power and the phenomenon of consumption from their own production. Because of this, it is very unlikely for the rural population to buy organic products.

The overwhelming majority of consumers in Romania say that they know what organic

products are. Only 13% of them say they have not heard or know nothing about such products.

There is a significant difference between the way how respondents self-assess their knowledge about organic products and the objective aim of information.

The vast majority of respondents are self-assessing as being average informed about organic products (giving scores between 5 and 8 to their knowledge on a scale with 10 steps). After evaluating the responses of the open questions, it results that approximately 50% of the respondents can define in a satisfactory way the organic products, while 8.4% of them seem well or very well informed. There is a very high percentage, about one third of respondents, which can not be said objectively, following the responses offered, to what extent they are informed about organic products. We believe that this state actually has two main causes. One of them is the confusion that many consumers make between the natural products and organic ones, and the other is a limitation of the research caused by the instrument used for data collection (questionnaire by phone, where the recording of the responses to the open questions is difficult and their clarity is sometimes desirable).

Although, from a percentage point of view the results are quite close, it is very interesting that the respondents who consider themselves very well informed, cannot explain convincingly what an organic product is, while some consumers that declare themselves averagely or poorly informed manage to give a convincing definition for organic products.

Another important conclusion of the study relates to the Romanian consumer perception upon organic products. For this one, the organic product is a natural product without added synthetic chemicals that do not harm human health and the environment. The attributes mentioned most frequently by the Romanian consumers are the lack of synthetic chemicals and the fact that the products are natural (with shares of around 45% of responses each). The environmental issues are mentioned by a much smaller number of respondents, approximately 7% of them. Organic products are perceived as being healthy, which is in fact the main reason of buying among the Romanian consumers.

The main limitations of the research are the lack of previous studies on the subject, well-grounded scientifically and data collection tool. Regarding the instrument for data collection (questionnaire by phone), it is possible that because of the faulty registration of some responses and inherent barriers of communication (hereinafter referred in specialized literature, in the sphere of communication, noise), the share of those who are objectively well informed about organic products, to be higher than in the graphs presented above.

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ASSESSMENT OF THE ECONOMIC EFFICIENCY OF THE AGRICULTURAL EXPLOITATIONS THAT HAVE RECEIVED FUNDS THROUGH NPRD, II PILLAR OF CAP, MEASURE 121, 2007-2013, AT THE LEVEL OF THE SOUTH-MUNTENIA REGION

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Abstract

The implications of accessing the European funds related to NPRD 2007-2013, on the agricultural exploitations performances was emphasized by the assessment conducted at the level of nine case studies (agricultural exploitations from the South-Muntenia Region) of the economic and financial efficiency and of the technical efficiency, in the post-project period, comparative with the year of submission of the funding requests. The conducted analysis emphasized the pressure put on accessing the investment funds on the general activity of the agricultural exploitations, and especially on the financial performances, most of the agricultural exploitations taken as case studies experimenting a decrease of the financial profitability. Also, it was emphasized a decrease of the technical efficiency (of the capacity to transform the inputs in outputs), of the exploitation activities and of the general activity, especially in large exploitations. The key method of analysis, used for these studies, was the method of data envelopment analysis (Data Envelopment Analysis - DEA) which was often used in assessing the efficiency of agricultural exploitations.

Key words: *agricultural holdings, DEA method, economic efficiency, scale efficiency,NPDR Pillar II, Romanian agriculture*

INTRODUCTION

The need to have an analysis of the economic efficiency of the agricultural exploitations that have received funds through Pillar II, for the period 2007-2013, became obvious along with the need of reporting by the communitarian authorities of the situation concerning the absorption of the funds taken from foreign sources. It is a series of specific methods for measuring the efficiency, as shall be mentioned bellow, but for saving reasons in the research, we chose the nonparametric model of the data envelopment analysis – DEA, which was often used in assessing the efficiency of the agricultural exploitations. The results obtained this way were and are used in adjusting the financing sources, through Pillar II, offering for authorities those key information required for a good adjustment of the financial system.

MATERIALS AND METHODS

The need to measure the economies' performance or the firms' efficiency and, especially, the measurement of the production factors' productivity, determined the development in the last decades of some specific methods for measuring the efficiency. In time, in addition to the econometric methods and models of analysis, there were also development nonparametric models, like the data envelopment analysis – DEA, which was often used in assessing the agricultural exploitations (Gorton&Davidova, 2004) [6]; Lambarraa et al., 2007 [8]; Krisciukaitiene et al., 2014 [7]; Baležentis et. al.,2014 [3]; Špička&Smutka, 2014 [9]; Atici& Podinovski, 2015 [2] etc.).
The DEA method was created starting from the idea that "the technical efficiency... reflects the ability of a company to obtain the maximum output from a given set of inputs"

[5]. This can be defined as follows: "a model of mathematical programming for data observation, ensuring a new path to obtain empirical estimations of the extreme relationships, like the production functions and/or the areas of the production possibilities, efficient, representing the cornerstone of the modern economy" [4].

The DEA method can be applied by models:

-CRS (constant return to scale) (model CCR) [4];

-VRS (variable return to scale) (model BCC) [4].

Also, the DEA method implies also two approaches: analysis oriented towards input (identification of the input quantities that can be reduced without modifying the produced output quantity) and the analysis oriented towards output (identifying the quantities where the outputs can be increased without affecting the used input quantities). The method shall compare each exploitation (DMU) with the most efficiency agricultural exploitation (DMU).

Due to our objective to measure the performance of the agricultural exploitations under the conditions of accessing the European funds, we used the orientation towards the output, our main objective being to measure the efficiency under the hypothesis that a DMU (an agricultural exploitation) can increase its results and efficiency by using the same inputs.

The DEA method shall follow this way the identification within some DMY (agricultural exploitations) of which operate to an optimal scale, respectively, presenting the potential for increasing the outputs with the actual combination of inputs. In our endeavour we applied the DEA method at the level of year 2008 (year of submitting the projects) and at the level of year 2014, being aimed the identification of:

-The efficiency of incomes from exploitation (Ve) under the current conditions of using expenses with raw materials and materials (Cm), of the expenses with the foreign services (Ce) of the staff expenses (C);

-Efficiency of the total incomes (Vt) under the current conditions of using the agricultural lands (S), intangible assets (A), share capital (own and borrowed) (K) and the staff expenses per employee (Cs).

We mention that above emphasized indicators as variables of the models were calculated per hectare, and the model complied with the main rule of applying the DEA approach, respectively the DMU number, to exceed the number of considered variables.

The variables tested this way were used for generating the scores, by the CCR and BCC models. The CCR model allowed obtaining the technical efficiency (ET), and the BCC model allowed calculating the pure technical efficiency (ETP). Starting from the results obtained by the two models it is generated the scale efficiency ES that reflects the potential productivity that can be reached to an optimal level of DMU [1]:

$$ES = \frac{ET}{ETP}$$

DEA Model oriented towards [11]:

$$Max\phi + \varepsilon\left[\sum_{i=1}^{m} S_i^- + \sum_{r=1}^{s} S_r^+\right]$$

$$\sum_{j=1}^{n} \lambda_j x_{ij} + s_i^- = x_{i0}, i = 1,2...,m;\ j = 1,2...,n;\ \lambda_j, s_i^- \geq 0$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} - s_r^+ = \phi y_{r0}, r = 1,2...,s;\ j = 1,2...,n;\ \lambda_j, s_i^- \geq 0$$

where: "n" number of DMU (exploitations); each DMU has 'm' inputs and produces 's' outputs; in year 'j' a DMUj consumes 'x_{ij}' from the input 'i' and produces y_{rj} of outputs 'r'; λ_j represent the amounts assigned by the linear program, 'ϕ' represents the calculated efficiency; 's_i' and 's_r' are the input and output errors; 'ε' is an element defined as lower than any positive real number [10].

For analyzing the scores we used the program MaxDEA 6.3 Beta, which allows the production of CRS (ET), VRS (ETP) and ES scores, under the model oriented towards output and hierarchy of the agricultural exploitations depending on these.

The assessment of the technical and scale efficiency of the agricultural exploitations taken for study was performed by the DEA method starting with the financial – accounting situations of the exploitations taken as case studies (***E1- Arenda Teleşti, E2-***

Agri, E3-Dra&Cor sub 500 ha; E4-Agro Loena, E5-AVE Agrosilv, E6-Arhonda cu 500-1000 ha; E7- Criscom, E8- Mobil MFM, E9 -Buzoieşti with over 1000 ha).

The assessment of the economic and financial performances of the agricultural exploitations taken for the study was realized starting with the financial and accounting situations of the explorations taken as case studies (***E1-Arenda Teleşti, E2-Agri, E3-Dra&Cor sub 500 ha; E4-Agro Loena, E5-AVE Agrosilv, E6-Arhonda cu 500-1000 ha; E7- Criscom, E8- Mobil MFM, E9 -Buzoieşti with over 1000 ha***) (Annexes 5.1-5.9) of the period pre-project (2005-2008) and the period post-project (2009-2014).

RESULTS AND DISCUSSIONS

Assessment of the technical and scale efficiency of the exploitation activity

Within DEA method oriented towards output, it is considered more efficient the exploitation that generates a higher level of output with the same quantity of input.

In 2008, at the moment of accessing the investment funds only E9 (Buzoieşti) was operating in optimal parameters, the exploitations E2 and E5 were the most inefficient, the exploitations E3, E6 and E8 were inefficient in proportion of over 50%, and the E4 and E7 exploitations had a high inefficiency. On the other side, the scores of pure technical inefficiency show us that the report between the exploitations expenses and the exploitations incomes was disproportionate in the E1, E2, E5 and E8.

Considering that most of the exploitations present a tendency for increasing the inputs in order to increase the incomes (situation proved also by the regression model), the scale efficiency was high and over the average, in the E1, E4, E5, E7 and E8 exploitations, which means that such exploitations could increase their relative efficiency with around 20-30% by redimensioning the exploitation activities.

In 2014, the score of technical efficiency was with 7,96% higher than in 2008 (de 0,501) which proves that the exploitations taken for the study could obtain the current exploitations incomes with only 50.1% from the current exploitations expenses. In other words, the analyzed exploitations, in order to function efficiently, should obtain with 49.9% more incomes than at the moment. Within the previously mentioned exploitations, with potential to be raised, it can be observed that in five years from implementing the investment, the situation is as follows (Table 1):

- E1 knew a decrease around 30% of the technical efficiency, reaching to a score of 0,113, meaning that it should obtain with almost 90% more incomes for the exploitation expenses, currently made;

Table 1. Model DEA – technical efficiency, pure technical efficiency, scale efficiency – exploitation activity

DMU	2008				2014				2014/2008 %		
	ET	ETP	ES	Scale profitability	ET	ETP	ES	Scale profitability	ET	ETP	ES
E1	0.159	0.193	0.822	Decreasing	0.113	0.150	0.752	Decreasing	71.2	77.8	91.4
E2	0.025	0.044	0.563	Increasing	0.534	1.000	0.534	Increasing	2161.0	2278.6	94.8
E3	0.433	1.000	0.433	Increasing	0.579	0.580	0.999	Increasing	133.6	58.0	230.5
E4	0.676	1.000	0.676	Increasing	0.879	1.000	0.879	Increasing	130.2	100.0	130.2
E5	0.019	0.024	0.776	Increasing	0.506	0.611	0.829	Decreasing	2713.4	2539.1	106.9
E6	0.493	1.000	0.493	Increasing	0.210	0.215	0.975	Increasing	42.7	21.5	198.0
E7	0.880	1.000	0.880	Increasing	**1.000**	**1.000**	**1.000**	Constant	113.6	100.0	113.6
E8	0.490	0.553	0.886	Increasing	0.200	0.296	0.675	Decreasing	40.8	53.5	76.2
E9	**1.000**	**1.000**	**1.000**	Constant	0.485	0.523	0.927	Decreasing	48.5	52.3	92.7
Average	0.464	0.646	0.725	-	0.501	0.597	0.841	-	108.0	92.5	115.9

Source: MaxDEA own processing

- E8 knew an even higher decrease of the technical efficiency (around 50%) reaching to a score of 0,200, meaning that it should obtain with 80% more incomes to the exploitation expenses, currently performed;

- E4 and E5 experienced significant increases of the technical efficiency (especially E5), which allow them to increase their scale

economies, these being due to increase their relative efficiency with only around 13-18%;
- E7 reached in 2014 the most efficient exploitation, proving an optimal report between the exploitation expenses and the exploitation incomes.

Also, we can see an improvement of the technical efficiency also in the E2 and E3 exploitations, which obtained scores over the average, exceeding the level of 50%. But the situation is more deficient within the E8 exploitation, which, after reaching its optimal technical level in 2008, in 2014 reached an inefficiency of 52%, although if due to its high dimension it has a high scale efficiency (92,7%).

In conclusion, we can say that in five years after implementing the projects, the small and middle exploitations are the most efficient, technically, while the large exploitations managed to prove a relative efficiency only due to the high dimension. Thus, we have an improvement of the technical efficiency at the level of the exploitation activity, especially in E4, E2, E3 and E5 and only one large exploitation (E7).

Assessment of the technical and scale efficiency of the general activity of agricultural exploitations

The analysis of the general activity of the agricultural exploitations starts from choosing as variables some clear indicators, for characterizing the production factors (earth, capital, labour). Thus, the nonparametric DEA method that was used in order to emphasize the efficiency of the results obtained by the agricultural exploitations, under the conditions of the current inputs, considered as variables the following inputs: area (S); intangible assets (A); Capital (own and borrowed) (K); Staff expenses per employee (Cs); Output: total incomes (Vt). In order to ensure the comparability of the economic indicators they were established by hectare.

The analysis of the efficiency indicators was realized based on the data envelopment analysis method, with the model CRS (constant return to scale) and VRS (variable return to scale). The research implied the assessment of the efficiency scores with constant scale efficiency (technical efficiency – ET), assessment of the efficiency scores with variable scale profitability (pure technical efficiency), assessment of the efficiency through the scale economy (reporting the CRS score to the VRS score, scale efficiency - ES).

In 2008, when the investment funds were accessed, the E2, E3, E6, E7 and E8 exploitations were optimal, operationally. With an average of 94,9% at the level of all exploitations of the technical efficiency, we can say that for the current inputs, the exploitations should have obtained total incomes with only 5,1% more. The E1, E4, E5 and E9 exploitations had high efficiencies, over 70%, and the scores of pure technical efficiency show us a non-proportionality between inputs and outputs, only in the E1 and E9 exploitations.

But the situation, in five years after projects' implementation shows us a slight deterioration of the exploitations' activity. While E2, E6 and E8 exploitations manage still to function in optimal parameters, E3 and E7 know a decrease in efficiency, especially E7. All this situation made that in 2014, for the score of the technical efficiency to be with 6,9% lower in 2008 (de 0,883) which proves that the exploitations taken for the study might obtain current incomes with only 88,3% of the considered inputs. In other words, the analyzed exploitations, in order to operate efficiently, should obtain with 11,7% more incomes that at the moment.

Except the previously mentioned exploitations, which maintained their technical optimal point (E2, E6 and E8), it is observed the following situation, in five years after implementing the investment (Table 2):

-E1 – knew a decrease with around 15% of the technical efficiency, reaching a technical optimum;

-E3 – after reaching its optimal point in 2008, in 2014 reached to have an inefficiency of 15,5% ;

-E4 – knew an increase around 6% of the technical efficiency, reaching the technical optimum;

-E5 – although remains with a high efficiency, knows a decrease around 2%, reaching in 2014 to have inefficiency around 3%;

Table 2. Model DEA – technical efficiency, pure technical efficiency, scale efficiency – general activity of agricultural exploitations

DMU	2008				2014				2014/2008%		
	ET	ETP	ES	Scale profitability	ET	ETP	ES	Scale profitability	ET	ETP	ES
E1	0.871	0.877	0.993	Decreasing	1.000	1.000	1.000	Decreasing	114.8	114.0	100.7
E2	**1.000**	**1.000**	**1.000**	Increasing	**1.000**	**1.000**	**1.000**	Increasing	100.0	100.0	100.0
E3	1.000	1.000	1.000	Increasing	0.845	1.000	0.845	Increasing	84.5	100.0	84.5
E4	0.940	1.000	0.940	Increasing	1.000	1.000	1.000	Increasing	106.4	100.0	106.4
E5	0.990	1.000	0.990	Increasing	0.974	1.000	0.974	Decreasing	98.4	100.0	98.4
E6	**1.000**	**1.000**	**1.000**	Increasing	**1.000**	**1.000**	**1.000**	Increasing	100.0	100.0	100.0
E7	1.000	1.000	1.000	Increasing	0.686	0.704	0.976	Constant	68.6	70.4	97.6
E8	**1.000**	**1.000**	**1.000**	Increasing	**1.000**	**1.000**	**1.000**	Decreasing	100.0	100.0	100.0
E9	0.737	0.809	0.912	Constant	0.446	0.606	0.735	Decreasing	60.4	75.0	80.6
Average	0.949	0.965	0.982	-	0.883	0.923	0.948	-	93.1	95.7	96.5

Source: MaxDEA own processing

Thus, we find that E9 – remains the most inefficient exploitation; in 2008, it should have obtained with almost 26% more incomes with the held inputs, in 2014, this percent grew to 55%; the exploitation knew even a decrease of the scale profitability, proving that the inputs are not adjusted to the proper dimension of the developed activities.

CONCLUSIONS

Conclusions on the technical efficiency – The assessment of the technical and scaling efficiency for the studied agricultural exploitations, realized with the DEA method, considered two models that followed-up the scaling of exploitations, depending on the technical efficiency of the agricultural activity, as a whole. The analysis of the technical efficiency, pure technical efficiency and scale efficiency scores (from 2008 to 2014) allowed us to reach the following conclusions:

- we have an improvement in the technical efficiency – *at the level of the exploitation activity*, especially in E2, E3, E4 and E5 and only an exploitation of large dimensions (E7);
- we have an improvement of the technical efficiency at the level of the general activity, especially in E1 and E4, while exploitations E2, E6 and E7 maintained their technical efficiency.

Thus, we can certify that the contributions granted by Pillar II of CAP, related to PNDR 2007-2013, Measure 121 creates a major pressure on the agricultural exploitations performances, with an impact especially on the long term financial profitability, and also on the general activity, in exploitations under 500 hectares.

However, our assessment emphasizes that the small and middle exploitations are more efficient, while the large exploitations suffered major decreases of the technical efficiency, following the performed investments, decreases that can be the consequence of a deficient management.

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ANALYSIS OF TOURIST ARRIVALS IN TOURIST AREAS, QUARTERLY AND TOTAL YEAR IN 2007-2013

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Abstract

Actuality of the theme reside that research is done in a new and necessary light of concept of sustainable development and also offers the possibility of using the forms and methods of development. Conceptuality sustainable development offers insight into the shape analysis, and the method to develop economically and socially, whose fundamental element can be created balance between social and economic systems and the factors that make up natural capital. The presence of sustainable development in Romanian economy means healthy growth based on the principles of fulfillment of human life, but also a concern of putting a service to harmonize environmental factors sustainable factors. Analysis of the number of tourist arrivals in the period 2007-2013 in tourist areas aims to identify prospects for growth in the number of arrivals of tourists in Romania by applying a methodology based on econometric models rigors requirements that ensure the formulation of relevant conclusions on the extent of flow trends foreign tourists.

Key words**:** *economic growth, econometric models, sustainable tourism, tourist areas*

INTRODUCTION

At first, the idea of sustainability was conceived as an alternative to environmental pollution [11] and excessive consumption of resources, but now sustainable development does more than keep the quality of life in all its forms.

Highlighting globalization and negative externalities [12] of underlying economic and social life in the past century, led the gain scientific and strategic policy concerns relating to the establishment and implementation of a new model for allocating scarce resources, based on sustainable development, the whose values are based on the principle of equal opportunities and paraded generations coexist in time and space inevitably our microcosm [15]. A sustainable development is a healthy development [1], a positive evolution of economic and social life in respect to the health of the common living today and always. We can say that the effective development of healthy development, the road incorporating values, criteria and indicators arising from the requirements of human health, the environment, communities, organizations and institutions, much more complex and prestigious common living our whole life [14].

For Romania this perspective opens the way for new approaches on the rise of health tourism 'when we have to rely on post-accession strategy for the period 2015-2024 in accordance with the requirements of the new unified European economy, as they result from the Europe 2020 Strategy.

MATERIALS AND METHODS

Statistical support for information and analysis of the dynamics of the number of tourist arrivals is divided into six tourist areas namely: spas; seaside area; resorts in the mountains; Danube Delta; Bucharest and town's county residence and other places and tourist routes.

Analysis of the number of tourist arrivals in the period 2007-2013 in the tourist areas is based on data provided by the National Statistics Institute.

Processing of these data was performed using the following methods: the relative sizes of structure adjustment and dynamic series of equations expressing the trend of the number

of arrivals and plotting the real and estimated data [5].

Structure arrivals (number of tourists) in touristic areas in 2007-2013 are presented in Table. 1.

Table 1. Arrivals structure in touristic areas, 2007-2013

Touristic areas	2007 %	2008 %	2009 %	2010 %	2011 %	2012 %	2013 %
1. Spas	10.64370	10.21629	10.41728	9.388333	9.804507	9.063272	8.550584
2. Seaside resorts	11.41954	11.68496	12.83730	11.63839	10.50899	10.50776	9.203066
3. Mountain resorts	14.31085	14.01298	13.53077	13.40003	13.61438	14.50946	15.57599
4. Danube Delta	1.058058	1.348573	1.147654	1.133394	1.164845	1.150094	1.021464
5. Bucharest and town's county residence	47.48565	47.19607	46.96397	49.81378	50.52462	49.82373	50.27648
6. Other places and tourist routes	15.08219	15.54113	15.10302	14.62608	14.38266	14.94568	15.37241
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: calculus on data from www.insse.ro

Tourist Area "Bucharest and towns county residence" attracts the largest number of tourists, between 47.0% and 50.5% of total arrivals. Thus, it proves that tourists are attracted to urban areas as a priority for both sightseeing and visiting on business or for to exercise their professional obligations.

Analyzing the tenured "Other places and tourist routes" found that tourism is the second preferably with a ratio of between 14.4% and 15.5% of total arrivals. It is obvious that a possible motivation of the tourist flow is similar [4] considered that tourist area "Bucharest and towns county residence."

"The resorts in the mountains" also attract a large proportion of tourists quantified at a magnitude of between 13.5% and 15.6% of total arrivals. Recognized beauty of the natural environment and especially the mountain area [8] of our country has a distinct tourist attraction. Option for mountain is justified by curative role of natural wealth (mineral water, pits, geothermal, saline, unpolluted atmosphere and ozone-rich air), multiple opportunities to practice sports in all seasons.

The spas and resorts in the coastal zone are definitely dependent on the seasonal factor, in these conditions tourist preferably has a smaller proportion assembly tourist flow, which is positioned between 8.5% and 12.8% with a slight advantage for the seaside.

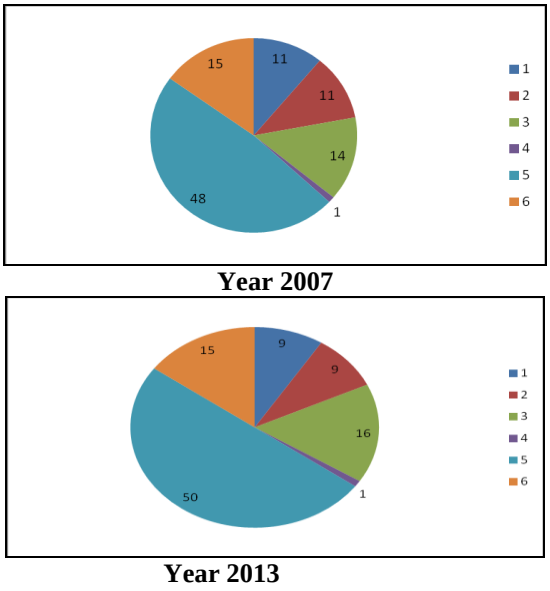


Fig. 1. Arrival structure on tourist area in 2007 and 2013

Note: the six areas are represented in the figure by numbers 1 to 6.

Source: author calculus

It is noted that (see figure 1) seaside resorts are positioned at a level with an obvious decrease in the proportion of 11.41954% in 2007 to 9.203066% in 2013 of total tourist arrivals at national and resorts spa centers have also diminished the relative representation from 10.64370% to 8.550584%.

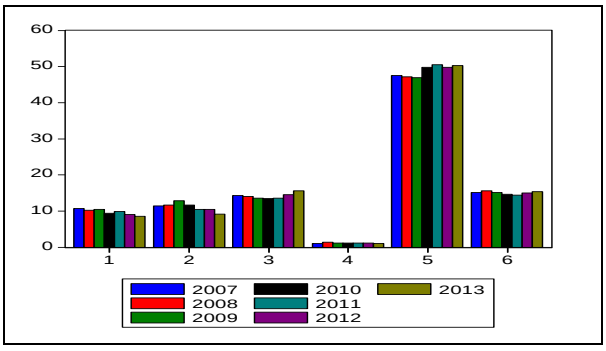


Fig. 2. Graphical representation of tourist arrival structure in 2007-2013

Source: author calculus

Interestingly, there is a significant structural shift in favor of area of residence Bucharest and county towns [16].

Figure 2 provides a conclusive picture on the preference of tourists for the area of Bucharest and towns county residence. Tourist areas in

the mountain resorts and other places and tourist routes attract a similar number of tourists but much lower than the previous reference. While spas and resorts areas of coastal attract tourist flow that can be considered comparable but at a more reduced compared to the other three tourist areas to which I referred. It is obvious that the Danube Delta through small number of tourists who attends, deserve attention to implementing a policy for zonal development and protection of national heritage areas representative.

The statistics in the table 2, shows the number of tourists (arrivals) for each year of the period analyzed for tourist areas and identify underlying general trend of amending them.

Table 2. Total number of arrivals in touristic areas in 2007-2013

Touristic areas / Year	1. Spas	2. Seaside resorts	3. Mountain resorts	4. Danube Delta	5. Bucharest and town county residence	6. Other places and tourist routes	Total
2007	742071	796162	997742	73767	3310664	1051519	6971925
2008	727942	832589	998468	96090	3362865	1107353	7125307
2009	639739	788356	830943	70479	2884121	927497	6141135
2010	566699	702517	808853	68414	3006862	882860	6036205
2011	686550	735881	953332	81567	3537932	1007130	7002392
2012	693646	804198	1110463	88021	3813196	1143849	7653373
2013	677081	728748	1233390	80885	3981161	1217270	7918535

Source: calculus on data from www.insse.ro

The graphical representation of the total number of arrivals (Figure 3) allows to specify that the dynamics of arrivals shows an evolution that on a general fund ascending evidence of decreased tourism flow in 2009 and 2010, and then, in 2011, 2012 and 2013, to register significant increases. It is obvious that the graph illustrates unequivocally situation-specific conjuncture in 2009 and 2010 tourism activity represented by the total number of arrivals that supports negative influence of the global financial and economic crisis.

The general trend chart that displays the total number of arrivals developments in the period 2007-2013 may be expressed mathematically by a linear trend equation. The definition of the equation is obtained by using the method of least squares and has the following expression [9]:

$$y = 6298807.571 + 169900.6786\ t,$$

Where y represents estimates of the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2, 3, 4, 5, 6, 7 related to the 7 years of the program.

The mathematical equation that shapes the general linear trend in the number of arrivals, the estimated size of the parameter b = 169900.6786 allows us to mention that during the 7 years of the period under review recorded an average increase from one year to another, 169900.7 tourists [2].

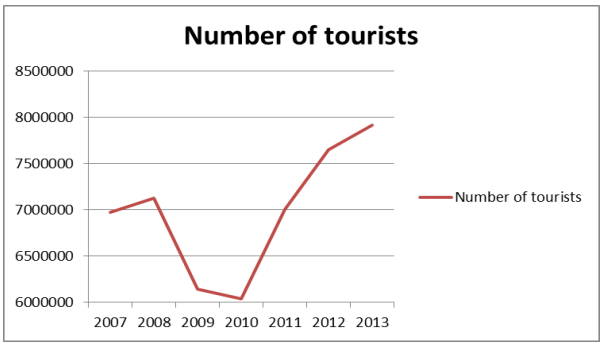


Fig. 3. Graphical representation of total arrival dynamics (2007-2013)
Source: author calculus

RESULTS AND DISCUSSIONS

Analysis of trend in the number of arrivals "spa resorts"

Statistical data in Table 3 shows the dynamics of arrivals (absolute and relative quarterly and year) in the "spa resorts", that are of curative treatment and well-defined.

Table 3. Arrivals in „Spa resorts", quarterly and yearly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Spa resorts	742071	727942	639739	566699	686550	693646	677081
Q1	102790	108469	80381	68445	75003	78367	80829
Q2	203486	191903	172494	159400	180663	176743	169057
Q3	268490	266817	251592	208622	282661	284355	277706
Q4	167305	160753	135272	130232	148223	154181	149489

The structure of arrivals in „Spa resorts", quarterly and yearly in the period 2007-2013 is presented in Table 4.

Changes that have occurred in the quarterly structure of the number of arrivals in spas are illustrated in the Fig.4.

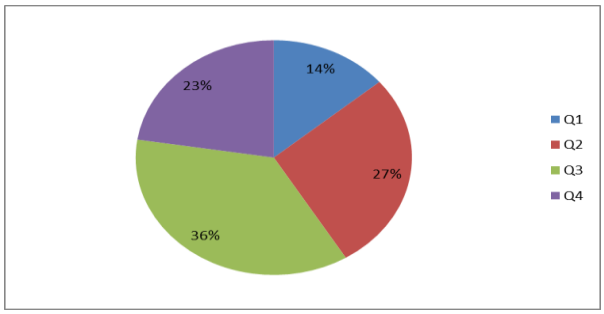
The analysis of arrivals in the "spa resorts", quarterly analyzed in period 2007-2013 allows us to highlight the issue of the number of arrivals in the first quarter which is a ratio between 11% and 15% of the total number of

tourists, and in quarter these conditions is recorded the lowest number of tourists.

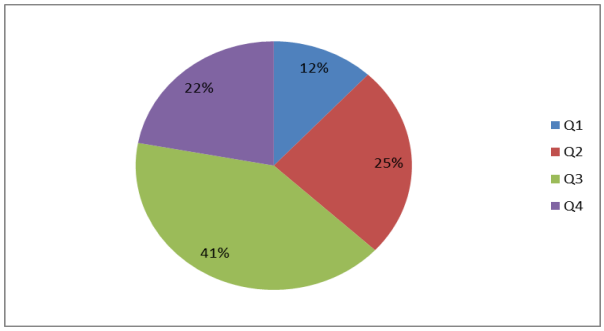
Table 4. Arrivals structure in „Spa resorts", quarterly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Spa resorts	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Q1	13.85177	14.90078	12.56466	12.07783	10.92462	11.29784	11.93786
Q2	27.42137	26.36240	26.96318	28.12781	26.31462	25.48029	24.96851
Q3	36.18117	36.65361	39.32729	36.81355	41.17122	40.99425	41.01518
Q4	22.54569	22.08321	21.14487	22.98081	21.58954	22.22762	22.07845

Source: calculus on data from www.insse.ro



Year 2007



Year 2013

Fig. 4. Spa resorts arrival structure, quarterly comparison 2007 and 2013
Source: author calculus

The fourth quarter is ranked second in number of arrivals decreased with a ratio of between 21.5% and 22.5% of the total number of tourists. This quarter, albeit a low tourist flow is two times higher than in first quarter.

A sensible proportion increased compared to the quarters I and IV, is recorded in the second quarter, when the number of arrivals has a proportion of 25% and 28% of the total number of tourists; quarter is peak tourist flow in the third quarter. The proportion of the number of tourists in this quarter is of a size between 36% and 41% of the total number of tourists.

It notes the situation recorded in the third quarter, which is maintained at a higher level and increasing by 5 percentage points, while the first and second quarters are marked reductions in proportions corresponding to two percentage points.

The analysis of dynamics of arrivals based on data in Table 3 and Figure 5 enables to be noted that the dynamics of arrivals in the "spa resorts" shows a downward trend in the first 4 years of the program, reaching a minimum of 566,699 tourists 2010, and in the years 2011, 2012 and 2013 to register a recovery which tends to stabilize at a level of over 680,000 tourists per year.

It may be mentioned that in 2009 and 2010 tourism activity, the economic system of the country as a whole, bear the influence of unfavorable economic and financial crisis that had international expansion (see Figure 5).

Fig. 5. Arrival dynamics in *„Spa resorts" (2007-2013)*
Source: author's calculus

The mathematics of the general trend recorded number of tourists is possible to achieve by a linear trend equation summarizing the dynamics of arrivals in the "spa resorts", 2007-2013. Defining the equation is obtained by using least squares and has the following expression:

$$y_1 = 707211.2857 - 7741.107143\ t,$$

Where y represents estimates of the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2, 3, 4, 5, 6, 7 related to the 7 years of the program.

Based on linear equation formalizing the general trend in the number of arrivals, the estimated size of the parameter b = -7741.107143 allows us to mention that during the 7 years of the period under review recorded a mean decrease from one year to the next with 7741.1 tourists.

Figure 5, through the arrangement of points, however, provides an alternative modeling and which conforms to a parabolic curve.

In this case, the equation trend is represented as follows: $y_1 = 828653.7143 – 88702.72619\ t + 10120.20238\ t^2$. It is noted that this model is highly particularized in the economic situation of the years 2009 and 2010 which may be considered contingent, as there is a clear tendency to increase the number of arrivals in the coming years.

Analysis of trend in the number of arrivals "seaside resorts"

In Table 5 are presented statistical data that characterize the dynamics of arrivals in the "Seaside resorts" where the tourist flow is significantly influenced by the seasonality factor.

Table 5. Arrivals in „Seaside resorts", quarterly and yearly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Seaside resorts	796162	832589	788356	702517	735881	804198	728748
Q1	16923	18500	16836	15381	11600	14341	12646
Q2	196669	178459	174677	143091	125555	149858	148135
Q3	557689	614498	574714	523968	575199	618762	549205
Q4	24881	21132	22129	20077	23527	21237	18762

Table 6.Arrivals structure in „Seaside resorts", quarterly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Seaside resorts	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Q1	2.12557	2.22198	2.13558	2.18941	1.57634	1.78327	1.73531
Q2	24.70213	21.43423	22.15712	20.36833	17.06186	18.63446	20.32733
Q3	70.04718	73.80568	72.90032	74.58439	78.16468	76.94150	75.36281
Q4	3.12512	2.53811	2.80698	2.85787	3.19712	2.64077	2.57455

Source: calculus on data from www.insse.ro

The dynamics of the structure arrivals in "Seaside resorts" (figure 6) in the quarters analyzed period (2007-2013), provides conclusive information on tourist flow which can be summarized as: the number of arrivals in the first quarter and fourth quarter has a proportion of between 1.6% and 3.2% of the total number of facilities. It appears that these two quarters has poor tourist attraction because there are not the conditions to satisfy the desires of leisure; second quarter is positioned on a higher place with a sensible proportion increased from 17.0% of arrivals and 24.7% of the total number of tourists. This quarter, touristic flow records that still bear the influence of unfavorable climatological decisive factor; quarter is peak tourist flow in the third quarter. The proportion of the number of tourists in this quarter is 70.0% to 78.2% of the total number of tourists.

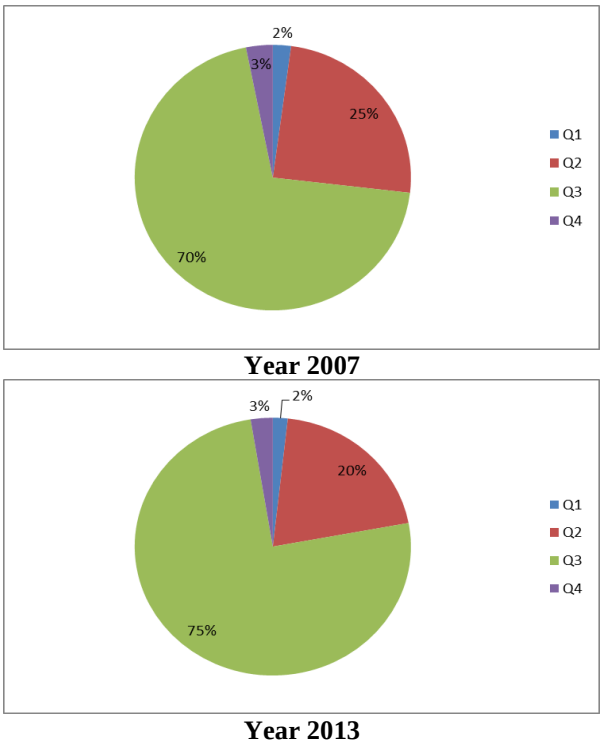


Fig. 6. Seaside resorts arrival structure, quarterly comparison 2007 and 2013
Source: author calculus

The shape of figure 7 provides information support about the linear trend equation on the dynamics of arrivals in the "Seaside resorts" for the period 2007-2013.

Defining of the linear mathematical model is obtained using the least squares method and has the following expression:

$$y_2 = 814278.5714 - 11124.96429\ t,$$

where y represents estimates of the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2, 3, 4, 5, 6, 7 related to the 7 years of the program.

Linear equation shaping the general trend in the number of arrivals in the seaside resorts, by the estimated size of the parameter b = -11124.96429 allows us to mention that during the 7 years of the period under review it was recorded an average fall from a year to another by 11,125 tourists.

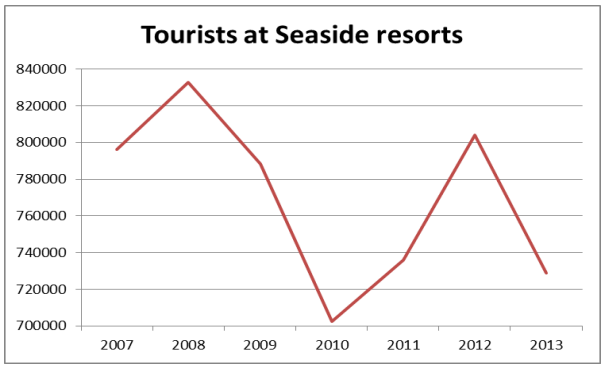


Fig. 7. Arrival dynamics in „Seaside resorts" (2007-2013)
Source: author calculus

Analysis of trend in the number of arrivals in the "mountain resorts"

Table 7 presents the statistics which characterize the dynamics of arrivals in the "mountains resorts", the tourist flow shows a general characteristic of relative uniformity quarterly, without significant discrepancies from one quarter to another.

Table 7. Arrivals in „mountain resorts", quarterly and yearly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Mountain resorts	997742	998468	830943	808853	953332	1110463	1233390
Q1	208192	209610	172585	153227	173757	214355	261350
Q2	240373	224404	196267	186339	205946	243985	271350
Q3	303208	321213	279619	266910	330398	388508	413173
Q4	245969	243241	182472	202377	243231	263615	287517

Table 8.Arrivals structure in „mountain resorts", quarterly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
mountain resorts	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Q1	20.86632	20.99316	20.76978	18.94374	18.22628	19.30321	21.18957
Q2	24.09170	22.47483	23.61979	23.03744	21.60276	21.97146	22.00034
Q3	30.38942	32.17059	33.65080	32.99858	34.65718	34.98613	33.49897
Q4	24.65256	24.36142	21.95963	25.02024	25.51378	23.73920	23.31112

Source: calculus on data from www.insse.ro

The analysis of arrivals in "mountain resorts", the quarters analyzed period (2007-2013), see Figure 8 allows us to highlight that the number of arrivals in the first quarter have a ratio between 18.2% and 21.0% of the total number of tourists, and in these conditions the quarter recording the lowest number of tourists.

The numbers of arrivals in the second and fourth quarter have comparable proportions ranging from 21.6% and 25.5% of total tourists. It appears that these two quarters shows a tourist attraction beyond the first quarter, due to special conditions created by the existence of holidays and school holidays for spring and winter. Peak tourist flow is in the third quarter. The proportion of the number of tourists in this quarter is of a size between 30.4% and 35.0% of the total number of tourists. In general, third quarter defines the period with a high share of leave which will lead consequently an increase in tourist flow.

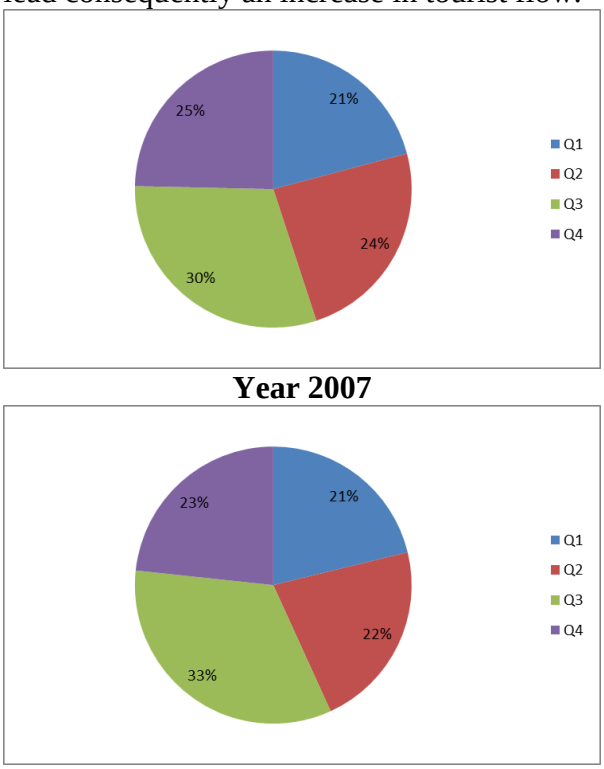


Fig. 8. Mountain resorts arrival structure, quarterly comparison 2007 and 2013
Source: author calculus

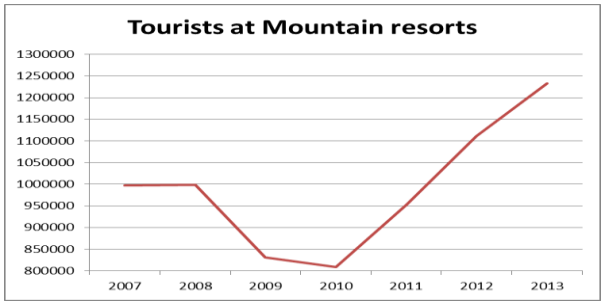


Fig.9. Arrival dynamics in „Mountain resorts" (2007-2013)
Source: author calculus

The graphic from Fig.9 offers informative support option for linear trend equation to represent the dynamics of synthetic arrivals "mountain resorts", 2007-2013.

Linear equation formalizing the general trend in the number of arrivals in the mountain

resorts is obtained by using least squares and has the following expression:

$$y_3 = 839981.1429 + 37618.67857\ t,$$

where y represents estimates of the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2, 3, 4, 5, 6, 7 related to the 7 years of the program.

The general trend in the number of arrivals in linear "mountain resorts" by the estimated size of the parameter b = 37618.67857 allows us to mention that during the 7 years of the period under review recorded an average increase from one year to another, with 37618.7 tourists.

Analysis of trend in the number of arrivals "Danube Delta"

Dynamics of arrivals in the "Danube Delta", is presented in absolute and relative terms in Table 9. It is evident that this area has a tourist attraction diminished significantly compared to other tourist areas because of less evolved conditions of reception and leisure.

Table 9. Arrivals in „Danube Delta", quarterly and yearly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Danube Delta	73767	96090	70479	68414	81567	88021	80885
Q1	7325	5209	6518	5936	6260	9540	8174
Q2	19610	22308	17571	22265	23224	26260	27075
Q3	32517	54850	34640	29128	38077	37019	34971
Q4	14315	13723	11750	11085	14006	15202	10665

Table 10. Arrivals structure in „Danube Delta", quarterly in 2007-2013

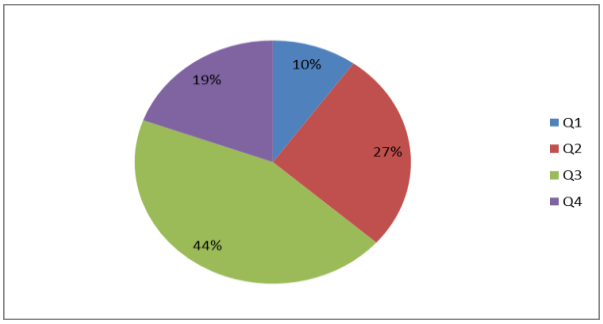
Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Danube Delta	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Q1	9.92991	5.42096	9.24815	8.67659	7.67467	10.83832	10.10571
Q2	26.58370	23.21574	24.93083	32.54451	28.47230	29.83379	33.47345
Q3	44.08069	57.08190	49.14939	42.57608	46.68187	42.05701	43.23546
Q4	19.40570	14.28140	16.67163	16.20282	17.17116	17.27088	13.18538

Source: calculus on data from www.insse.ro

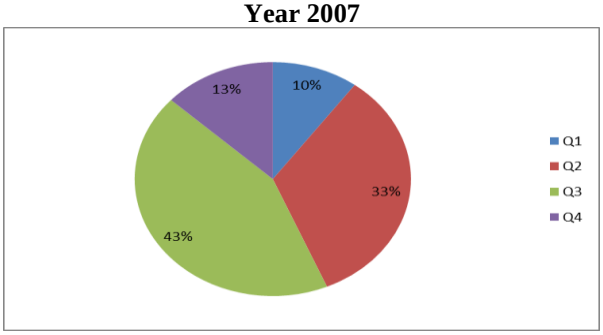
The statistic data presented in Table 9 and illustrated in figure 10 detailing the structure arrivals "Danube Delta", the quarters analyzed period (2007-2013) enables us to highlight the aspect that the number of arrivals in the first quarter is an amount between 5.4% and 10.8% of total tourists in these conditions is the quarter that has the lowest number of tourists.

The number of arrivals in the last quarter of the 7 years analyzed records proportions between 13.2% and 19.4% of the total number of tourists. Both the fourth quarter and first quarter does not provide the desired climatic conditions to be attractive options of carrying out tourism activities in the area. Second quarter recorded a significant increase in tourist flow in the Danube Delta, compared with the first quarter of this period are the proportions of between 23.2% and 33.5%, is three times higher. Second Quarter ahead also and fourth quarter which marks a decrease obvious tourist flow to the third quarter.

It is noted that the peak tourist flow is in the third quarter. The proportion of the number of tourists in this quarter is of a size between 42.1% and 57.1% of the total number of tourists. Third quarter, by environmental features that define climate offers favorable conditions for leisure.



Year 2007



Year 2013

Fig. 10. Danube Delta arrival structure, quarterly comparison 2007 and 2013
Source: author calculus

The Fig.11 provides information support option for linear trend equation to represent the dynamics of synthetic arrivals "Danube Delta" 2007-2013.

The trend equation [13] summarizing the dynamics of arrivals in the "Danube Delta" for 2007-2013 is obtained by using least squares and has the following expression: $y_4 = 77559.85714 + 582.2857143\ t$, where y represents the estimated values the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2,

3, 4, 5, 6, 7 related to the 7 years of the program.

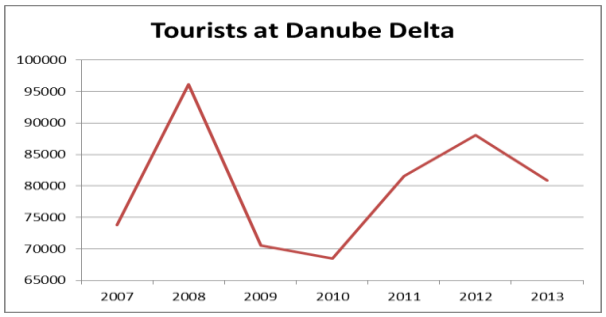


Fig. 11. Arrival dynamics in „Danube Delta" (2007-2013)
Source: author calculus

The estimated size of the parameter b = 582.2857143 from the linear trend equation [6] allows us to specify that the "Danube Delta" during the 7 years of the period analyzed, there is an average increase from one year to another with 582.3 tourists.

Analysis of the trend in the number of arrivals "Bucharest and town county residence"

The dynamics of arrivals in the "Bucharest and town county residence" is presented in absolute and relative terms in Table 11. The municipalities of our country presents a major tourist attraction due to superior conditions for accommodation and overall quality of tourism services that are offered and the possibilities of leisure in modern locations tailored to the preferences of tourists. Typically, large cities with heavy tourist areas of historical importance, institutions, commercial malls, headquarters of companies, museums, parks, zoos etc...

Table 11. Arrivals in „Bucharest and town county residence", quarterly and yearly in 2007-2013

Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Bucharest and town county residence	3310664	3362865	2884121	3006862	3537932	3813196	3981161
Q1	680444	730030	617172	595557	682383	759397	780399
Q2	856137	895363	759691	803631	923346	1037572	1060640
Q3	931158	927870	782212	843511	1034926	1077669	1146177
Q4	842925	809602	725046	764163	897277	938558	993945

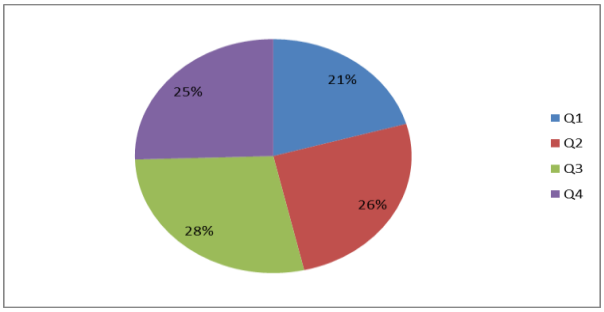
The statistic data presented in Table 11 and diagram (figure 12) detailing the structure arrivals "Bucharest and town county residence", the quarters analyzed period (2007-2013) enables us to highlight that the number of arrivals in first quarter is 19.3% to 21.7% of the total number of tourists, and in these conditions the quarter recording the lowest number of tourists.

Table 12.Arrivals structure in „Bucharest and town county residence", quarterly in 2007-2013

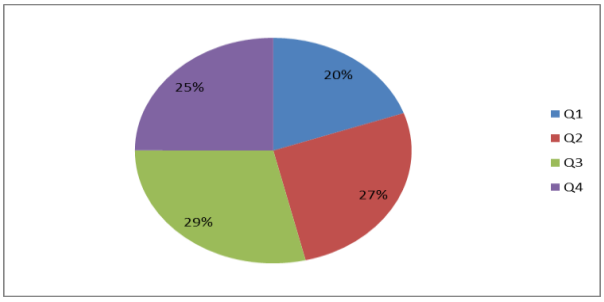
Year / Touristic area	2007	2008	2009	2010	2011	2012	2013
Bucharest and town county residence	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Q1	20.55310	21.70857	21.39896	19.80659	19.28762	19.91497	19.60230
Q2	25.85998	26.62501	26.34047	26.72657	26.09847	27.21004	26.64147
Q3	28.12602	27.59165	27.12133	28.05287	29.25229	28.26157	28.79002
Q4	25.46090	24.07477	25.13924	25.41397	25.36162	24.61342	24.96621

Source: calculus on data from www.insse.ro

From the research we find that second and fourth quarter of the 7 years analyzed recorded comparable proportions between 24.1% and 27.2% of the total number of tourists (arrivals). Quarter with the most intense tourist activity is localized in the third quarter. The proportion of the number of tourists in this quarter is of a size between 27.1% and 29.3% of the total number of tourists (arrivals).



Year 2007



Year 2013

Fig. 12. Bucharest and town county residence arrival structure, quarterly comparison 2007 and 2013
Source: author calculus

The analysis of arrivals in the "Bucharest and town county residence" in the dynamics of the 7 year period under investigation highlights that make up generally in this area that the tourist flow has a certain temporal uniformity purposes explained in particular by

professional and business interests.
The graphical representation of Figure 13 may be exposed to information support option for linear trend equation [3] summarizes representing dynamics of arrivals in the "Bucharest and town county residence" for 2007-2013.

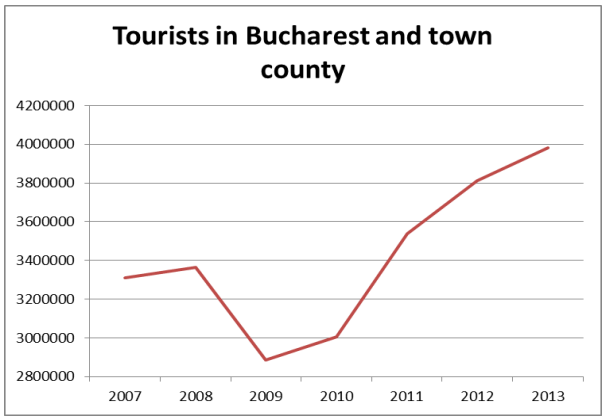


Fig. 13. Arrival dynamics in „Bucharest and town county residence" (2007-2013)
Source: author calculus

Summarizing, the trend equation of the dynamics of arrivals in the "Bucharest and town county residence" for the period 2007-2013 is obtained using least squares and has the following expression:

$$y_5 = 2904405.286 + 127355.8571\ t,$$

where y represents estimates of the number of arrivals as linear trend and t is the time variable for granting conventional sizes: 1, 2, 3, 4, 5, 6, 7 related to the 7 years of the program [7].
The estimated size of the parameter b = 127355.8571 from linear trend equation allows us to specify that the "Bucharest and town county residence" during the 7 years of the period analyzed, there is an average increase from one year to another, with 127355.9 tourists.

CONCLUSIONS

Sustainable tourism development meets the needs of present tourists and regions [10] which constitutes their host and also protects and enhances opportunities for the future. Including tourism potential elements that define sustainable development is an important step in the economic recovery of any country.
To improve tourism image orientation requires the development strategy for concrete actions leading to the creation and strengthening of tourism status, so we see the need for a national strategy and a local (regional) strategy. Industry, agriculture, tourism, services and other economic activities must come from human and institutional capacities to harness natural-regional potential in respect to the ecological balance and fulfillment in people's lives behalf.
The period under review (2007-2013) is strongly influenced by the economic crisis which has manifested itself strongly in 2009 and 2010 which disrupted a continuous upward trend of tourist flows. The plots in Figure 3 - Figure 9 clearly illustrate the evolution of the number of arrivals in tourist areas and numerical fall in 2009 and 2010. This economic context that is marked by a strong particular the analyzed period, will influence the shape of the econometric representation and the number of tourist arrivals under these conditions a solution to be considered is increasing the number of observations and replacing marked by abnormal levels with conventional levels. Linear models identified for the 6 tourist areas have statistical support needed to receive a flawless viability assessment.
Switching to the implementation paradigm "common living whole health" aims to ensure the fulfillment of people's lives from harmony between their needs and the needs of ecological balance. Another economic competitiveness approach limited resources may not result only from life experience using scientific knowledge in the name of responsibility for "the health of the common living". A competition outside the "health of the common living" is an end in itself, motivated solely by financial gain, which brings "nominal monetary gain for some" and "real human and ecological losses for others." What is healthy for business organization - industrial, agricultural, tourism etc. - The net profit in the monetary expression to be and people, media, communities and families, for state budgets.

A great tour, the net added value, can be achieved only when we use the natural potential, economic, spiritual-cultural-zone of a particular region in respect for "the health of the common living," so that all stakeholders gain green economic, social, spiritual, and human social community.

ACKNOWLEDGMENTS

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THE ROLE OF FAMILY FARMS TO ENSURE FOOD SECURITY

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Abstract

This paper aims to bring more knowledge regarding the concept of food security and to identify the role of family farms in this process. In this sense, will be made documentary studies based on the national and international specialized literature and will be processed data provided by competent international organizations (FAO, EUROSTAT etc.). Food security requires, first, obtaining food products, sufficient like volume, structure and quality, to meet the needs for food of the population throughout the year. United Nations Organization for Food and Agriculture was estimated that food production will be increased in 2050 by 60%. Under present conditions, much of this growth should come from the family farms in developing countries.

***Key words*:** *family farms, food security, food products*

INTRODUCTION

Food security involves primarily: production of food products, sufficient like volume, structure and quality, to meet the needs for food of the population throughout the year, thus ensuring to obtain high quality products; accessibility of the necessary food for the entire population, including the disadvantaged; combining the criteria of equity, with economic efficiency in the production and distribution of food, tending continuously to raise efficiency; obtaining food products with complex nutritional quality, clean and aligned to international standards. [3]

Currently, worldwide there are over 500 million *family farms*, which are the predominant *model in agriculture* and the leading provider of food both in developed countries and the developing ones. [5]

Year 2014 was declared International Year of the Family Farm, which is why the United Nations Organization for Food and Agriculture has facilitated the implementation of cooperation programs on this issue with country Governments, International Development Agencies, farmers' organizations and other relevant organizations of United Nations and with non-governmental organizations (NGOs). According to the Ministry of Agriculture and Rural Development of Romania "applying fair agricultural, environmental and social policy, family farms can contribute to the eradication of hunger and poverty while protecting the environment and ensuring sustainable development." [2]

Rural world is a reality extremely vast and complex, while being tackled in various aspects of numerous research institutions and numerous researchers. The terminology used to describe the rural area is extremely rich and ***sustainable rural development*** remains a challenge and a priority objective of national and European. In developed countries, economic development strategies in rural areas aimed at reshaping the rural economies in the context of farm restructuring and economic and social changes associated with it. *The rural economy in Romania* is still poorly diversified and depends to a very large extent on agriculture, dominated by subsistence and semi-subsistence farms. [4]

Romania's agrarian structures are highly polarized. Thus: 40% of usable agricultural area (SAU) of Romania is 2.5 to 2,800,000 small and very small farms (below 5 ha); 40% of the country, i.e. from 3.8 to 4.0 million ha is owned by about 800 large farms (with area

of 1,000 ha each); 20% of Romania's SAU is in farms with surface comparable to the European Union (5-50 ha). [9]

The concept of the family farm is associated with family values such as solidarity, continuity and commitment. In terms of economic, family farm is identifying with specific business skills, management, risk assessment, endurance and professional fulfillment. Family farms offers more than just a professional occupation, which reflect the lifestyle of many Romanians and Europeans. [6]

Family farms can play an important role in the safety and food security by increasing food availability in poor countries, preservation of traditional products, ensuring the transition to a more healthful diet etc. [10]

MATERIALS AND METHODS

The data on which are collected and processed in this work come from the international literature and the official websites of international institutions empowered (FAO, EUROSTAT etc.). As *research methods* were used bibliographic synthesis (basic research), statistical methods for quantitative analysis and qualitative methods for evaluation indicators.

The research had two main components, namely: a documentary component, which took into account: reviewing the definitions and concepts; presentation of current issues of worldwide interest on food security; study on food security indicators; a qualitative component, which includes a series of results and discussion on the role of family farms in ensuring food security and global problem of population growth and its effects.

RESULTS AND DISCUSSIONS

According to the FAO, 80% of *agricultural land* is owned by small farmers (each working up to 10 hectares). While 75% of the food we consume is generated by 12 plants and five animal species, *family farms* preserves species resistant to climate change. [5]

Food needs satisfaction of the population depends not only on the existence of food availability, but also the solvent demand of the population, and therefore the size of the raw product supply cost level.

Currently food costs, in many countries, including Romania, exceed 50% of the income of the population. Such a situation constitutes a brake on the development of the internal market and a main barrier to economic growth. [4]

Making the perspective of ***food consumption pattern*** of optional generalized satiety form may occur both by increasing revenues and reducing in real terms food prices so that the share of the population spending money for food consumption in total expenditure consumption to decrease in comparable terms from over 50% to about 15-20%, as is the European Union. [8]

Worldwide, ***global food security*** is measured by two *fundamental indicators*, namely: production of wheat and corn stocks. Wheat is the most effective parameter because for half of the energy needs of a man and is less perishable like fruits and vegetables can be stored long term. *Wheat production per capita* is calculated and shows how much wheat a person should consume, and inventories show that consumption exceeds production, or vice versa. [3]

Every day the world's population grows by about 220,000 people, and every year the world population added 80 million people. All these people must have access to sufficient food and safe food. The increase comes mainly from developing countries that, overall, nearly double their population by 2050 from 0.9 billion today to 1.7 billion. Overall, 2050 will be over 9 billion. The question is: will manage the earth to feed us all safe food in sufficient quantities? [3]

Agricultural policies whose general objectives were originally meant to food security from own production, and subsequently with the CAP reform, the objectives were to increase the quality of their products and their competitiveness in the internal market and external environment, protecting the interests consumers, sustainable agricultural development, have been and are

EU policy priority. Besides social issues aimed consumer protection, safety and security food etc., the importance of agriculture to European Union countries and the resulting economic aspects.

The EU, in 2007, agriculture occupies in achieving GDP share from 0.5% in Luxembourg and 6.1% in Greece and Lithuania, and food, beverages and cigarettes from 0.9% in Luxembourg and 4.0% in Lithuania. These contributions with low level, is not negligible considering the value of GDP in the EU-27. [8]

The main bodies involved in the monitoring of global food security are: FAO - Food and Agriculture Organization (United Nations Organization for Food and Agriculture); EC - European Commission; USDA - United States Department of Agriculture (Department of Agriculture of the United Nations).

According to data published by these international institutions in recent years, states that there are problems of food insecurity in 86 countries, 43 in Africa, 24 in Asia, 9 in Latin America and the Caribbean, 7 in Oceania and 3 in Europe. In 2004, 35 countries have received emergency aid due to food crises. The main causes were: civil and military conflict, post-conflict situations, refugees, economic disadvantaged areas and climate issues. [11]

In 2001, German Chancellor Gerhard Schröder, states that: "Extreme poverty, growing inequality between countries and within the country, are the major problems of contemporary, because they are due to instability and conflict. Reducing global poverty is therefore a prerequisite for safeguarding peace and security". For example, rapid population growth and the gradual reduction of agricultural use exacerbates poverty rates in rural areas. City dwellers and poor villagers enjoy very limited access to information and services that enable them to space births and limit the tasks according to their preferences. Also increasingly difficult living conditions compromise the formation of income in rural areas and contribute to worsening health conditions, determine migration rural - urban and peri-urban newcomers installing the already fragile environment. [8]

The number of food emergencies has increased over the past two decades from an average of 15% per year in the 1980s to more than 30% per year after 2001. Most of these increases occurred in Africa, where the average number of food crises almost annually tripled. Balance causes food crises has shifted over time. Since 1992, the proportion of seizures that were attributed mainly human causes such as conflict or economic crises doubled increasing from 15% to less than 35%. More than 45 million people have been affected by the humanitarian crisis of 2003. Most of these crises persisted long, often being triggered by military conflict and drought, floods and the effects of AIDS. [5]

In Europe, Regulation no. 1292-1296 adopted by the EU Council on 27 June. 1996 defines food aid program and food security of the European Commission. It resulted from a food aid policy reform progress established since 1994 in order to make food aid an integrated effectively as possible in policy development and food security strategy of the countries concerned with this problem. Nature of food aid (with direct reference to the reserves of agricultural products) is made in accordance with Article 11 of the said Regulation. Reducing the vulnerability of the helpless population of food aid system results in better identification of their needs for a better appreciation of the strategy by which they implement to nutrition risk factors. Representation of Regulation 1992/96 is also found in the International Food Aid Convention, negotiated in 1999. Annual Convention sets minimum understanding about food aid (Argentina, Australia, Canada, the European Commission and members, Japan, Norway, Switzerland, U.S.A.). [8]

As can be appreciated from all the issues set out above, **food security** is influenced by four major groups of factors, namely: social economic and political environment; performance of the agrifood sector; social protection; health and hygiene. In this context, *the role of family farms* to ensure the extra production to ensure national security

imperative regionally, nationally and internationally, is undeniable. Although there is no universally accepted definition of the ***family farm***, the farm is small (generally with an area of between 10 - 100 hectares) the workforce is represented mainly by the owner family and the output designed for both personal consumption and marketing. [7]

In Romania recorded the APIA (Agency for Payments and Intervention in Agriculture) 60,000 family farms, which represent less than 5% of the farms, which also include subsistence and semi-subsistence farms and commercial farms, given that this institution farms account for less than 1 ha. [1]

The most common operational model of agriculture in the European Union is represented by family farms. Most of the 12 million European farms are set up as family farms, transmitted from one generation to another, there by contributing to sustainable socio-economic development of rural areas. This type of farms contribute to ensuring food security, increasing the level of food safety, quality, value, origin and diversity of food. [6]

Family farms have significant production potential, but their development capacities are reduced, given that low investment potential, are poorly mechanized and can not compete large farms (commercial). In this context, specialists dialogues with farmers revealed that their needs are the same anywhere in the world. These include, firstly, technical assistance, financial assistance, a special focus on women farmers and increase youth participation in the activity of these farms. Women represent 43% of the labor force in agriculture in developed countries and 50% in East Asia and South-East and some parts of Africa. [11]

At European level, and not only, were directed large sums of money for the establishment or development of family farms. Number of businesses in agriculture was one of the best developments in the European Union, being funded projects in the plant, horticulture and livestock. For the programming period 2014 - 2020, founds from National Agencies for Budgets and the EU budget for agriculture has been reduced, but are still at a very high level. [10]

The table below shows *the distribution of the share of family farms* internationally in 2010, having as parameter for assessing the area owned and / or operated. (Table 1)

Table 1. Number and percentage of family farms in total agricultural holdings

Countries	Total number of agricultural holdings	Number of family farms (10-100 ha)	The percentage of family farms
Belgium	42,850	25,750	60.09
Bulgaria	370,490	15,760	4.25
Czech Republic	22,860	10,740	46.98
Denmark	42,100	22,920	54.44
Germany	299,130	190,850	63.80
Estonia	19,610	7,210	36.76
Ireland	139,890	109,700	78.41
Greece	723,060	76,580	10.59
Spain	989,800	271,170	27.39
France	516,100	236,450	45.81
Croatia	233,280	23,970	10.27
Italy	1,620,880	236,940	14.61
Cyprus	38,860	1,890	4.86
Latvia	83,390	29,850	35.79
Lithuania	199,910	38,810	19.41
Luxembourg	2,200	1,170	53.18
Hungary	576,810	41,230	7.14
Malta	12,530	50	0.39
Netherlands	72,320	39,170	54.16
Austria	150,170	73,280	48.79
Poland	1,506,620	330,630	21.94
Portugal	305,270	35,080	11.49
Romania	**3,859,040**	**69,030**	**1.79**
Slovenia	74,650	11,720	15.69
Slovakia	24,460	3,840	15.69
Finland	63,870	45,910	71.88
Sweden	71,090	38,420	54.04
U. K.	186,800	104,060	55.70
Iceland	2,590	390	15.05
Norway	46,620	31,760	68.12
Switzerland	59,070	39,560	66.97
Montenegro	48,870	2,240	4.58

Source: Statistical Office of the European Union, Eurostat, www.ec.europa.eu/eurostat.

In order to ensure food safety is necessary transformation of family farms in some modern and competitive farms, especially in developing countries. Dialogues with farmers revealed that their needs are identical worldwide. These include technical assistance, special attention to female farmers and increasing youth participation in the work of these farms.

CONCLUSIONS

Multidimensional nature of *food security*, just as the fight against poverty, requires a good correlation between the various economy sectors - agriculture, trade, infrastructure, health - and the variety of intervention levels - local, national and international levels.

Food safety and security policy in the EU is considering the whole chain of food for consumption by animals or humans. It provides extensive regulations and emphasizes the responsibility of manufacturers and suppliers in terms of their participation in providing quality food supply.

According to FAO (Food and Agriculture Organization - United Nations Food and Agriculture), **food security** is "guaranteeing each individual permanently in any place or time of access to sufficient and healthy food to allow him to have a system sufficient food for a healthy and active life ".

Human rights are universal, interdependent and indivisible. *The right to be free from hunger and discrimination is a fundamental right to life and security of person*. While violent conflicts surely result from a combination of several factors, poverty creates conditions for the emergence or maintenance of a conflict. Investing in development is of particular importance in reduced probability of war, and development strategies should take into account the possible effects on reducing the risk of conflict (or its extension accidental).

Reported seizures disrupt food production and food security undermines chasing people from their homes, kicking eroding the foundation of everyday life and social status of families, communities and countries. However, frequently, farmers and communities resignations show remarkable disasters.

Currently, *CAP objectives* include helping agriculture to achieve its multifunctional role in society: producing safe and healthy food, contribute to rural development and environmental protection and enhancing status and its biodiversity cultivated. Also, it was important for the EU to establish common rules for the approval of genetically modified organisms (GMOs) in agriculture.

EU tries to help the environment by: providing financial assistance to encourage change; for example, reducing the number of animals per hectare of land, leaving fallow field borders, creating ponds and planting hedges, thus bypassing traditional methods of agriculture; amortization support for preservation of nature; insisting that farmers observe the laws related to the environment (and on the health of consumers, animals and plants) and watchfulness on the correct operation of the land if they wish to qualify for direct subsidies.

At this point, it may be noted, however, that *food policy* is not only an issue of agriculture and food industry, but the entire national economy. Overcoming the current situation depends on both, the macroeconomic policy and sectoral developments GDP between national and sectoral labor productivity, revenue and prices, generating solvent demand increased, widening the internal market and economic spillover effects.

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CONSIDERATIONS UPON THE CLIMATIC CHARACTERISTICS OF THE AGRICULTURAL YEAR 2011 – 2012 IN THE OLT COUNTY

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Abstract

The agricultural production in a region is influenced by the natural factors, the climatic and social ones and especially by the technological level and the value of investments. The analysis of the relationship between the climatic factors and the agricultural production is important in the agricultural management. The primary objective of this study is to analyze the main climatic factors: air temperature, soil temperature, precipitations and relative air humidity which condition the performance of the fundamental processes that occur in plants. The analysis of these factors is performed for the agricultural year 2011 – 2012, considered a dry year in the Olt County.

Key words**:** *air temperature, agricultural year, precipitations, soil temperature, the Olt county*

INTRODUCTION

All the climatic conditions during an agricultural year determine the value of the crops through the evolution of each climatic parameter, in closer or farther limits, being connected with the bioclimatic requirements, specific to each phenological stage of an agricultural culture.
The climatic conditions are not the same for all the crops and geographic regions in which the plants are grown.
Therefore, the weather may be favorable or restrictive to cultures, as increasingly deviate from the optimal necessary, becoming risk factors with different degrees of intensity [6].
This study will analyze the main climatic factors which limit the vegetative development processes and the productivity of the crops [3]. They are: the air temperature, soil temperature, precipitations and the relative air humidity.
The climatic analysis will be made for the agricultural year 2011 – 2012, which corresponds to the period September 2011 - August 2012 in the Olt county.

The Olt County (Figure 1) is a region characterized by a relief of smooth plains and low plateaus, mainly covered by chernozem soils or brown and reddish brown forest soils [4]. The general inclination of the relief is from the north to the south, offering large areas with a sunny exhibition [5].

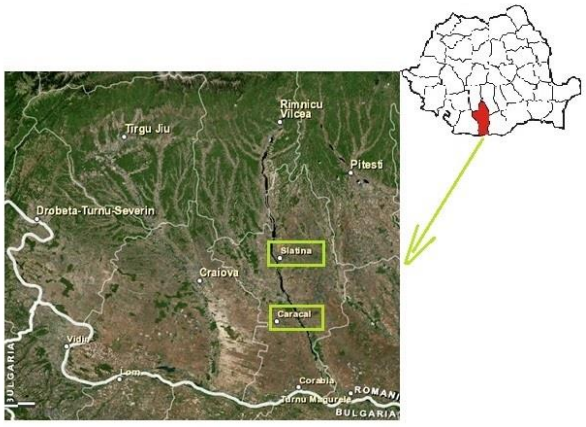

Fig. 1. The geographical localization of the Olt county and of Slatina and Caracal meteorological stations
Source: Own processing from www.arcgis.com

From climatic point of view, the Olt county belongs to the transitional temperate climate, the subsector with a transition climate from outside the Carpathian arch [1].

In relation to these conditions, with the traditions and other factors, the Olt county imposes as an important agricultural region of the country, especially for cereals. The agricultural area in the Olt county, in 2008, was 437165 ha, distributed as follows: 390569 hectares of arable land, 31022 hectares of natural grassland, 7630 hectares of vineyards and orchards 7307 [11].

MATERIALS AND METHODS

In order to analyze the climatic agricultural year 2011 – 2012, there were used the statistical-climatic data from Caracal and Slatina meteorological stations (Figure 1). Caracal meteorological station is located at 44° 07` north latitude, 24° 21` east longitude and at 112 m altitude, while Slatina meteorological station is located at 44° 27` north latitude, 24° 22` east longitude and at 165 m altitude.
To these are added the agro-climatical briefings drafted by NMA [10], the statistical methods, graphs and maps.
The processing, representing and interpreting of the statistical data aim the brief analysis of the climatic conditions of the Olt county, for the period September 2011 – August 2012.

RESULTS AND DISCUSSIONS

The main climatic factors with an important role in the growth, development and productivity of the crop plants are: the air temperature, soil temperature, precipitations and the air humidity, plus the light.
The air temperature affects the physiological processes of plants (photosynthesis, respiration, water absorption etc.). Each physiological process occurs at air temperatures ranging between a minimum and a maximum, between which is an optimum for the process [9].
These values are specific for each species cultivated, growth stage and desired level of the crop, thus delimiting the range area of each species grown [7].
For the agricultural year 2011 – 2012, in the Olt county, there was an annual average temperature of 11.7 ^{0}C at Slatina and 12.2 ^{0}C at Caracal, being by 0.3 ^{0}C and respectively 0.6 ^{0}C higher than the annual average during 1990 – 2013.
The high temperatures in July and August, are not used by plants, influencing in a negative way the vegetation by the phenomena of heat and drought that occurred in the agricultural year 2011 – 2012 (Figure 2).

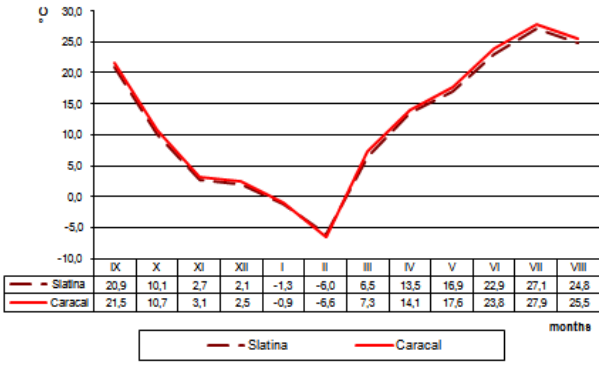

Fig. 2. The annual air temperature regime (℃) at Slatina and Caracal meteorological stations in the agricultural year 2011 – 2012
Source: Processed data after ANM

In terms of the monthly minimum temperature, the lowest minimum was recorded at Slatina, in February, of -23.9 ^{0}C, and in January, at Caracal, of -23.3 ^{0}C (Table no. 1). The maximum temperature recorded the highest monthly value of 39.6 ^{0}C in August, at Slatina and 40.7 ^{0}C in July, at Caracal, being the highest in the period 1990 – 2013 (Table 1).

Table 1. The minimum and maximum monthly air temperature (℃) at Slatina and Caracal meteorological stations in the agricultural year 2011 – 2012

Month/ Meteoro-logical station	Slatina		Caracal	
	Minimum temperature	Maximum temperature	Minimum temperature	Maximum temperature
IX	8.1	34.9	10.3	35.3
X	- 2.4	27.8	- 2.2	28.1
XI	- 7.0	15.9	- 5.9	16.5
XII	- 6.8	14.7	- 5.6	17.9
I	- 20.3	11.9	- 23.3	12.7
II	- 23.9	10.4	- 23.2	7.2
III	- 6.9	24.0	- 4.6	25.3
IV	- 2.0	28.7	- 1.7	28.8
V	8.4	30.5	8.8	30.7
VI	9.9	35.4	10.6	36.8
VII	14.1	39.0	15.3	40.7
VIII	10.6	39.6	12.8	40.5

Source: Processed data after ANM

Each phase of vegetation occurs with the accumulation of a certain sum of effective temperatures, causing the development effectiveness.

The annual sum of the daily average temperatures ≥ 5 ^{0}C increases from north to south, from 3800 ^{0}C to 4000 ^{0}C. The sum of average daily temperatures ≥ 10 ^{0}C ranges between 3400 ^{0}C and 3800 ^{0}C and that ≥ 15 ^{0}C ranges from 2800 ^{0}C to 3200 ^{0}C. The actual average daily temperatures sum required for each phenological phase reflects, quantitatively, the requirements of plants against temperature.

In the agricultural year 2011 – 2012, the number of tropical days (≥ 30 ^{0}C), in the Olt county ranged from 80 days at Slatina (2.2% of the agricultural year) and 91 days at Caracal (2.5% of the agricultural year).

The soil temperature is closely related to the air temperature, their effects on plants being simultaneous.

In the crop year 2011 – 2012, in the Olt county, the annual average was 13.7 ^{0}C at Slatina and 12.4 ^{0}C at Caracal, the monthly evolution being shown in Figure 3.

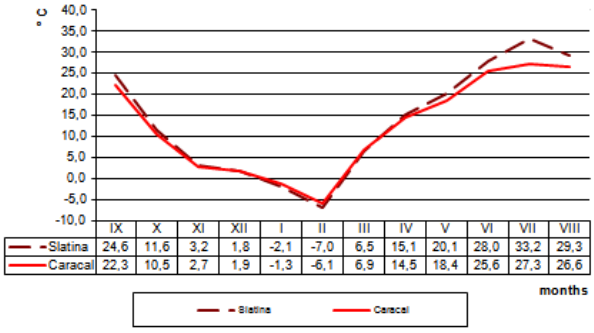

Fig. 3. The annual soil temperature regime (℃) at Slatina and Caracal meteorological stations in the agricultural year 2011 – 2012
Source: Processed data after ANM

Precipitations are a natural source of supplying the soil with water. The water requirement for the plants differs from one phenological stage to another. When precipitations coincide with the critical water stages for plants, their effectiveness in achieving the harvest is great. For the agricultural year 2011 – 2012, in the Olt county, there were recorded values of 459.4 mm at Slatina and of 340.5 mm at Caracal. These values were less than the multiannual period 1990 – 2013, with 130 mm at Slatina and 186.8 mm at Caracal. During the year, the values ranged between 0.0 mm in September and November 2011, for both stations and 69.8 mm at Slatina and 81.7 mm at Caracal, both values recorded in January 2012 (Figure 4).

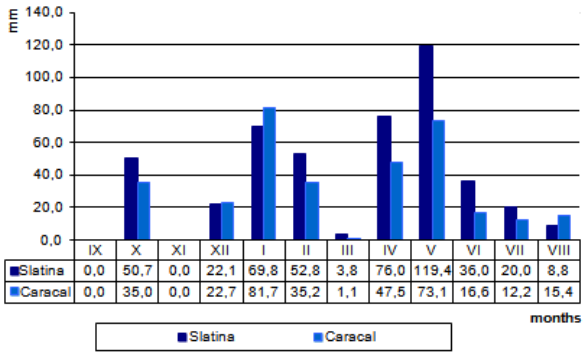

Fig. 4. The annual precipitations regime (mm) at Slatina and Caracal meteorological stations in the agricultural year 2011 – 2012
Source: Processed data after ANM

During the agricultural year 2011 – 2012, September, November 2011 and March 2012 were the driest months of the period 1961 – 2014 [8]. Throughout the year, there was a total of eight months of drought.

The lack of precipitations and soil water causes the drought, determining an imbalance between requirements of plants and their ability to supply with water [2].

The relative air humidity directly influences the vital processes of the crop plants. If the air humidity is low, it intensifies the plant transpiration and their water consumption increases, and if it is high, it prevents perspiration, pollination, flowering and fructification. In the analyzed annual year, the annual values were 70.7% at Slatina and 68.9% at Caracal, values below the multiannual average of the period 1990 – 2013 (Table 2).

Values of ≤ 50% relative humidity in July and August, for the both meteorological stations represent a huge shortage of humidity in the air (Table 2).

Table 2. The relative air humidity (%),at Slatina and Caracal meteorological stations in the agricultural year 2011 – 2012

Month/ meteorological station	Slatina	Caracal
IX	57	57
X	71	74
XI	81	82
XII	92	89
I	93	84
II	90	86
III	60	62
IV	65	65
V	77	73
VI	64	60
VII	49	47
VIII	49	48
an	70.7	68.9

Source: Data processed after ANM

CONCLUSIONS

The agricultural year 2011 – 2012, which corresponds to the period September 2011 – August 2012, was characterized, for the Olt county area, through a higher thermal air regime than normal. Associating with the air and soil humidity deficit, the vegetation deterioration could be noticed for the autumn crops. The long precipitations deficit and the high water need of plants, especially during May-June for the autumn crops, and from June to August for the spring crops, maintained and expanded the soil droughts.

In these climatic conditions, which characterized the agricultural year 2011 – 2012 as a dry one, for the row crops, there were reported forcing stages, fading, twisting and partial or total drying of leaves, increasing the percentage of seeds for the dry sunflower and a large number of sterile plants.

Taking into account the above analyzed climatic conditions, there were recorded the following productions in the agricultural year 2011 – 2012, in the Olt county: 286894 tonnes of wheat, with 185839 tons less than in the agricultural year 2010 – 2011, 24956 tonnes of barley, 136338 tonnes of maize, with 325 554 tonnes less than in the previous agricultural year, 79380 tons of sunflower and 174953 tonnes of vegetables, 23185 tons less than in agricultural year 2010 – 2011 [12].

Agriculture represents the economic sector with the highest vulnerability to the climate variability as a result of the reliance on weather developments during the growing season of the crops.

To know the climatic conditions is absolutely necessary in order to take the necessary measures for reducing the impact on the agricultural production process.

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IS RAW – VEGAN AN ALTERNATIVE TO THE TRADITIONAL DIETS IN ROMANIA?

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Abstract

Movement "raw food" is not an invention of the XXI century, not even of the twentieth century. The first studies occurred in the late nineteenth century, but the development of the movement happened only after ending of the Second World War. The name „row-vegan" was given by the great German physician Ernest Gunter who speaks and describes the many advantages of this harmonious way of life, about this natural diet in his book "raw-vegan – a hope for everyone". We must not confuse the natural or vegetarian style with this diet. Live-Food can change people's lives by improving health, physical and mental work capacity, by reducing expenses on medicines, doctors, hospitals, the disease risk transmitted by animals: trichinosis, tuberculosis, avian flu, swine flu, foot and mouth disease, and releasing "slavery cooking" of a huge number of people, especially women

Key words: *diet, food, health, raw-vegan, Romania.*

INTRODUCTION

Swiss doctor Maximilian Bircher - Benner is the first who put into question the live food as treatment and set up a clinic in 1897 in Zurich, to treat patients suffering from various diseases. He experienced the direct healing cure jaundice by fresh apples.
His name is withheld by history as the inventor of the product „muesli" (unfortunately his invention has been diversified over time so that the "muesli" today does not really have anything to do with the original recipe of Swiss doctor).
Norman Walker, Max Gerson, Weston Price - all are specialists in the early years of the 20th century who studied the effects of live feed and wrote scientific papers based on their direct observations. The 80s meant basically developing this type of diet. The current *fast food* is that marks the last century and which, unfortunately, is responsible for many health problems [2].
In the USA, the movement *raw food* caught more quickly and more widely because it has been promoted by actors, actresses, artists in general. How tendency of the masses is to follow the example of a public, it was natural that the American space be increasingly more followers of natural nutrition and kitchen without fire [1,3].
Here, in Romania, the pioneer of food without fire was Elena Nita Ibrian who believed in a regime ovo-lacto-vegetarian and at 25 ages was diagnosed and operated from cancer without many chances to survive. She lived 89 years, having a varied activity and wrote over 50 books which combine recipes of this cuisine, but also many useful health tips [8].

MATERIALS AND METHODS

In order to set up this paper, a corresponding information and documentation was done using the recent literature and research results.
The paper is a critical overview on the main aspects regarding the new trend in a healthier food consumption.
What does raw food practically mean? It is not beyond religion and does not require

adherence to any sect. It is simply a diet based on unprocessed foods, without cooking it with fire, and often organic (or least traditionally cultivated).

Fig. 1. Raw food pyramid, Source:[12]

Raw vegetables, raw or dried fruits, nuts, seeds, grains in pure form, eggs, cheese naturally occurring, fish, even meat to some extent, are all part of herbal nutrition.

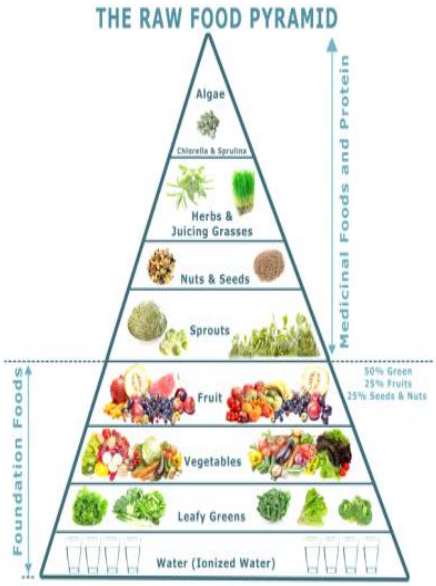

Fig. 2. *The Raw food pyramid, Source:*[12]

Nothing canned, additives or any other additions to the product, nothing's sites, chemically processed or derived by methods other than traditional handmade. There are different branches: those who choose to combine foods containing vegetable protein with animal protein and those who reject heading for a vegetarian or vegan diet par excellence. Natural diet without heat treatment follows three basic principles. First, it consumes the product but not the manufacturer, so it consume milk and does not cow, and it does not consume chicken but egg and so on [4].

The second principle is that for the preparation of food it is used temperature not exceeding 42 ° C.

The third principle is that it excludes all the refined products, technologically and genetically modified, such as bread, sugar, refined oils and recommend a food including honey, bran and pressed cold oil.

It is consuming natural food prepared without heat treatment (boiled, fried, baked or broiled) and in particular vegetable juices, fruit juices, whole wheat, whole grains, seeds, sprouts vegetables or cereals, bee products, coconut milk, pure water.

In this way, at least 75 % of food must be fresh and only 25 % to be dehydrated within 42 degrees Celsius [5].

The variety of cuisine without fire and the combination of natural products with similar tastes are vast; those preparations were heat treated but they are healthier for our body. For example we can mention a few products such as kale and vegetables, fresh or pickled, milk (raw, unpasteurized) and all dairy products obtained up to 37 degrees Celsius or natural temperature of the sun, eggs, all kinds of grains and seeds, all kinds of natural dried fruits.

As in all kitchens, the food is much diversified and rich in taste: cook the soup, cabbage rolls, cookies, cakes, ice-creams, teas and coffee.

RESULTS AND DISCUSSIONS

In the presented study, conducted on samples from subjects who had a raw vegan diet, the purpose was to observe the beneficial effects. Also, there were identified the negative effects on the subjects, which, in the opinion of the doctors, could have been avoided if they had maintained a balance and would not be exaggerated the percentage of *raw food* diet. *Raw vegan* diets contain more than 70 % thermally unprocessed food. All *raw diets* decrease good cholesterol (HDL) and increase homocysteine levels. Both changes are known

to be hazardous to health.

The study was done on 201 subjects who consumed at least 70 % of food in raw form at least two years. Then, the same study showed low levels of lycopene in the studied subjects [8].

According to another study realized on 513 subjects, all *row diets* led to a significant decrease in body weight in both sexes and *amenorrhea* at women. These negative effects are even more important as the duration of this type of food eaten is longer and the percentage of raw food in the diet is higher. Raw diet has been correlated with the decreased bone mass, which is related to osteoporosis. The study was done on 18 volunteers who ate raw food across 3.6 years (in mean). All low bone mass is due to the increased risk of occurrence of dental problems. The study was done on 130 vegetarians who consume at least 95% of food in raw form at least 17 months (median 39 months).

Solutions for optimizing the benefits of a balanced vegetarian diet

Regarding the shortcomings that are referenced where vegan diets (raw or not), researchers realized a series of studies showing that for a healthy life, vegetarians, vegans and raw vegans can supplement the diet with the right food to substitute shortages vitamins and minerals or dietary supplements and can adjust the level of B12, iron, calcium and zinc.

Calcium is absorbed more from cabbage and broccoli than from milk (an amount of 50-70 % on cabbage and only 32 % of milk). Other foods with a high calcium content are dried raisins (165 mg), sesame paddy (88 mg), oranges (74 mg), humus (64 mg) , almond (50 mg). For calcium intake is recommended a daily intake of vegetables, such as spinach, broccoli, turnips, cabbage, cauliflower, celery, peas, green beans, and dry products - peanuts, nuts.

Although, the critics argue that the iron from plants is not as well absorbed as C vitamin from consumed meat. The iron-rich foods are bran (11 mg), lentils (3.3 mg), pumpkin seeds (2.5 mg), apricots (1.5 mg), raisins (1.1 mg).

Zinc is necessary for human life and health. It plays an important biological role in the cell division; it assists sexually mature and ensure the production of enzymes that the body needs to function. Zinc also has antioxidant properties which help to prevent aging effects and rapid healing. The recommended daily dose of zinc is 11 mg for men and 8 mg for women. The vegetable sources of zinc include beans, corn, peas, peanuts, peanut butter, pumpkin seeds, sunflower, cereals fortified with zinc. Most fresh fruits such as avocados, raspberries, apricots, blackberries, figs, berries and pomegranates contain appreciable amounts of zinc. Zinc is essential for health one of the trace elements, this accelerating wound healing, contributing to the smooth functioning of the prostate, helping to increase fertility, improving brain function, improving respiratory diseases and helping the development of muscles, enhancing the appearance of skin, hair and nails.

Vitamin B12 is probably most often used as an argument against *vegan* and *raw vegan* diet. Vitamin B12 is the largest and most complex of all vitamins and is necessary for the formation of red blood cells. It is essential to prevent certain types of *anaemia* and neurological disorders. It is also involved in the metabolism of fats and carbohydrates and is essential for growth.

Although vitamin B12 is produced exclusively by the microbial synthesis in the digestive tract of animals, who do not consume animal products. This states that this vitamin can be assured in several ways. Vitamin B12 can be present in raw vegan diet including algae and other marine plants and *maca*, but they have small amounts of B12 so that the 100 % raw vegans consumers should take supplements with B12 vitamin.

The recent researches have shown that the deficiency of B12 for a short period of time can lead to neuropsychiatric disorders. The B12 supplementation can restore the levels of B12 in the body and eliminate *anaemia*, but the changes at the nervous system level are irreversible. The risk of a diet with a low level of B12 is caused by the fact that the vegetable products contain too little vitamin B12. [7, 10,11,12, 13]

A similar study made by the Nutrition Council

showed that the most viable way to assure B12, it is the nutrition B12 tablet which should be taken daily after diluting in water, as discovered and researchers at Loma Linda University.

CASE STUDY:

In 2011, when the company *PACIFIC BIO CULTURE SRL* was founded, one has proposed that the Restaurant (NACE code 5610) to get into a niche market rather than the poorly represented and developed restaurants where (RAW) vegan food is served.

Raw vegan food domain is a modern one challenging as the preparations included in the restaurant menu to combine the usual ingredients with exotic food. The result of this combination is a fresh, tasty, nutritious and especially hearty food.

Therefore it can easily explained the development of the company Pacific Bio Culture, which increased its turnover from Lei 45,000 and 3 employees to Lei 360,000 and 7 employees in only 2 years.

Table 1. Pacific Bio Cultura SRL information

Address:	29, Av. Lt.Vasile Fuica Str., App. 7, Bucharest District 1, Bucharest, 12083
Legal form:	Limited liability company, CAEN Code: 5610, Restaurants
Registration number: Unique registration code:	J/40/11044/2011
Company Status :	In operation
Social seat:	96B, Drumul Lapus Str., Bucharest District 1, Bucharest
Wardens:	Filip Cristina Paula, warden
Shareholders:	Name: Filip Adela Ioana
Financial information:	
2013:	Turnover: Lei 361,478 Profit: Lei 0 Employees: 7
2012:	Turnover: Lei 366,858 Profit/Losses: Lei -72,092 Employees: 4
2011:	Turnover: Lei 44,376 Profit: Lei 0 Employees: 3

Source: Ministry of Finance [6, 9]

CONCLUSIONS

In Romania the *raw vegan* food mission is difficult, although it is appreciated theoretically, but when it comes to put in practice the situation is changing. [2]

The trend in the last few years is rediscovering gastronomy, at least for a segment of the population and deserves by a pricing policy that encourages healthy eating.

But for now, most of the "clients" are oriented to what is cheap and not at all healthy.

As long as the eco and bio products market is also booming in Romania, the adoption of vegan diets will become more accessible. And the people seem to have a high interest both in terms of health, as well as for pure economic reasons.

Overall, raw food is very hearty thanks to the use of large amounts of sprouted grains, root vegetables and various kinds of nuts soaked not get fat, but they are very nutritious. So, in the winter the costs do not rise very much; it can reach up to 50 Lei/person/day.

Vegan diet without fire seems to be a good deal for consumers. During a summer week when it is consumed only *raw food*, one spends about Lei 30-50 per 7 days. The menu consists of fresh fruit and some vegetables bought from the market.

Live-Food can change people's lives by improving health, physical and mental work capacity, by reducing expenses on medicines, doctors, hospitals, the disease risk transmitted by animals: trichinosis, tuberculosis, avian flu, swine flu, foot and mouth disease, and releasing "slavery cooking" of a huge number of people, especially women.

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MOLDOVAN TAX REFORM: 25 YEARS OF CHANGES

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Abstract

Since its independence, the Republic of Moldova decided to consolidate its place among the democratic nations and started the economic reform in order to integrate it in the European and international economy as well as in the process of globalization. The reform of the national economy was oriented towards the substitution of the old, outdated and almost collapsed socio-economic system by one capable to ensure the continue progress in the society. This reform could be done through fiscal legitimacy, which may be achieved by a clear and transparent establishment and predictable rules, especially in the statutory and the administrative aspects of the tax system. Unfortunatelly, the concept adopted to be implemneted does not consider the ongoing changes and local particularities. After 20 years of implementation, the tax system is still characterized by oversize, austerity and the state's inability to manage its resources efficiently. Nevertheless, many steps have been made to change things in the last 5 years. This paper aimed to examine the tax reform changes in order to reveal the weaknesses of the Moldovan tax system and to understand its areas of strength.

Key words: *tax reform, fiscal policy, tax administration, tax law, tax system, taxing culture*

INTRODUCTION

Moldova's transition from planned to market economy required a total reconstruction of the tax system structure, particularly: taxes, tax administration and legislation of tax matters. However, in practice, Moldova's tax system wasn't able to solve the multitude of problems that occurred. This system is unfair as it hampers economic growth, applying half measures, and does not ensure state programs and services efficiently. The legal economy was substituted with "shadow one" that gets alarming proportions until present. The tax system, after 20 years, was characterized by oversize, austerity and state's inability to manage efficiently available resources and some steps were taken in the last 5 years. With this paper we aim to examine the tax reform changes in order to reveal the weaknesses of Moldovan tax system and to understand its areas of strength.

MATERIALS AND METHODS

This research is relevant for two groups of addresses: governments and policy makers, and academic stuff and researchers. Firstly, we analyse the Moldovan fiscal policy. Second we distinguish six stages of the Moldovan tax system transformation, including characterization of the main changes of tax reform, highlighting Tax Administration transformation, Tax law amendments and new legal implementations, the administrative-territorial reforms; the Information Technology efforts, etc. The article focuses primarily on the situation faced by Moldova in the last 25 years. A large amount of data provided by IMF, OECD, Mains State Tax Inspectorate, Ministry of Finance information and other sources of technical expertise was collected, synthesized, and analysed.

RESULTS AND DISCUSSIONS

1. Fiscal policy transformation: statistical evidence

Moldovan tax reforms generally correspond to the "flat tax" approach, based on tax simplification and aligning the *de jure* tax burden with the *de facto* capacity of the tax administration. An increase of tax payments in 1990-1995 was obtained, essentially on account of high inflation (up to 77% of the

companies' benefit were ensured by inflationary pressure) [22]. In 1996 this reserve is exhausted, while reducing GDP and tax evasion continued their pace. Reform introduced after the turn of the millenium reduced tax rates without reducing tax revenue, by broadening the tax base and reducing the number of exemptions. These "flat tax" reforms are widely seen as helping to reduce corruption (Moldova assessed score of public-sector corruption below 3 on a scale of 0 (highly corrupt) to 10 (very clean))[1] and shadow economy (the averaged rate of the shadow economy in Moldova is 44.4% during the analysed period) and accelerate GDP[2] (Table 1). Schneider clearly demonstrates that the increase of tax and social security contribution burdens is by far the most important single contributor to the increase of the shadow economy [6, p. 56].

Table 1. Moldova: Key Macroeconomic Indicators, 1991-2014

	Fiscal Accounts			Real economy					Remittances % of GDP	Corrupt.Percept.Index	Shadow Economy
Year	Expenditures, % GDP	Revenues, % GDP	Gen.Gov. Balance, % GDP	GDP, mil US $)	GDP grow,% change	Imports, % vol. change	Exports, % vol. change	GDP deflator			
1990	-	-	-	3,503	-2.40	-	-	13.5	-	-	-
1991	-	32	-	3,095	-16.00	-	-	139.8	-	-	-
1992	-	20	-	2,319	-29.10	-	-	945.0	-	-	44.25
1993	-	17	-	1,524	-1.20	-26.9	-45.8	860.5	-	-	43.36
1994	22.7	17.0	-5.7	1,424	-30.90	2.8	25.4	276.4	-	-	42.87
1995	46.2	39.4	-6.8	1,400	-1.40	26.5	29.2	38.7	0.06	-	43.11
1996	43.9	35.9	-8.0	1,700	-5.20	31.0	10.7	26.9	5.14	-	43.57
1997	50.0	39.8	-10.2	1,900	1.60	12.3	1.7	12.6	5.93	-	43.80
1998	42.6	37.6	-5.0	1,698	-6.50	-10.4	-26.4	5.6	7.58	-	44.24
1999	36.7	29.5	-6.3	1,171	-3.40	-20.0	2.7	44.9	9.55	2.6	44.87
2000	34.5	31.0	-3.5	1,288	2.10	26.1	10.4	27.3	13.86	2.6	45.35
2001	29.4	29.2	0.3	1,481	6.10	12.0	15.1	12.1	16.43	3.1	45.65
2002	30.4	29.6	-0.8	1,662	7.80	18.0	20.1	9.8	19.48	2.1	45.76
2003	33.3	34.0	0.7	1,981	6.60	28.6	19.0	14.9	24.57	2.4	45.76
2004	34.6	35.4	0.7	2,598	7.41	0.3	8.3	8.0	27.14	2.3	45.61
2005	37.0	38.6	1.7	2,988	7.49	24.6	18.5	9.4	30.62	2.9	45.20
2006	39.8	39.9	0.0	3,408	4.80	10.9	-0.1	13.4	34.50	3.2	44.98
2007	42.0	41.7	-0.2	4,403	3.07	14.6	15.0	15.8	33.88	2.8	44.50
2008	41.6	40.6	-1.0	6,056	7.76	2.9	-0.7	9.3	31.18	2.9	43.94
2009	45.2	38.9	-6.3	5,438	-5,99	-23.6	-12.1	2.2	22.04	3.3	-
2010	40.8	38.3	-2.5	5,813	7.09	14.3	13.7	11.1	23.25	2.9	43.4
2011	39.0	36.6	-2.5	7,016	6.41	19.7	27.4	7.7	22.81	2.9	-
2012	40.1	38.0	-2.1	7,253	-0.70	2.2	1.7	7.9	24.62	3.6	-
2013	38.7	37.0	-1.8	7,985	9.40	4.4	9.6	4.1	24.86	3.5	-
2014	41.4	39.3	-2.2	7,944	4.60	0.4	1.1	5.1	26.11	3.5	-

Source: elaborated by author based on the Moldova STS, World Bank, Transparency International and source [5] data.

The efforts to stimulate economic growth through the tax system during this period resulted in an insignificant result, with large macroeconomic imbalances (e.g. decreases of exports and negative GDP growth), especially in crisis time. Statistics show that Moldova's public finance system remains vulnerable to macro financial and political shocks[3] and dependence of the personal remittances is evident. Remittances in Moldova averaged 892.49 USD Million from 1995 until 2015, reaching an all time high of 2,074.57 USD Million in the 2014, growthing gradually. However, 2008 crisis brought about 10% decrease of remittances in GDP. Thus, we can conclude that tax system does not achieve both financial function, contributing to the destabilization of the financial structure (budget deficit, external debt, etc.), and the regulating function (changing tax laws create undue burdens for taxpayers and tax administration, loss of taxpayers' confidence and ultimately their emigration abroad, etc.). Thus the government of Moldova is losing up to 20% of its revenue due to tax collection effort [2, p.143] and according to the 2004 population census, 25% of the labour force – were working abroad [14, p.3].

The primary objective pursued by the state fiscal policy during all stages of tax system transformation is to identify the balance between the need to increase revenues, as a main source of covering the expenses directed towards the economic and social needs and the need to support the business environment, which is the main factor of economic growth. Thus, since 2000, Moldova's fiscal performance has been commendable, in contrast to its deteriorating performance through most of the 1990s. Over the past 25 years (1990-2014), the share of tax revenue as a percent of GDP has changed, with a volatility from 21.8 to 34.0 percent and never reached its pre-1990 level of 41 percent (Table 2).

The structure of revenue changed too. While social contributions remained a significant source of revenue, the collection of CIP and

[1] Fore more info see: http://cpi.transparency.org

[2] The cumulative decline in GDP of 65% between 1990 and 2000 turned Moldova into the poorest country in Europe, which has lasted until present time.

[3] Moldova has been faced four major crises (The economic, social and political crisis of 1989-1992, The Russian Financial Crisis of 1998, The global economic and financial crisis of 2008 and The Ukrainian and Russian crisis of 2014–present) that revealed the need for fiscal adjustment.

customs tax revenues declined substantially (e.g. CIT is reduced from 12.3% in 1989 to 2.2% in 2014 and Foreign Trade taxes – from 6.3 to 1.4 respectively).

Table 2. Moldova: Revenue structure by Percent of GDP, 1991-2014

Year	Tax rev. in tot. Revenue, %	Social Fund contrib	Health Fund contrib	Excises	VAT	CIT	PIT	Foreign Trade taxes	Other Taxes	Total tax revenue
1989	-	6.3	-	-	12.0	12.3	4.4	6.3	-	41.0
1990		-	-	-	-	-	-	-	-	-
1991		-	-	-	-	-	-	-	-	-
1992		9.6	-	-	6.7	4.8	1.8	-	-	22.8
1993		7.8	-	-	4.4	4.6	1.6	-	-	31.3
1994	75.4	7.1	-	-	4.3	4.5	1.7	-	-	28.8
1995	81.6	10.2	-	-	7.0	4.9	2.5	-	-	27.4
1996	82.1	9.8	-	-	7.0	4.1	2.5	-	-	29.9
1997	75.3	8.2	-	4.5	10.7	2.4	2.8	-	-	28.3
1998	81.3	8.6	-	4.1	12.3	2.2	2.2	1.2	1.5	21.8
1999	75.2	6.4	-	3.6	7.6	1.9	1.8	1.9	1.6	24.8
2000	75.1	6.3	-	4.1	8.4	1.7	1.7	1.4	1.4	25.0
2001	79.9	6.8	-	3.6	7.9	1.8	1.8	1.2	1.2	24.4
2002	83.3	9.1	-	2.9	9.0	1.9	2.1	1.5	1.2	25.8
2003	80.0	7,3	-	3.2	10.1	2.1	2.3	1.7	0.9	27.5
2004	83.2	7.2	1.0	2.8	10.7	2.4	2.5	1.5	1.0	29.8
2005	80.9	7.8	1.2	3.1	12.3	1.9	2.6	1.8	0.9	31,6
2006	82.5	7.9	1.2	2.4	13.8	2.4	2.5	1.9	0.8	33.3
2007	80.5	8.2	1.6	2.6	14.2	2.6	2.5	1.7	0.7	34.0
2008	83.3	8.6	1.8	2.5	14.5	1.1	2.4	1.8	0.7	33.4
2009	81.5	9.2	2.3	2.5	12.6	0.7	2.4	1.5	0.7	32.0
2010	80.2	8.3	2.1	2.9	12.7	0.7	2.1	1.5	0.6	31.0
2011	83.4	8.0	2.0	3.2	12.7	0.7	2.1	1.4	0.5	30.5
2012	83.8	8.1	2.0	3.3	12.1	2.2	2.3	1.5	0.3	31.8
2013	85.1	7.8	2.0	3.5	12.2	2.1	2.2	1.4	0.3	31.4
2014	85.4	8.1	2.3	3.6	12.5	2.2	2.3	1.4	0.3	32.7

Source: developed by author based on Ministry of Finance and Moldovan Tax Administration data.

As Table 2 shows, the tax revenues are holding the major budget revenues over the period, constituting the higest rate of 85.4 percent in 2014. Of these, 39.7 percent reprezents direct taxes and 45.8 percent represents indirect taxes. The main innovation in response to the 1990-2014 changes was the introduction of VAT. The source of income continue to lead the structure of tax revenues, reaching 32.7 percent of total tax revenues in 2014.

Excessive expenses are the main cause of increasing the budget deficit. The tax reduction to the level at which they can stimulate the production is impossible. In order to decrease the budget deficit, Moldova had to go a long way from consolidation to decentralization of fiscal powers that continue to present time. Intergovernmental fiscal relations should be reformed in a way that is consistent with fiscal discipline and reduces the inefficiencies stemming from small, fragmented local governments.

During the 2001-2009 period, the total public expenditure registered an upward trend. Generally growth is uniform, except expenses for compensation of employees, which increased from 2001 to 2009 by 3.6 percentage points. Nevertheless, it has to be mentioned, that public expenditure growth in this period is based on the increase of public revenues, reaching an all time high of 45.2 percent of GDP in 2009 and to a record low of 29.4 percent in 2001. After 2009, mounting imbalances and the impact of the crisis necessitated sizeable fiscal adjustment. The government undertook tax policy reform and a rationalization of current expenditures. With an already high tax burden and weaknesses in revenue collection, adjustment has mostly been achieved by constraining expenditures (Table 3). As a result, the fiscal deficit of the general government has declined by over 4 percentage points of GDP in the five years since 2009, to 2.2 percent in 2014. Moldova has managed to restrain transfer and public consumption (including the wage bill and purchases of goods and services). Meanwhile, capital expenditures increased to 7.9 percent of GDP in 2014.

Table 3. Moldova: Expenditures structure by Percent of GDP, 1991-2014

Year	Use of goods and services	Other current	Compensation of employees	Social benefits	Capital expenditures	Total expendture
1995	-	-	-	-	-	46.2
1996	-	-	-	-	-	43.9
1997	9.5	13.7	8.9	13.0	4.9	50.0
1998	6.4	13.6	7.1	10.8	5.0	42.6
1999	4.3	14.1	6.1	7.8	2.6	36.7
2000	4.6	8.9	7.7	8.3	5.0	34.5
2001	4.6	6.0	8.1	7.2	3.5	29.4
2002	3.6	3.2	9.5	9.1	5.0	30.4
2003	6.2	4.1	9.6	8.8	4.6	33.3
2004	7.8	4.3	7.8	9.7	5.0	34.6
2005	7.7	4.3	8.0	10.8	6.2	37.0
2006	8.3	3.9	9.2	10.6	7.8	39.8
2007	8.7	5.1	9.1	11.6	7.5	42.0
2008	9.3	2.3	11.6	11.4	7.0	41.6
2009	10.0	4.1	11.7	14.3	5.1	45.2
2010	9.3	2.9	10.3	13.5	4.8	40.8
2011	8.8	2.4	9.5	13.1	5.2	39.0
2012	8.9	2.6	9.6	12.6	6.3	40.1
2013	8.8	2.2	8.3	12.3	7.1	38.7
2014	9.3	2.6	8.7	12.9	7.9	41.4

Source: elaborated by authors based on the Moldova Ministry of Finance, Medium Term Expenditure Framework (MTEF) and World Bank data. There is no data public available for 1990-1994 period.

Following a substantial adjustment in 2010-2014, Moldova's fiscal position is projected to deteriorate significantly, with the budget deficit excluding grants projected to widen from 3.8 percent of GDP in 2013 to 7.1 percent in 2015. According to IMF [18, p.9], this reflects significant 'pre-election increases in wages and pensions, some ad hoc tax benefits, and weaker economic activity. The

authorities have also introduced measures to compensate those affected by trade restrictions'. Moreover, Moldova could experience a decline in external assistance, making it important to preserve fiscal sustainability in the long and medium term. In this regard, further expenditure adjustments and improvement in tax collection, by promoting voluntary compliance among taxpayers, and therefore administration are needed.

3.Moldovan Tax Reform

After the breakdown of the Soviet system, Moldova was left with the heritage of a socialist state, including internal distortions and external imbalances. In this regard, Moldova had to recover from a centrally planned economy and move to market-oriented economy. One of the biggest challenges faced was reform of the Moldovan tax system (MTS). In fact, we argue, no tax system existed in the normal sense (Box 1) [20].

Box 1. The state played a dual role in the system as a tax collector and tax payer, owning centralized banking system, which track state owned enterprises (SEs) transactions. Budget revenue were ensured by two primary sources: turnover tax on consumption goods and services that was extremely low or negative (subsidies) on basic products and very high on luxury goods, and SEs profits, classified as deduction of surplus product rather than profit taxes varying from 50 to 100%. However, without strict rules on deductible production costs, total tax liability becomes negotiable. Thus, the state adjusted arbitrarily tax structure and administrative procedures to meet budgetary requirements. Moreover, negotiable tax liabilities allowed state to exclude bankruptcy through SEs tax relief request and generate lack of transparency within the system. Even SE management did not know what others paid in taxes. The population was unaware of tax procedures or even of tax burdens.
There were other taxes also (e.g. Personal Income Tax (PIT), considered undesirable to tax works directly and the payroll tax, designed to increase the effective price of labour) that did not play a significant role in centrally planned economies.

Based on the pace and direction of tax reforms, as well as relative success of reform implementation, we can distinguish six stages of transformation:

I – 1986-1991 – initial stage, defines the configuration of the MTS as an independent state; the stage during which taxation was aimed to perform only the fiscal function of the system. The beginning of this stage coincides with the Soviet Union promotion of economic restructuring measures, by introducing transparency, "perestroika" (reconstruction) and the "acceleration" of economic development by Gorbachev M in early 1986 and the collapse of the Soviet Union in 1991. The first step towards a tax system was taken in 1987-88 by introducing fixed "economic rates". The absolute sums of payments set in financial plans were transformed into fixed percentage rates.

The necessity for tax reform has obviously appeared since 1990. According to the Concept of the tax reform, the tax system must provide a homogeny and fair attitude to all taxpayers, regardless of the type of property and management; ensure a stable basis for financing state programs and development of services. The structure of this system should be organized in such a way that state can guarantee social and economic facilities for some groups of the population and sectors of the economy.

Decision No. 68 of the Council of ministers of MSSR can be motioned as among the first important legislative decisions related to tax matters in this period. According to the decision, a new body was created called the State Tax Inspectorate, including its independent subdivisions within the Ministry of Finance, on 7 March 1990.

II – 1992-1994 – characteristic for the second stage is the achievement of the control function. As a result of the second stage of transformation, the tax system has generated a flux of laws that constituted the legal basis of a recently new independent state, called the Republic of Moldova.

It has to be mentioned that along with the adoption of the Law on the foundations of the state tax system the real tax reform started on 17 November 1992. This act was determined the economical, juridical and organizational establishment of the tax system in Moldova, and provided the types of taxes and taxpayers' obligations, rights, obligations and fiscal authorities' accountability, defending taxpayers' defend and taxation liability for

infringements. This law served us for a decade (abolished after entry into force of Title V of the Tax Code in 01.07.2002).

During this phase have been identified the main type of taxes: Value Added Tax (VAT); Excises; Corporate Profit Tax (CPT); Personal Income Tax (PIT); Land tax; Road tax and transit tax.

Among the most important legislative acts related to the tax matters can be mentioned:

-Law on Tax banks and other credit institutions' benefit Nr. 490-XIII/ 1994;

-Law on local taxes and fees Nr.186-XIII/ 1994.

Characteristic of the second phase is the introduction of the national currency on 11.29.1993, which subsequently had an impact on personal income tax rates and adoption of the Constitution on 29.07.1994, which legalized the principles concerning taxation directly and general principles of law. Moreover, it should be noted that in conditions of extremely high inflation rates during that period [12, p.35][4], the promoters of the tax system did not consider offsetting the fixed capital situation of the reproduction, which became extremely alarming. The funds accumulated for the renewal of fixed assets (depreciation) have not covered the companies' needs. Depreciation rules set at levels much lower than in reality led to an artificial increase of profits, and consequently to an excessive CPT paid to the state budget. This process had huge impact on the consumption of productive economic potential, reflecting a particularly negative trend in the reduction of profitable companies (in 1993, only 17% of manufacturing companies were profitable [19, p.94]).

III – 1995-1996 – this stage is characterized by accelerating the pace of development of the tax system. In order to stimulate development of production, the promoters of the tax system transformations designed the fiscal levers' mechanism, particularly by stimulating investment activity.

In this regard, many changes occurred in the direct and indirect taxation:

-A new VAT rate at zero percent starts its application.

As so, the items imported from the former Soviet Union and exported to countries that are not part of the former USSR were exempt from VAT. However, application of two methods on VAT system calculation made it even more complicated. Thus VAT turns into a distorting tax, which admits several times taxation during the collection process.

-The process of granting tax exemption for joint ventures with foreign investment was greatly simplified[5]. Thus there was offered a range of tax facilities related to VAT and customs duties.

-Local enterprises were granted with tax credit[6].

-The progressive method was excluded, by enacting the CIT 32% single rate for all enterprises (except financial institutions (who was paying up to 40% of their taxable income) and enterprises who receive income from running casinos, slot machines, video parlors (who was paying up to 70% of their taxable income).

-Since the end of 1995, taxable profits are reduced by the amounts of actual expenditure incurred for direct investments destined for technical re-equipment and reorganization of production. The only condition provided was the full use of depreciation allowances and other own resources, but not more than 70% of taxable profits[7]. And in 1997, the taxable profit is reduced by the amounts of actual

[4] According to data provided by Marcova Elena, the average annual inflation rate for 1985-1994 period, was 478,1 percent, which was quite higher comparatively to Ukraine -1155,6%; Poland – 113,1%; Romania – 79,0%; Bulgaria – 77,8%; Greece – 16,7%; Spain – 6,2%; Italy – 5,7%; France – 3,1%; Austria – 2,8%; Belgium – 2,6%; Germany -2,4%; the Netherlands – 1,8%.

[5] Law No.197-XIII of 27.07.1994 on amending the Law on Foreign Investment, Arts.35 et seq.37 and 38.

[6] Law regarding the support and protection of small business No.112-XIII of 20.05.1995. Official Gazette of the RM, No.2 of 25.08.1995, Art.7. According to this law, subjects of small businesses dealing with production activities or social services were allowed tax credits under the exemptions from paying CPT and reduced tax rates at the end of granting tax credit period.

[7] Law No.1214-XII, art.6 (1a) of 17.11.1995 on amending the Law on Corporate Profit Tax.

expenditure incurred for jobs' creation, taking as base 10 minimum wages per year for each job[8].

-From 1996, some exemptions were provided on CIT for banks and other credit institutions performing loans in direct investment[9].

Nevertheless, there are some disadvantages of this period that have to be mentioned:

-Tax differentiation of the fiscal regime for imports and exports between former USSR and non-USSR countries as well as different tax regime between the members of the Commonwealth of Independent States.

-Tax discrimination of domestic investors comparatively to foreign investors. Moreover the undiscerning Tax privileges granted have transformed Moldova into an oasis only for fiscal speculations and hidden business, as well as for foreign companies with experience in tax fraud.

-Complication of the tax system. In this regard, the number of legislative, normative and instructive acts currently implemented was very impressive (e.g. the provisions on deductible business expenses demanded knowledge of the entire set of detailed rules. In 1996 there were 41 legislative acts in force regulating taxation of companies' benefits, including 11 laws, one parliamentary decision, three Decrees of the President, 7 Government's Decisions, 17 instructions and practical guides of the Ministry of Finance and Tax Inspectorate, a few instructions of the Department of Statistics, etc.) [4].

At the same time, it has to be mentioned that characteristic for this period is establishment of the budgetary mechanism, by adopting the Law on budget system and budget process and Law on budget classification in 1996.

Even though Moldova achieved certain progress in tax reforms during the first three stages, later, as we will see, many challenges were faced in terms of maintaining good tax policies, completing transformation of the tax system into one similar to that of developed countries, and recovering previous tax revenue levels.

IV – 1997-2005 – this stage is characterized by the practical implementation of the New Fiscal Reform Concept[10], followed by entry of the Tax Code into force, the National Accounting Standards[11], the Government Decision on the tasks of the State Treasury and continuous improvement of the tax management system.

In this regard, the tax legal system was improved by adopting:

-The Tax Code (1997-2001), which establishes rates and bases for taxes;

-The Law on Customs Tariffs No.1380-XIII/1997, and subsequent amendments;

-Law on Entrepreneurial Patent No.93-XIV/1998;

-The Law on State Social Insurance No.489-XIV/1999, defines the scope and coverage of the National Social Insurance Fund;

-Law on Farms No.1353-XIV/2000;

-Law on Entrepreneurial Cooperatives No.73/2001;

-Law on Local Public Finance, No.397-XV/2003;

-Law on e-document and digital signature No.264-XVI/2004);

-Law on Leasing Nr.59-XVI/2005, etc.

It has been recognized that 'gradual implementation of these laws has brought more stability and transparency into the fiscal system' [17, p.8]. This effort was supported by tax administration reform: in 1991 - developing the computerization program of the State Tax Service; 1996 - setting the tax inspectorate offices to an e-mail and unification tax filing system; 1998 - application of the Information System database; 2002 - Tax Code, Title V - Tax Administration, etc.

Moreover the Ministry of Finance has a role to play in this regard and its role has been strengthened through various mechanisms,

[8] Law No.1214-XII, art.6 (1f) of 22.07.1997 on amending the Law on Corporate Profit Tax.

[9] Law No.665-XIII of 23.11.1995 on completion and modification of Art.5, Law No.490-XIII regarding taxation of banks and other credit institutions from 03.08.1995.

[10] Parliament Decision regarding Tax Reform Concept, No.1165-XIII of 24.04.1997.

[11] Transition to the National Accounting Standards took place on 01.01.1998. This transition has ensured strict records of taxable financial results according to the international rules, for the whole period of activity (and not only for the ended activity as was done previously).

including the Medium Term Expenditure Framework (MTEF) starting with two periods: 2003-2005 and 2004-2006. Furthermore the tax legal system transformation was supported by enforcement acts: Criminal Code No.985-XV/2002 and Law on the Declaration and Monitoring of the Income and Assets of State Dignitaries, Judges, Prosecutors, Public Servants and Certain Persons holding Managerial Positions No.1264-XV/2002.

Two administrative-territorial reforms and other changes to local finances have caused considerable uncertainty and reduction (Box 2) weak Moldovan economy from an institutional point of view through contradictory or not logical legislative base.

V – 2006-2010 – characteristic for this stage is improvement of national legislation on tax administration and fiscal reporting, and creation of a favourable investment environment.

Box 2. In the analysed period (1990 - 2014) Moldova had three administrative-territorial reforms: 1994, country's territory was divided in 38 raioane (districts), including five in Transnistria and three in Gagauzia; 1998/1999, the districts were amalgamated in 10 judete (counties), accompanied by a significant administrative reform, with new division of competency and resources, as in Romanian model, returning to the pre-soviet administrative-territorial structures from sub-optimally small local governments, reinforcing self-administration; 2001/2003, new administrative-territorial reform adopted by the Communists, which took effect after the local elections in 2003. The current model of territorial reform was established, with significant reductions in local autonomy and was justified by need to reduce the number of local government employees and to bring services closer to the people.

The main challenges of the period are:

-Law No. 111-XIV/2007 on fiscal amnesty. Thus, "*historic debt"* on taxes was cancelled, as well as other payments, *penalties and fines, imposed on taxpayers.* As a result of the tax amnesties being annulled, the national public budget was in arrears in the amount of 4.3376 billion MDL [3, p.109].

The Tax Code set the CIT rate to zero percent with entry into force on January 1st, 2008. However, this measure has not achieved its purpose, as foreign investors have not rushed to come and the situation of the domestic companies has been double hampered as a result of the increased fines size and inexperience. Although the current CIT rate is 0%, companies must submit a CIT declaration. An incomplete or incorrect CIT declaration is fined by 15% of undeclared or reduced taxable income. Moreover, the cost of credit, corruption, and a lack of an independent court system were considered to be more important obstacles to business development than taxation [16].

-Law No. 111-XIV/ 2007 on capital legalization. Declaring real estate, securities, shares held by individuals and businesses that have not been previously declared or their real value was diminished for tax purposes, could legalized the capital until 30 December 2008. For their legalization the owners should pay a tax of 5% of the positive difference between the declared value at the moment and the previously declared value.

In order to create a favourable investment environment, the Government of Republic of Moldova adopted the Strategy for attracting investment and promoting exports for 2006-2015 [7]. During the given period the following tax and customs facilities were used:

-Exemption from VAT and customs duties for the import of goods worth more than 1000 MDL and with higher operating period of 1 year;

-Enterprises with investments in statutory capital or that make capital investments of over USD 250,000 are entitled to a 50% income tax reduction, effective for a period of five consecutive years [1, pp.117-118].

-Full exemption from corporate income tax is granted to entities with investments of more than USD 2 million, 5 million, 10 million, 20 million or 50 million. The period of exemption depends on the amount, and can be up to seven years if certain conditions are met [10].

-Customs duties levied on goods imported from all countries, except CIS and Romania, with which Moldova has signed agreements on free trade. Thus only part of the total import was subject to customs duties. The

exported goods has not been charged customs duties.

Tax Code has been improved by adding:

-New provisions on taxation of non-residents regarding concretization of income sources, forms of activity and mode of benefit of tax facilities and incentives in order to avoid double taxation.

-New Title IX „Road Taxes" of the Tax Code [9].

Significant changes were made to the Law on Securities Market adopted in 2007. The amendments were focused on investor protection; increase in secondary market transactions and disclosure of information provisions.

At the same time, other laws have been adopted and amended:

-Law on State Registration of Legal Entities and Individual Entrepreneurs No.220-XVI/2007 [11].

-Law on Limited Liability Companies (LLC) of 14.06.2007.

-Law on Joint Stock Companies (JSC), which was amended essentially in 2007.

-Contravention Code of the Republic of Moldova, Law nr. 218-XVI/2008.

In 2006, by Government Decision no. 1208 from 20.10.2006 the Strategy for the Development of the State Tax Service for the years 2006-2010 was approved, marking a new development stage, meant to contribute to the tax administration foundation strengthening that was put in place in previous years. According to the STS Development Strategy for 2006-2010, a number of IT systems have been implemented, which allowed achieving significant results in the area of taxpayers' service, such as [21, p.9]:

-An infrastructure that allows submitting tax returns and tax reports electronically. In order to reduce administrative burdens, tax and reporting procedures have been simplified. Thus MTA developed its new portal: www.fisc.md, which allows taxpayers to quickly access needed information: "Download forms", "About the taxpayer", "Fiscal invoices", services of certification and issuance of digital signatures. Herewith, the "electronic counter" was launched which is meant to provide the electronic tax services. Also, the mechanism for taxpayers notification about the term of tax return and tax reports (fiscal calendar) submission was launched, as well as the notification about the receipt of tax return by the State Tax Service and errors in these declarations. An alternative to the paper-based tax return was introduced in 2010. The new automated information system (AIS) "electronic declaration", "Quick declaration" and "Electronic declaration for individuals" was launched. The S.E. "Fiscservinform" and the tax electronic services' portal: www.servicii.fisc.md were created. There were 33 electronic services provided by STS, at the end of 2014.

-Interaction between the State Registration Chamber and the Ministry of Justice based on one-stop shop principle;

-The Tax Cadastre Informational System that track real estate used as housing, commercial or industrial premises;

-Tracking system for tax memory cash registers that allows on-line receiving and analyzing currency exchange offices operations.

It has to be mentioned that tax transformation starts to be influenced most by the EU' Neighbourhood Policy in this period. According to 2005 EU-Moldova European Neighbourhood Partnership Action Plan, Moldova had to advance its efforts on improving the fiscal administration and ensuring stability in collecting budget revenues.

VI – 2011-present - Currently tax transformation continues to be influenced by the EU' Neighbourhood Policy and international cooperation. In this context, "Moldova reformed its tax system, bringing VAT and excise legislation into line with the EU acquis and international requirements. Excise duties on tobacco products, alcohol and energy products were increased, with the aim of gradually reaching the minimum EU rates by 2025. An action plan was launched to implement the tax part of the Association Agreement, covering the period 2014-16. In cooperation with the Ministry of Finance, Moldova's tax authority started preparatory work on introducing the Transfer Pricing regime. The tax authority also launched a

comprehensive organizational modernization program and started preparing strategies, aligned with the Association Agreement Action Plan, to develop key business and IT tools" [8, p.13]. Moreover, the core part of the Association Agreement is Deep and Comprehensive Free Trade Area (DCFTA). In this context, Moldova started to reduce and/or eliminate import duties in line with its commitments and adopted implementing provisions to manage the tariff rate quotas on imports of selected EU products in November 2014.

Tax evasion, or aggressive tax avoidance, have prompted contemplation of a more enhanced collective cooperation among states over international tax. Perhaps not surprisingly, therefore, OECD and EU member states have seen a surge of issues associated with significant cross-border transactions rising in recent years. The OECD Base Erosion Profit Shifting Action Plan aims to counteract unacceptable tax avoidance through allocating taxable profits to locations different from those where the actual business activity takes place. Being affected by the international cross-border approach and OECD and EU practices, Moldova started to focus on evasion and avoidance problems by transforming its tax law at the national and international levels. Thus, following the dynamic development of the international tax principles, the Republic of Moldova has joined, on 27 January 2011, the Convention on Mutual Administrative Assistance in Tax Matters. At the same time, substantive tax law started to be improved by provisions concerning tax evasion and taxpayers' control (e.g. art.244 and 244^1 of Moldovan Criminal Code, art.301 of Moldovan Contravention Code, Chapter 11^1 of Tax Code – Indirect Methods of estimation of individuals' taxable income (Law No.267 of 23.12.2011), etc.).

In the hope "to develop into a modern efficient European tax administration" [21, p.15], MTA is entering in more and more cooperative and collaborative relations. Thus cooperation and collaboration agreements were signed with the Swedish Tax Agency, the French General Directorate of Public Finance, the Dutch Tax and Customs Administration, and the Estonian Tax and Customs Board. Moreover, the Moldova Tax Authority initiated negotiations and correspondence cooperation on experience exchange in the field of tax administration with the Ministry of Finance of Azerbaijan and Germany, Israel Tax Agency and others.

Also, the intergovernmental fiscal relations' reform must be mentioned: the on-going fiscal decentralization aims at improving the quality and delivery of public services. According to the National Decentralization Strategy 2012, the specific objective for fiscal decentralization is to improve the current system of local finances "to ensure the financial autonomy of local public authorities, maximizing the efficiency and equity in allocation of resources while maintaining fiscal discipline". In this context, new amendments to the Law on Public Finance and the Tax Code were approved by Parliament in November 2013. They set new rates for sharing national taxes with the two tiers of local government, introduced formulas for transfers to local governments and removed subordination in financial relations between top and bottom-tiers of local government. The new Law is to be fully applied beginning in 2015 [15, p.xii]. In addition, the introduction of a rule-based fiscal framework aims at anchoring medium-term policy decisions.

CONCLUSIONS

Generally, we consider last period as the most relevant to Moldova's necessities of the Taxing Culture Change and results will not hesitate to come. This period is characterized by the following strengths: Budget revenue growth; STS' ability to face up to new challenges; Willingness to collaborate with international and external partners; Reducing bureaucracy by proposing the introduction of simplified administrative procedures, increased number of e-returns and e-services; Initiating inter-institutional collaboration.

Even though the tax reform in Moldova has achieved some important progress to date, significant challenges remain for the coming years.

No one argues that the current set of laws is perfect, even in the most developed countries, and moreover in Moldova. But analyses like this can move us toward a superior situation by revealing the weaknesses of local tax system and understanding its areas of strength.

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CASE STUDY ON MODEL FACTORIAL ANALYSIS OF TURNOVER IN A MEAT FACTORY FROM SOUTH-WEST DEVELOPMENT REGION

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Abstract

This paper studies the evolution of the turnover, which is determined by the action of several factors, and of particular importance in determining the causes and growth reserves of this indicator has the studying of the structure of sales, structure by type of turnover on groups of products (goods) and the types of customers. Thus, in the case of SC "Diana" SRL, the largest contribution on the turnover was the sold production, with a contribution of 67-78%, followed by sales of goods, with 28-37%. In the period under review, turnover registered a downward trend due to the influence of the three factors with direct action: the average number of employees; annual average productivity and leverage of manufactured products intended for sale.

Key words**:** *agriculture, factorial analysis, Romania, turnover*

INTRODUCTION

The turnover is the main entity's form of income, together with other operating, financial and extraordinary incomes, constitutes the totality of the entity's incomes. From this total there will be made the payment of expenses to suppliers, staff expenses due to the state, the payment of debts to banks, the payment of its utilities and other expenses that the entity can have [2].

Turnover is a persistent problem in organizations [1]. The impact of turnover has received considerable attention by senior management, human resource professionals, and industrial psychologists [4]. It has proven to be one of the most costly and seemingly intractable human resource challenges confronted by several organizations globally [3]. Agriculture and food industry have always been sectors of economic activity with great importance for Romania [5].

The option of promoting agricultural development, among Romania's strategic options, requires the adoption of measures necessary to restore as rapidly as possible the economic and social balance.

In this context, the modernization of production, able to respond not only new dimensions of technics, but also to market requirements, the action the economic laws of the competitive market of agricultural products, will mutate the way production and marketing of agricultural products are made.

One of the most important players in Romania's food market is the company "Diana" which was established in April 30, 1991 having as main business the selling of food and nonfood products. "Diana" store network has developed over time a rich product offering with the support of dozens of producers in the country and abroad. Special attention was given to the tuning of this offer with the needs expressed by customers with specific local supply needs. The brand "Diana" recognizes that, besides financial profit of its business, one that ensures investments in upgrades and new capacities, reliable profit achieved by the real needs of direct customers is most important for the future.

MATERIALS AND METHODS

In this paper, time series have been used with regard to the evolution of economic indicators from financial reports of SC Diana SRL. The study of turnover was based on the factorial analysis. For businesses with production activities, like the one on which we conduct

our research, with activity in processing and commercializing meat, is shaped following the corresponding factorial:

$$CA = \overline{Ns} \times \frac{Pf}{\overline{Ns}} \times \frac{CA}{Pf}, \quad (1)$$

where: CA means the company's turnover;

$\overline{Ns}$ – the average number of employees;

Pf – manufactured production intended for sale;

$\frac{Pf}{\overline{Ns}}$ – average annual labor productivity, calculated from the output obtained intended for sale;

$\frac{CA}{Pf}$ – leverage production obtained intended for delivery.

RESULTS AND DISCUSSIONS

Analysis of turnover for a period of time provides useful information on the enterprise's activity and the trend of business. From this point of view, the dynamic of society should be compared with the market dynamics, respectively with the dynamic of the industry. If, for example, the sector of which the enterprise belongs is dynamic, this means that the analyzed company will lose market share, whether as a result of growth at a rate higher sales volumes existing competitors, either the occurrence of new competitors, or the result of simultaneous action of two cases.

If we consider, for example, the activity of "Diana" Ltd., specialized in the production of meat and meat products, development of the turnover reveals the significant characteristics of this company. Trend of turnover is increasing in the six examined years (2008-2013), the increase being at the end of 2013, over 82%. Similar developments were registered in other companies like SC "Unicarm" LLC (84.26%); SC Smithfield SRL (150.17%); SC "CARMOLIMP" LLC (41.00%). Only in the case S.C. "Integra" Ltd., turnover had a decreasing trend, driven by several factors that directly and indirectly, including sales of goods, which decreased during the period we are talking about 63%. Company SC "Marex" SRL, however, having had a turnover with a continuous upward trend in 2008-2012, a year later became insolvent.

Evolution of turnover is caused by the action of several factors, and a great importance in determining the causes and reserves for growth of this indicator has studying the structure of sales by type of structure, of turnover by product groups (of goods) and the types of customers

If we consider component elements of net turnover, according to Ministry of Finance Order no. 94/1002, this indicator results from the sold production, sales of goods, income subsidies, out of which commercial discounts were deducted. For the analyzed companies, these different elements have contributed to the formation and evolution of the turnover.

Structural analysis should be done with studying the evolution over time of turnover. In this way we can deduce whether the change in sales structure advantaged or not the company from economical point of view. If we consider the information S.C. "Diana" SRL in the past two years (2012 and 2013), the causal link between turnover and the three factors with direct action on it, we arrive at meaningful conclusions on the level of turnover variation.

Table 1. Elements of calculation and factorial influence on turnover in the case of SC "Diana" S.R.L.

Indicators	Symbol	Realized in the period		Indicators (%)
		2012	*2013*	
Turnover (th lei)	CA	327,688	305,291	93.17
Production off take (th lei)	Pf	232,211	204,167	87.92
Average number of employees	$\overline{Ns}$	532	542	101.88
Annual average productivity of labor (thousand of lei per employee)	$\frac{Pf}{\overline{Ns}} = \overline{Wa}$	436.4868	376.6919	86.30
The degree of recovery of manufactured products	$\frac{CA}{Pf}$	1.411165	1.495300	105.96

Source: [6], Own calculation

Using factorial model (1), determining factors action involves the following calculation steps:

$\Delta CA = CA_{2013} - CA_{2012} = 305,291 - 327,688 = -22,397$ thousand lei,

from which:

1. As a result of the influence of average number of employees:

$$\Delta CA(\overline{Ns}) = (\overline{Ns}_{2013} - \overline{Ns}_{2012}) \times \frac{Pf_{2012}}{\overline{Ns}_{2012}} \times \frac{CA_{2012}}{Pf_{2012}} = (542-532) \times$$

$$\times \frac{232,211}{532} \times \frac{327,688}{232211} = 10 \times 436.4868 \times 1,.111165 = 6,159.55 thousand lei$$

2. As a result of the influence of annual average productivity:

$$\Delta CA\left(\frac{Pf}{\overline{Ns}}\right) = \overline{Ns}_{2013} \times (\overline{Wa}_{2013} - \overline{Wa}_{2012}) \times \frac{CA_{2012}}{Pf_{2012}} = 542 \times (379.6919 - 436.4868) \times$$

$$\times \frac{327,688}{232,211} = 542 \times 59.7949 \times 1.411165 = -45,734.21 thousand lei$$

3. As a result of the influence of the degree of recovery of manufactured production intended for delivery:

$$\Delta CA\left(\frac{CA}{Pf}\right) = \overline{Ns}_{2013} \times \overline{Wa}_{2013}\left(\frac{CA_{2013}}{Pf_{2013}} - \frac{CA_{2012}}{Pf_{2012}}\right) = 542 \times 376.6919 \times$$

$$\times \left(\frac{305,291}{204,167} - \frac{327,688}{232,211}\right) = 542 \times 376.6919 \times (1.4953 - 1.411165) = 17,177.59 thou lei$$

Analyzing the data presented in the table, we find that in the case of SC "Diana" SRL, turnover in 2012-2013 declined by about 7%. This was due to several factors action, wrote and explained below.

So, for example, commodity production has declined compared to 2012 with 2%, while at the enterprise level human resources increased by almost 2%. Such manifestations of the two indicators mentioned above contributed to a decrease in average annual productivity by almost 60 thousand lei per employee. Such a situation characterizes a decrease in the use of intensive labor analyzed at the enterprise level, reflecting the low efficiency with which labor was expended. In order to identify reserves of labor productivity it is required the factorial analysis, highlighting the influences performed by daily average productivity and average hourly productivity.

Among the main reserves of labor productivity at the enterprise level we can mention the following:

-better use of working time per employee;

– better work organization;

-enhancing the qualification of employees;

-developing a motivation policy for employees etc.

We also notice that, in the case of SC "Diana" SRL, between effect indicators (Ca, Pf) and effort indicators (number of employees) the correlation of balance and efficiency demonstrated by the indices are not met in the past two examined years (2012 and 2013); effort indicators index grew faster (101.88%) than effect indicators index (93.17% in the case of turnover and 87.92% in the case of manufactured products intended for sale).

All these events have contributed not only to a lower productivity annual average labor, but allowed the same time and at a favorable evolution of the degree of recovery of manufactured products intended for sale, the latter manifesting itself in an increasing trend of almost 6%. We conclude, therefore, that the reduced level of turnover in the period 2012-2013, was the natural consequence influenced by the three factors with direct action: the average number of employees; annual average productivity and the capitalization degree of manufactured products intended for sale.

While increasing the number of employees by 10 people (1.88%) influenced the turnover, raising it to 6,159,550 lei and increasing recovery of production fabricated from 1.411165 to 1.4953 allowed an increase in turnover of 17,177,590 lei, the third factor, the average annual labor productivity had a negative influence. The downward trend of this indicator, with about 60 thousand lei per employee (-3.7%) was reflected in a substantial reduction in the level of turnover of the company, this a drop of 45,734,210 lei.

We can say also that the index of manufactured products intended for sale (86.3%) was surpassed by the average number of employees index (101.88%) which

contributed to the reduction of labor productivity by 3.7%, reflecting unfavorable on the level of turnover, which decreased by 6.83%. On the other hand, the growth in turnover (93.17%) is higher than the growth rate of production of goods (87.92%) which caused increasing recovery of production fabricated intended for delivery (105.96%) with positive impact on economic development of society.

CONCLUSIONS

Analyzing the evolution of turnover we can notice a number of ways to increase its targeting:
– diversifying the offer;
– ensuring an optimum ratio between quality and price;
–improve company image through promotional actions;
– research of the market in order to analyze the demand and harmonize it with the offer.;
– promoting sale prices below of competitors;
– attracting new customers and retaining existing ones through various promotional activities;
– improve product quality and diversification etc.

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RESOURCE EFFICIENCY OBJECTIVES AND ISSUES FOR A GREEN ECONOMY

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Abstract

The main objective of this paper is a theoretical-methodological grounding and analysis of the resource-efficiency objectives and policies required for the implementation of the Sustainable Development Strategy in the EU and Romania, as well as for the transition to a resource efficient, greener and circular economy. We first outline some of the most important conceptual and theoretical issues by considering resource-efficiency as a paradigm behind the green (and circular) economy. The concept of resource efficiency expressed by the resource productivity (RP) indicator has a clear environmental and economic dimension, so it is considered an appropriate indicator of sustainable development. The objectives are shown to be strategical also in the European Union and in Romania, since the principal objective of the Roadmap to a Resource-efficient Europe (COM/2011/0571 final) is improving economic performance while reducing pressure on natural resources by boosting resource-efficient production. Moreover, in the data and graphs presented further in the paper, we try to compare the level and evolution of some key statistical indicators, in Romania and in EU-27, to enable us to check the main trends as well as whether these trends may be considered consistent with the objectives of a resource-efficient economy. Since in Romania the trend had as negative effect the increase, instead of a decrease in the gap towards the EU-27 average level of resource productivity, it must be reversed and aligned to the EU average. The recommendation is to implement programs and policies promoting higher resource-efficiency and a green economy ultimately.

Key words**:** *sustainable development, resource-efficient, green economy, resource decoupling, resource-productivity*

INTRODUCTION

The main concerns raised by sustainable development principles, such as:

- framing social and economic development within the carrying capacity of ecosystems;
- decoupling economic growth from environmental degradation;
- the long-term preservation of the viability of the overall system and its environmental, economic, institutional and social components,

have become even more stringent nowadays, in view of a transition towards a green economy.

We may still consider that a green economy is the ultimate outcome of a sustainable economic development, since a green economy generates increasing prosperity while preserving the natural ecosystems that sustain our societies and our economies.

Creating a more energy and resource-efficient society that uses resources responsibly and organizes industrial processes as to minimize waste should reflect objectives of sustainable economic development in all major areas**.**

Therefore, sustainable development involves carrying out a green economic growth which is no longer confined to reducing pollution, but requires, among other principles and paradigms, structural changes in the processes and in manufactured products, as well as in the type and amount of resources used.

The main objective of this paper is a theoretical-methodological grounding and analysis of resource-efficiency objectives and

policies required for the implementation of the SDS (Sustainable Development Strategy), as well as for the transition to a resource efficient, greener and circular economy in the European Union and in Romania.

MATERIALS AND METHODS

The methodology used below is based on:
• Relevant literature review;
• Clarification and definition of the main methodological and operational concepts;
• Figures and graphic models displaying the nature and direction of dependence;
• Analysis and synthesis of the strategic objectives for a sustainable and resource–efficient economic development in the European Union
• Adjacent calculations, with data indicators and graphics, for a dynamic comparative analysis of the trends of main indicators.

RESULTS AND DISCUSSIONS

Conceptual and theoretical issues

The concept "resource efficiency" means using the Earth's limited resources in a sustainable manner, while minimizing impacts on the environment. It allows us to create more with less and so deliver greater value with less input [13].
As we have pointed out in a previous paper, water is one of the most important and scarce environmental resources, with some particular characteristics that raise serious challenges for a good management and sustainable development [11]. But water is not the only priceless natural resources that we rely on for a sustainable socio-economic development.
All stages of the resources' life cycle – extracting natural resources, transforming them into goods, and subsequent processes of recycling and disposal – put pressure on the environment. Yet this systemic relationship is the very essence of the continuous economic process of production and consumption.
Since we depend on the natural resources of the earth, it appears necessary to require a new economic system that respects the integrity of ecosystems. Green economy aims at sustainable management of environmental resources, based on the belief that our biosphere is a closed system with finite resources and a limited capacity for self-regulation and self-renewal [1].
In this respect, the resource nexus is as well a conceptual model that illustrates the interconnections between and among different resources (Figure 1); in other words, it visually displays that one (or more) resource is used as an input to produce another resource [2].

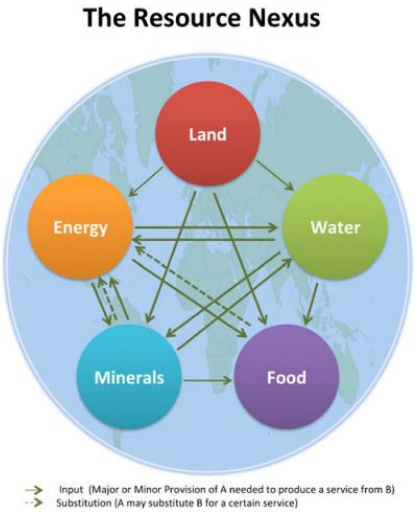

Fig. 1. The global resource nexus model
Source: [2]

We find the global resource nexus model (Figure 1) as very suggestive for a green (circular) economy model and especially for our topic, since the importance of the sustainable management of natural resources and of their increased resource-efficiency is highlighted and may be better acknowledged.
More efficient production processes and better environmental management systems can significantly reduce pollution and waste, and save water and other resources. Therefore resource-efficiency is a paradigm behind the green (and circular) economy, a system that optimizes the flow of goods and services to get the most out of raw materials and cuts waste to the absolute minimum.
The need for higher resource-efficiency has clearly been outlined by the EU's Thematic Strategy on the Sustainable Use of Natural Resources [3]. Also, as previously analysed in [13], we observe that resource-efficiency, enabling the decoupling of resource use and

environmental impacts from economic growth and measured by the resource-productivity indicator, underpins all the valuable ideal concepts of economy and development: sustainable development, the green economy and the circular economy, as well as the strategies dedicated to their objectives.

Besides the economic significance, the issue of resource efficiency expressed by the resource productivity (RP) indicator has a clear environmental dimension, so it is considered an appropriate indicator of sustainable development. Resource productivity describes the relation between economic outputs in monetary terms (Y – numerator) and a physical indicator (M or R – denominator) for material or resource input.

The concept 'resource productivity' may be analysed in a welfare perspective and is understood to involve a quantitative dimension (e.g. the quantity of output produced with a given input of natural resources) but also a qualitative dimension (the environmental impacts per unit of output produced with a given natural resource input).

In the sustainable development framework, total resource consumption (material flows, energy and land) is an appropriate description of the long-term environmental disturbance potentials and its reduction turns out to lead reliably to a de-escalation of most environmental problems, although not proportionally. Breaking the link between material use and economic growth (called the decoupling effect) means a dematerialization of economic development, or the relative or absolute reduction in the quantity of materials required to serve economic growth.

In the recent relevant literature [14], the decoupling is considered in two distinct effects: the resource decoupling, which could be referred to as increasing resource productivity; the impact decoupling, referred to as increasing eco-efficiency.

From a strategic viewpoint, in raising the resource productivity resource decoupling seeks to alleviate the problem of scarcity and respond to the sustainability challenge of intergenerational equity by reducing the rate of resource depletion, while also reducing costs. Besides that, resource decoupling may be expected to simultaneously reduce the environmental impacts of certain resources.

Issues and objectives for a resource-efficient economy

The EU's Thematic Strategy on the Sustainable Use of Natural Resources [3] has the objective of achieving a more sustainable use of natural resources by reducing the negative environmental impacts generated by the use of natural resources while ensuring economic growth. Moreover, at present, a resource-efficient economy is required expressively in Europe. The Europe 2020 Strategy and its flagship initiative on "A Resource Efficient Europe" [4] set the EU on the path to a systemic transformation.

Resource efficiency covers a wide range of resources, with the materials that are normally measured (minerals, fossil fuels, metals) being a proxy for the wider set. Smarter use of these resources will nearly always translate into fewer greenhouse gas emissions, less pollution and a better environment.

A resource-efficient economy is very close to advanced concepts such as the 'green economy' or the 'circular economy'; both promote great resource-efficiency gains through a systemic transformation in the way resources flow through the economy and society, arguing that there are business and job opportunities to be had by revolutionising recycling and re-use.

For being faced with growing global competition for resources, European policies have put increasing focus on the goal of 'dematerialising' economic output, i.e. reducing the quantity of resources used by the economy [8].

For example, the Roadmap to a Resource Efficient Europe [5] emphasises the risks associated with rising resource prices and the burdens on ecosystems that result from escalating demand for resources. The Roadmap defined medium and long term objectives and the means needed for achieving them taking into account progress made on the 2005 Thematic Strategy on the Sustainable Use of Natural Resources and the EU's strategy on sustainable development.

The strategic Roadmap to a Resource-efficient Europe should be seen in the context of the

worldwide efforts to achieve a transition towards a green economy.

The principal objective of the Roadmap is improving economic performance while reducing pressure on natural resources by boosting resource-efficient production [5]. Mainly by technological and managerial eco-innovation, higher and sustained improvements of resource efficiency performance are within reach and can bring major economic benefits, so that all the strategies for sustainable development should be effectively underpinned [12].

It is important that governance and monitoring of progress will take place in the framework of the Europe 2020 strategy and will integrate the relevant elements of the EU Sustainable Development Strategy in order to ensure overall coherence. Although some key benchmarks are already provided in the Europe 2020 headline targets of 20% greenhouse gas emission reduction (30% if the conditions are right), 20% renewable energy sources, and 20% improvement in energy efficiency, the EU needs more tools to monitor progress on resource efficiency.

The European Resource Efficiency Platform (EREP) is setting targets and guidelines to increase resource productivity and eco-efficiency in the most sensitive and important sectors or national economies. To emphasize its focus and concern on the methodological issues and trends of the resource productivity indicator, EREP has also subsequently endorsed a target in its recommendations:

"We call upon the EU to set a target for a substantially increased decoupling of growth from the use of natural resources, in order to improve competitiveness and growth as well as quality of life. The target should aim to secure at least a doubling of resource productivity as compared with the pre-crisis trend "[9].

Furthermore correlated to a resource-efficient economy, but even more demanding for an increase in resource productivity is the concept and model of circular economy. The strategic approach *Towards a circular economy: a zero waste program for Europe* [6] promotes a fundamental transition in the EU, away from a linear economy for resources to be not simply extracted, used and thrown away, but put back in the loop so they can stay in use for longer. This approach also sets out measures driving a more efficient use of resources and waste minimization.

In the Analysis of an EU target for resource productivity accompanying this latest strategy [6,7], it is claimed that the EU should set ambitious, credible targets as soon as possible to improve the overall resource productivity of the EU economy, with a view to achieving the EU 2020 objective of overall decoupling of resource use and environmental impacts from economic growth.

In the data and graphs presented further in the paper, we shall try to compare the level and evolution of some key statistical indicators, in Romania and in EU-27, to enable us to check the main trends as well as whether these trends may be considered consistent with the objectives of a resource-efficient economy.

As illustrated in Figure 2, the EU's resource consumption has declined in the period 2000 to 2012, although the financial crisis of 2008 and subsequent economic recession in Europe also have contributed clearly to this trend.

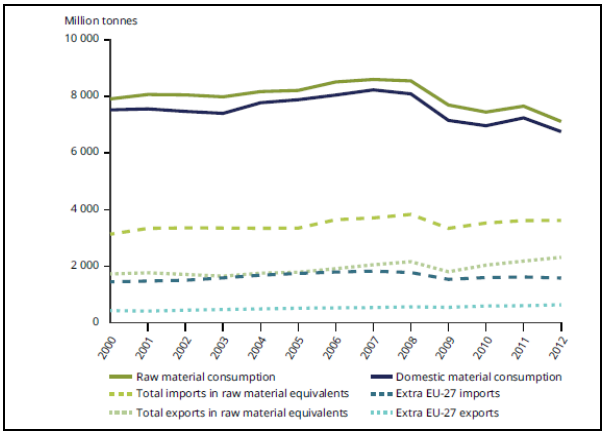

Fig. 2. EU-27 domestic material consumption and raw material consumption, 2000–2012 Source: European environment | State and Outlook 2015 [8]

In the recent report *European environment | State and Outlook 2015* [8] are synthesized also some trends and prospects of the resource productivity in the European Union:

- *5–10 year trends:* there has been some absolute decoupling of resource use from economic output since 2000, although the

economic recession contributed to this trend;

- 20+ year outlook: European economic systems remain resource intensive, and a return to economic growth could reverse recent improvements.

On the other hand, the latest Eurostat data show that Romania has a productivity of resources equal to 33% of the European average. The Romanian economy consumes 59% more raw materials than in other European countries, and this, together with the fact that labour productivity and capital are low in our country, puts us in the last position in the top of resource efficiency [10].
Checking this status and the resource-efficiency level and trend in Romania, our time-series computations and analysis, showed that the evolution of the Romanian economy in recent years has been indeed inconsistent with the principles of sustainable development and with the objectives of increasing resource efficiency [13].

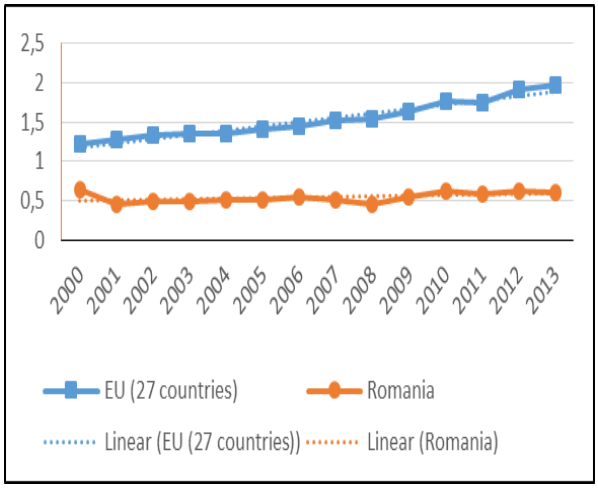

Fig. 3. Evolution and trends of the RP in EU and in Romania, 2000-2013 (Purchasing Power Standard per Kilogram)
Source: Own computation, based on data from Eurostat, accessed in March 2015

As evident from Figure 3, the average level of resource productivity (RP expressed in PPS/kg) in the EU-27 has grown quite significantly (60%) in 2013 as compared with 2000. On the contrary, in Romania, the RP expressed in PPS/kg in 2013 was 4.6% lower than in 2000, and this was quite a recovery after the drop of 28% in the RP level of 2008. Although when expressed in PPS/kg, the RP level in Romania was rather stable in the 2000-2013 period, with a flat trend (Figure 3), the gap towards the EU-27 average level of resource productivity has widened in recent years, since in 2000 RP in Romania was of 52.4% of the average RP in EU-27 while in 2013 it represented only 31.1% of the average RP in EU-27, in PPS/kg.
A possible explanation to be further explored, is that economic recession may have brought, in EU and Romania as well, some negative economic issues but also some positive effects or opportunities of cutting resource-intensive production. These issues have been more or less powered and acknowledged by the public and private stakeholders in the national economy.

CONCLUSIONS

In the framework of sustainable development, resource-efficient and green/circular economy approaches, the resource productivity has become a lead indicator in measuring progress and signalling the sensitive issues.
As a conclusion on the strategic importance of the resource productivity, we may underline that increasing resource efficiency, namely the resource productivity of the European Union by 15-30% is essential to deliver the resource efficiency agenda established under Europe 2020 Strategy for a smart, sustainable and inclusive growth and moving towards a greener/circular economy.
A realistic target to increase resource productivity, endorsed by the EU Member States would focus political attention and tap the currently overlooked potential of a greener economy to create sustainable growth and jobs and increase the coherence of EU policy.
In Romania so far (by 2013) the scenario of a sustainable, resource-decoupling economic growth seems to not have come truth in reality, since the overall resource productivity has remained low, and has even decreased as compared to the pre-accession level (in 2012 as compared to 2006). The trend had as negative effect the increase, instead of a decrease in the gap towards the EU-27 average level of resource productivity (Figure

3), so it must be reversed and aligned to the EU average.

But then the EU is already forecast to increase its resource productivity by 15% between 2014 and 2030 under a business- as- usual scenario. Using smart policies to promote the transition to a green and more circular economy, as called for by the European Resource Efficiency Platform, it would be possible to double this rate.

Therefore, our future research will outline, analyse and recommend the best policies and good practices leading to increased resource efficiency and sustainable economic growth, ultimately to promoting a green economy in Romania.

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THE COSTS OF WINTER WHEAT CULTIVATION IN RADOMSKO MUNICIPALITY IN YEARS 2011-2014

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Abstract

The level of profitability of production of certain agricultural products is the basis for the decision whether to grow the crop on the farm. The revenues of farms in Poland are highly diversified as confirmed by the results of Polish FADN (Farm Accountancy Data Network). The income level is influenced by several factors the most important of which are: natural conditions, farm production potential, intensity of production as well as payments under the Common Agricultural Policy. The increase in wheat growing popularity in Poland consists in a comprehensive use of the harvested grain, large production capacity in the climate and soil conditions of our country and the fact that wheat is a commercial commodity. The paper presents the results of studies performed in years 2011 - 2014 which aimed at comparing the production and economic effect of growing winter wheat on a farm in Radomsko municipality. The necessary information to calculate profitability came from the reports held by the farm to determine the profitability of new cultivation techniques for which the indirect and direct costs as well as profit were calculated.

Key words**:** *costs, cultivation, profitability, winter wheat*

INTRODUCTION

Implementation of progress in the economy is the main source of achieving better production results and performance, thus improving the living standards of the population [3,9]. The progress can be characterized as quantitative and qualitative changes which, in economic terms, mean reducing social expenditure per unit of finished product [1,2].

Implementation of innovations that contribute to increasing the economic efficiency in agricultural activity is just as important as in the whole economy. The obtained reduction in the unit costs of production translates directly to the end result i.e. an increased income and improved competitiveness of the farm [25,18,24].

The implementation of new solutions, however, is usually very expensive and not every farm can afford it. The implementation cost, next to the awareness and educational background of the farms' managers is the main factor that limits innovation. From the economic perspective the farm is most importantly expected to: increase production, reduce manufacturing costs and increase economic potential. Additionally, the implementation of innovations is usually accompanied by working conditions improvements and the reduction of negative influence of agricultural production on the natural environment. The decisive factor for cultivation of a new species is the income that the farm can obtain from a hectare. Profitability of cereal crops depends on the level of yield achieved and the dynamics of changes in grain prices vs. production costs. Profitability of cereal production is also significantly influenced by sale prices [4,5,6].

The search for methods to reduce the energy intensity of the growing and harvesting of cereals, while increasing productivity and efficiency simultaneously, has become a necessity due to the rising costs of inputs [10]. As wheat is of great importance in human nutrition and is one of the most widely cultivated cereals in Poland (representing approximately 26% of the total cereal crops) [16], and the primary factor influencing the energy intensity of production is plowing, the

authors decided to analyze cultivation systems in terms of the profitability of production [11,12]. The yield of each cultivated crop is a derivative of its genetically conditioned productivity potential and the level of fulfillment of the biological needs of the plant with a composition of environmental and agro-technical factors [17,23]. Cereal crop architecture affects the growth processes of plants, their assimilation activity, the pace of accumulation of assimilates and the development of generative organs [7,22]. High yields of winter wheat can be expected under optimal composition of the yield's structure. This demonstrates complex interactions among plants – composing elements of the crop, as well as between plant organs, which highlights the need for skilful control over plant crop during vegetation. Improperly performed agro-technical practices may worsen biometric features and yield structure, and this in turn may reduce the amount and the quality of harvested crops. The yield of wheat grain and its technological quality depend on the varietal characteristics, habitat factors and the applied agricultural technology. Important technological features are also the density and alignment of grain and the total ash content[14,15]. The yield and quality of wheat grain is significantly influenced by fertilization with nitrogen and the timetable and methodology of its application. With the trend of declining grain prices and increased prices of production means (in recent years, particularly the prices of fertilizers and pesticides) the cutting of costs is one of the few opportunities for improving economic performance in farms engaged in commercial production of winter wheat, which is often the basis for their living[13,21].

MATERIALS AND METHODS

The paper presents the results of studies from years 2011 - 2012 aimed at comparing the profitability of winter wheat cultivation on an individual farm in Radomsko municipality located in the south - eastern part of the Łódź Province. The total area of the farm is 150 hectares, where dominating is the cultivation of winter wheat in cereals group next to root crops and rape. The necessary information to calculate profitability came from the reports held by the farm to determine the profitability of new cultivation techniques or new means of production. Indirect and direct costs as well as profit were calculated [19]. The adopted working hypothesis assumed that the profitability of winter wheat in individual years varied depending on domestic and global prices of grain and weather factors that determined the amount of obtained yields [24,20]. The purpose of this study was to determine and compare the profitability of winter wheat in 2011-2014 for different sales prices, varying weather conditions and for stable prices of production means.

Table 1. Average air temperature (°C).

Month	Years				Average in 1956 - 2006
	2011	2012	2013	2014	
I	-4.2	-2.8	-3.1	-2.6	-2.9
II	-1.7	-2.2	-2.1	1.5	-1.9
III	1.9	2.1	2.0	2.7	2.1
IV	8.0	7.6	7.2	8.1	7.6
V	13.4	12.3	12.9	12.7	13.1
VI	16.1	15.9	15.6	17.1	16.0
VII	17.8	16.9	17.5	18.2	18.0
VIII	16.7	15.7	16.9	17.0	17.4
IX	13.2	12.8	12.5	13.7	13.5
X	6.8	7.1	7.2	8.1	8.4
XI	2.0	3.1	2.5	2.8	3.0
XII	-0.8	-1.1	-0.5	-0.8	-0.9
Average	7.4	7.3	7.4	8.2	7.8

Source: the author's own elaboration

Table 2. Precipitation (mm)

Month	Years				Average in 1956 - 2006
	2011	2012	2013	2014	
I	21.7	15.4	49.5	35.4	31.1
II	38.9	38.8	46.1	42.9	31.0
III	15.6	27.0	38.5	30.6	33.3
IV	26.8	59.4	12.0	39.5	39.4
V	67.1	47.5	49.7	51.9	52.7
VI	18.9	14.3	53.1	66.1	65.1
VII	62.9	20.1	91.3	101.2	88.5
VIII	65.9	92.1	62.1	62.9	65.3
IX	47.3	40.1	23.7	46.3	49.8
X	5.1	41.7	22.9	37.8	39.4
XI	19.2	36.4	51.6	44.2	45.4
XII	84.5	31.9	25.4	36.9	39.6
Average	473.9	464.7	525.9	595.7	580.6

Source: the author's own elaboration

RESULTS AND DISCUSSIONS

The yield of wheat crops in individual years depended on weather conditions during the growing season and above all on the

distribution of temperatures and precipitation in the critical period of development for cereals, i.e. from the earing phase until milky-wax ripeness phase[8]. Similar dependences are indicated in previous studies by other authors. Low precipitation in season 2012, especially in January and March, was compensated in April and May. More favorable precipitation conditions were recorded in 2013. Despite more favorable weather conditions in 2014 (higher temperatures) the obtained yield was not significantly higher than in 2012. Table 4 shows the costs and profitability of winter wheat cultivation in years 2011 - 2014.

Table 3. Farming technology of winter wheat

List	Years		
	2011/2012	2012/2013	2013/2014
Fore crop	Winter rape	Early season potato	Oats
Soil treatment			
Disking	12.08.2011	17.08.2012	25.08.2013
Tillage	16.09.2011	10.09.2012	16.09.2013
Harrowing	16.09.2011	11.09.2012	17.09.2013
Cultivation machine	17.09.2011	16.09.2012	19.09.2013
Pre-sowing fertilization			
N 60 kg · ha^{-1} – ammonium nitrate	19.09.2011	17.09.2012	21.09.2013
P_2O_5 40 kg · ha^{-1}	19.09.2011	17.09.2012	21.09.2013
K_2O 60 kg · ha^{-1}	19.09.2011	17.09.2012	21.09.2013
Sowing	20.09.2011	18.09.2012	22.09.2013
Weed regulation in autumn and spring			
Maraton 375 SC – 4dm^3 · ha^{-1}	26. 10.2011	04. 11.2012	28.11.2013
Lancet Plus 125 WG – 0.5 kg · ha^{-1}	12.04.2011	10.04.2013	07.04.2014
Mustang 306 SE 0.6 dm^3·ha^{-1}	07.05.2011	29.04.2013	05.05.2014
Nitrogenous fertilization in spring			
N 60 kg · ha^{-1} – ammonium nitrate	07. 03.2012	04.03.2013	06.03.2014
N 40 kg · ha^{-1} – urea	11. 04.2012	14.04.2013	09.04.2014
Pests and disease control in spring			
Cerone 480 SL – 1.0 dm^3·ha^{-1} + Duett Star 334 SE – 1.0 dm^3·ha^{-1}	18. 04.2012	115.04.2013	21.04.2014
M o n d a t a k 450 EC	15.05.2012	13.05.2013	18.05.2014
Amistar 250 SC – 0.9 dm^3·ha^{-1}	02.06.2012	30.05.2013	04.06.2014
Karate Zeon 050 CS – 0.1 dm^3·ha^{-1}	12. 06.2012	11.06.2013	14.06.2014
Harvest	04.08.2012	07.08.2013	09.08.2014

Source: the author's own elaboration

In both the first and the third years under study the cost of purchasing seed took the largest share in the direct costs. This cost was associated with the high price of seed in 2011 and 2013. According to the methodology for calculating this economic category the cost did not include the assessed labor cost of the farmer and his family. Apart from the valuation of outlays, the profitability of wheat production was estimated based on the grain price in a given year which largely depended on the yield and the volumes of purchased grain for the whole country. Indirect costs accounted for 43.9% to 46.0% of the total costs. Total indirect costs of the farm ranged from PLN 1,457.32 to 1,702.84.

Table 4. Production and economical result (in PLN) for winter wheat grown on a farm located in Radomsko municipality in Łódź Province.

List	Years		
	2011/2012	2012/2013	2013/2014
Seed	340.00	280.00	390.00
Mineral fertilizer	1,068.00	1,306.00	1,361.00
Plant protection	303.54	422.21	374.34
Other direct costs	0.00	0.00	0.00
Total direct costs	1,711.54	2,008.21	2,125.34
Total indirect costs	1,457.32	1,702.84	1,662.13
Total costs	3,168.86	3,711.05	3,787.47
Direct production cost 1dt	34.23	44.63	40.10
Total production cost 1dt	63.38	82.47	71.46
Yield in dt per hectare	50	45	53
Production value	4,500.00	4,150.00	4,780.00
Other financial revenues	1,247.43	1,104.86	1,241.18
Total revenues	5,747.43	5,254.86	6,021.18
Financial result per 1ha	2,578.57	1,543.81	2,233.71
Total income per 1ha excl. EU grant	1,414.69	520.24	1,069.95

Source: the author's own elaboration.

CONCLUSIONS

The level of production costs for winter wheat depends mainly on the applied technology of cultivation, grain variety and vegetation conditions which man has no influence on. The purchase cost of seed on the farm in the analyzed years ranged from PLN 280 to 390

and depended on whether the farmer used his own material or purchased material. The difference here is small, as farmers who buy certified seed receive a grant in the amount of PLN per hectare from the Agricultural Market Agency. The farmer considered it reasonable to use the purchased seed as it guaranteed higher yield and better quality of the obtained grains (better parameters - better price), the material is properly treated (elimination of cumbersome treatment process and treatment cost). On the analyzed farm the costs related to the use of mineral fertilizers ranged from PLN 1,068.00 to 1,361.00. The difference in the cost of fertilization in years 2011 - 2014 is significant and depended mainly on fertilizer prices (wholesale orders or orders made by a group of several farmers with fertilizers delivered direct to the farms is a less expensive solution with the negotiable margins). The costs of purchase of chemical plant protection products on the concerned farm in years 2011 - 2014 ranged from PLN 303.54 to 422.21. The largest gap in the direct cost was noted for the costs of the applied plant protection products. This is due to the price of each group of products against the same weeds or diseases, although the farmer did not notice any difference in their effectiveness.

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CHANGES IN WORK PROFITABILITY IN THE AGRICULTURAL SECTOR IN ROMANIA AND BULGARIA BETWEEN 2007 AND 2014

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Abstract

The main aim of the study was to analyse changes in work profitability in the agricultural sectors in Romania and Bulgaria. The study used the Economic Accounts for Agriculture, which enabled analysis of the economic situation in agriculture according to uniform standards. The study was based on a system of work profitability indexes and factor analysis. The research proved that during the post-accession period (2007-2014) on average work profitability in agriculture increased in real terms by 8.41% per annum in Romania and by 17.1% per annum in Bulgaria. As results from the factor analysis, between 2007 and 2014 favourable changes in work profitability in the agricultural sector in Romania were chiefly caused by greater productivity and reduced remuneration costs. On the other hand, increased productivity and subsidies to production were the main causes of favourable changes in work profitability in the agricultural sector in Bulgaria.

Key words: *Economic Accounts for Agriculture, Bulgaria, Romania, work profitability*

INTRODUCTION

In 2007 Romania and Bulgaria joined the European Union (EU). The integration with the EU and the resulting implementation of instruments of the Common Agricultural Policy (CAP) in the agricultural sectors in these countries created new and potentially favourable conditions of their functioning. Membership in the EU provides access to a huge market, and thus it provides real opportunities to generate greater income and to receive subsidies to agricultural activity due to the size of the EU market [2, 3, 4, 5, 11]. The main aim of this article is to analyse the conditions of work profitability in the agricultural sectors in Romania and Bulgaria after their accession to the EU. The first part of the article discusses the source materials and methodological assumptions. It presents a calculation of generating income based on the Economic Accounts for Agriculture [7] and the system of indicators used for analysis of changes in work profitability in agriculture. The second part presents the research findings, including: an analysis of generating income, a systemic analysis of work profitability and a factor analysis of changes in work profitability in the agricultural sectors in Romania and Bulgaria between 2007 and 2014.

MATERIALS AND METHODS

The analyses were based on the Economic Accounts for Agriculture (EAA), i.e. financial statements applicable in the EU, which enable analysis of the economic situation in agriculture according to uniform rules [7]. The main goal of the EAA is to monitor income in agriculture by analysis of many income categories, i.e. gross and net value added, operating surplus and net agricultural entrepreneurial income (see Tables 1 and 3). The first income category in the EAA, i.e. gross value added, measures the value generated by all agricultural entities. On the one hand, the next category, i.e. net value added, measures the value generated by all agricultural entities, which is corrected by depreciation. In general, value added is an indicator of the capacity to bring new values in relation to material costs and it is an important indicator of the quality and quantity of human capital [8, 10].

When net value added is corrected by the amount of other taxes on production and other production subsidies, we receive another

income category, i.e. value added in the costs of factors of production (income from factors of production). This income category is a measure of the value generated by factors of production, i.e. land, capital and labour. The labour factor is shown in the form of all labour resources engaged in the agricultural activity – it encompasses both farmers' own work and the hiring of labour. Hired labour is directly related with another income category, i.e. net operating surplus (mixed income). It measures the value generated by land and capital resources as well as unpaid labour. It is less than the value added in the costs of factors of production as it is reduced by the costs of hired labour.

The last and most important income category in the EAA is net agricultural entrepreneurial income. Its value is calculated by correcting the operating surplus with the balance of financial costs and income and with land lease costs. Net agricultural entrepreneurial income is a synthetic measure of the level of remuneration for unpaid labour resources, remuneration for capital employed and rent for land ownership.

The abovementioned EAA calculation was used to analyse the level, trend, dynamics and causes of changes in work profitability in agricultural sectors in Romania and Bulgaria and present them as a system of indicators. The systemic approach to work profitability in agriculture results from four basic premises, i.e. a high degree of synthesis of this income category, the need to respect the sequential character of income categories in the EAA, the key or accessory character of these categories, the possibility to make cause-and-effect analyses and to apply quantitative methods. In the systemic approach work profitability in the agricultural sector can be shown as the following equation [4]:

$$\frac{DR}{ZN} = W_1 \times W_2 \times W_3 \times W_4 \times W_5 \times W_6 \times W_7 \times W_8$$

$$\frac{DR}{ZN} = \frac{WB}{ZO} \times \frac{WN}{WB} \times \frac{WN - PD}{WN} \times \frac{DCZ}{WN - PD} \times \frac{NO}{DCZ} \times \frac{NO + SO}{NO} \times \frac{DR}{NO + SO} \times \frac{ZO}{ZN}$$

where:

DR/ZN – work profitability indicator [agricultural entrepreneurial income (DR)/number of unpaid employees (ZN)], W_1=WB/ZO – labour productivity indicator measured by gross value added [gross value added (WB)/total number of employees (ZO)], W_2=WN/WB – indicator of costs of depreciation of fixed assets [net value added (WN)/gross value added (WB)], W_3= (WN – PD)/WN – tax costs ratio [(net value added (WN) – taxes (PD))/net value added (WN)], W_4=DCZ/(WN – PD) – indicator of subsidies to agricultural production [**factor income** (DCZ)/(net value added (WN) – taxes (PD))], W_5=NO/DCZ – indicator of payroll expenses [operating surplus (NO)/**factor income** (DCZ)], W_6= (NO + SO)/NO – indicator of financial income and costs [(operating surplus (NO) + balance of received and paid interest (SO))/operating surplus (NO)], W_7=DR/(NO + SO) – indicator of lease costs [agricultural entrepreneurial income (DR)/(operating surplus (NO) + balance of received and paid interest (SO))], W_8=ZO/ZN – indicator of employment resources structure [total number of employees (ZO)/number of unpaid employees (ZN)].

The analysis of changes in work profitability in the agricultural sectors in Romania and Bulgaria is based on factor analysis – the logarithmic method [4]. The application of this method enables investigation of the dependence between the work profitability indicator and the factors determining profitability. Apart from that, it enables concretisation of the strength and direction of the influence of these factors on the variable under analysis [8, 9].

RESULTS AND DISCUSSIONS

Table 1 shows the basic EAA in Romania between 2006 and 2014, i.e. the period following Romania's accession to the EU and its beginning to use the CAP instruments. The table also includes information about the employment level and structure, work profitability measured by the relation between the agricultural entrepreneurial income per unit of unpaid labour resources as well as the share of subsidies in income.

As results from the data in Table 1, between 2007 and 2014 the income of the agricultural

sector in Romania, measured with the value of output at producers' prices, **made an** average yearly increase of 1.10% in real terms. However, it is noticeable that the changes in the income did not result in a permanent increasing tendency and they were subject to multidirectional variation during the period under analysis.

Table 1. The Economic Accounts for Agriculture – agriculture in Romania in 2006-2014 (real value in million €)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014/ 2006 (%)	R_g (%)
Output at producer price	12,478.3	10,268.6	12,431.2	10,655.9	11,125.1	12,744.1	10,222.8	12,065.6	10,984.4	88.0	2.15
Subsidy on products	169.2	228.2	355.2	319.3	41.9	0.0	0.0	0.0	0.0	-	-
Taxes on products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Output at basic prices	12,647.5	10,496.8	12,786.5	10,975.3	11,167.0	12,744.1	10,222.8	12,065.6	10,984.4	86.9	1.89
Intermediate consumption	6,469.3	5,913.9	6,909.3	6,011.9	6,356.5	7,018.2	5,818.0	6,861.8	6,493.3	100.4	1.83
Gross value added	6,178.2	4,582.9	5,877.2	4,963.3	4,810.5	5,725.9	4,404.9	5,203.8	4,491.1	72.7	1.97
Fixed capital consumption	1,796.0	1,658.2	1,412.5	1,496.5	1,697.8	1,940.4	1,854.8	2,050.5	1,835.3	102.2	1.11
Net value added	4,382.2	2,924.7	4,464.7	3,466.8	3,112.7	3,785.5	2,550.1	3,153.3	2,655.8	60.6	2.44
Taxes on production	29.3	42.1	31.7	17.0	16.9	15.5	14.8	14.3	13.8	47.3	-8.90
Subsidies on production	448.9	360.5	279.9	552.2	738.8	844.7	962.5	1 131.4	1 217.9	271.3	17.52
Factor income	4,801.8	3,243.0	4,712.9	4,002.0	3,834.6	4,614.7	3,497.7	4,270.4	3,859.9	80.4	4.70
Compensation of employees	1,420.8	1,289.5	1,467.9	1,643.5	2,000.2	248.2	249.3	205.1	199.6	14.0	-7.97
Operating surplus	3,381.0	1,953.6	3,245.0	2,358.5	1,834.4	4,366.6	3,248.5	4,065.3	3,660.3	108.3	10.41
Rent paid	33.6	38.4	47.5	46.8	57.6	81.2	100.9	99.6	96.6	287.8	14.21
Interest paid	9.0	5.1	41.7	69.6	71.0	78.6	92.9	89.0	86.2	954.8	88.31
Interest received	3.0	3.0	7.1	9.2	9.9	5.8	8.1	7.9	7.6	252.7	21.01
Enterpreneurial income	3,341.4	1,913.2	3,162.9	2,251.2	1,715.8	4,212.6	3,062.8	3,884.5	3,485.1	104.3	9.89
Total agricultural labour input (thous. AWU)	2,527.0	2,205.0	2,152.0	2,152.0	1,639.0	1,532.0	1,573.0	1,564.0	1,444.0	57.1	-4.79
Non-salaried agricultural labour input (thous. AWU)	2,264.0	1,994.0	1,931.0	1,925.0	1,429.0	1,326.0	1,349.0	1,386.0	1,279.0	56.5	-5.30
Work profitability (thous. €/AWU)	1.48	0.96	1.64	1.17	1.20	3.18	2.27	2.80	2.72	184.6	17.11
The share of subsidies in income (%)	18.5	30.8	20.1	38.7	45.5	20.1	31.4	29.1	34.9	188.9	0.40

[1]average annual rate of change in the 2007-2014 years
Source: own elaboration based on the Economic Accounts for Agriculture

Apart from that, since 2011 there was a systematic decrease in the income at producers' prices. In 2014 (2714 million euros) it was even 15.6% lower than before the accession (3,247 million euros). Between 2007 and 2014, in consequence of a considerable increase in subsidies to products (4.95%) the income of agriculture in real terms, measured with the value of production at base prices, increased by 1.17% per annum

on average. However, it is noticeable that in 2014 there was a significant decrease in the subsidies and thus, they had marginal effect on the value of income at base prices. There was a relatively more favourable trend in changes in the gross value added, which on average increased by 1.64% per annum. However, it is noticeable that the average yearly dynamics of changes in the gross value added (1.64%) was noticeably greater than the dynamics of changes in the value of production (1.17%). This means that between 2007 and 2014 the efficiency of intermediate consumption outlay increased. As results from Table 1, during the entire post-accession period, in real terms the gross value added in the agricultural sector in Romania was lower than before the accession. For example, in 2014 it was 1,105 million euros, whereas in 2006 it amounted to 1,383 million euros, so it was 25% greater. On the other hand, there was a very low increase in the net value added (on average by 0.62% per annum), which points to marginal changes in the income efficiency of agriculture in Romania. This poor dynamics of changes was caused by a dynamic increase in depreciation costs. During the period under analysis the value increased from 98.3 million euros to 158 million euros, i.e. by more than 60%, so on average it increased by as much as 9.82% per annum. Although it was an unfavourable situation in view of the EAA, but on the other hand, it indicated progressing technological modernisation in the agricultural sector in Romania. The income from the factors of production increased much more than the net value added in Romania. The strong dynamics of changes in this income category was relatively less related to changes in taxation, because it chiefly resulted from the amount of other production subsidies received due to the implementation of the CAP instruments. Between 2006 and 2014 in consequence of Romania's accession to the EU there was a nearly nine-fold increase in the value of subsidies in real terms. These changes were decisive to the dynamics of changes and the income from the factors of production. In the post-accession period in real terms its value increased by 3.39% per annum. In consequence, in real terms the income from the factors of production increased from 1,167.5 million euros (2007) to 1,409 million euros (2014), i.e. by 21%. In the post-accession period there was a noticeable rising trend in the remuneration costs in the agricultural sector in Romania. On average they increased by 5.48% per annum, so in 2014 they were 49.8% greater than in 2006. This means that the remuneration costs more and more strongly reduced the income from the factors of production. It resulted in an increase in the operating surplus of 3.10%, which was lower than the increase in the value of income from the factors of production. As results from Table 1, similarly to the income categories discussed above, there was high variability of the value of the operating surplus in real terms in Romania. Apart from that, at the end of the period under analysis it was only slightly greater than before the accession to the EU. Between 2007 and 2014 there were considerable changes in the values of lease costs and financial costs and income in the agricultural sector in Romania. As far as the resulting reduction of the operating surplus is concerned, the lease costs were of primary significance. Their value increased from 73.6 million euros in 2007 to 236.1 million euros in 2014, i.e. more than three times. Such a high increase in the lease costs was chiefly caused by minimal changes in agricultural entrepreneurs' income in real terms. On average their income increased only by 1.36% per annum. Apart from 2008, in most of the years under study the income was lower than before Romania's accession to the EU. In spite of the generally poor dynamics of these changes there was a significant increase in work profitability, measured with the ratio between agricultural entrepreneurs' income and the number of unpaid employees. As results from the data in Table 1, between 2006 and 2014 the work profitability ratio increased from 2.49 thousand euros (2006) to 4.27 thousand euros (2014), i.e. by about 72%. Simultaneously, it is necessary to stress the fact that the favourable and dynamic increase in work profitability in the agricultural sector in Romania chiefly resulted from reduced

employment. During the period under study on average agricultural entrepreneurs' income increased only by 1.36% per annum, whereas employment in agriculture decreased by 5-6%.

Table 2. Factor analysis of changes in work profitability (DR/ZN) in Romanian agriculture in 2007-2014 years

Years	$\frac{WB}{ZO}$	$\frac{WN}{WB}$	$\frac{WN-PD}{WN}$	$\frac{DCZ}{WN-PD}$	$\frac{NO}{DCZ}$	$\frac{NO+SO}{NO}$	$\frac{DR}{NO+SO}$	$\frac{ZO}{ZN}$	$\frac{DR}{ZN}$
	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	
value of ratios									
2006	2,445	0,709	0,993	1,103	0,704	0,998	0,990	1,116	1,476
2007	2,078	0,638	0,986	1,125	0,602	0,999	0,980	1,106	0,959
2008	2,731	0,760	0,993	1,063	0,689	0,989	0,985	1,114	1,638
2009	2,306	0,698	0,995	1,160	0,589	0,974	0,980	1,118	1,169
2010	2,935	0,647	0,995	1,239	0,478	0,967	0,968	1,147	1,201
2011	3,738	0,661	0,996	1,224	0,946	0,983	0,981	1,155	3,177
2012	2,800	0,579	0,994	1,380	0,929	0,974	0,968	1,166	2,270
2013	3,327	0,606	0,995	1,360	0,952	0,980	0,975	1,128	2,803
2014	3,110	0,591	0,995	1,461	0,948	0,979	0,973	1,129	2,725
average	2,445	0,709	0,993	1,103	0,704	0,998	0,990	1,116	1,476
partial deviations									
2007/2006	-0,195	-0,127	-0,009	0,024	-0,187	0,001	-0,012	-0,011	-0,516
2008/2007	0,346	0,221	0,009	-0,072	0,170	-0,012	0,006	0,010	0,679
2009/2008	-0,235	-0,117	0,003	0,121	-0,216	-0,021	-0,008	0,004	-0,469
2010/2009	0,286	-0,091	-0,001	0,078	-0,247	-0,009	-0,015	0,030	0,031
2011/2010	0,491	0,044	0,003	-0,024	1,385	0,035	0,028	0,015	1,976
2012/2011	-0,779	-0,358	-0,005	0,323	-0,050	-0,026	-0,036	0,025	-0,906
2013/2012	0,436	0,115	0,003	-0,035	0,062	0,016	0,018	-0,083	0,532
2014/2013	-0,186	-0,068	-0,002	0,197	-0,011	-0,004	-0,006	0,001	-0,078
average	0,020	-0,047	0,000	0,076	0,113	-0,003	-0,003	-0,001	0,156
structure of partial deviations[1] (%)									
2007/2006	34,44	22,41	1,66	4,18	33,09	0,16	2,09	1,98	100
2008/2007	40,92	26,11	1,11	8,48	20,03	1,45	0,74	1,16	100
2009/2008	32,37	16,08	0,42	16,71	29,80	2,92	1,09	0,60	100
2010/2009	37,77	11,98	0,08	10,27	32,69	1,24	1,94	4,02	100
2011/2010	24,25	2,16	0,13	1,19	68,43	1,71	1,40	0,73	100
2012/2011	48,63	22,37	0,29	20,15	3,14	1,62	2,24	1,55	100
2013/2012	56,67	15,01	0,42	4,61	8,12	2,06	2,33	10,78	100
2014/2013	39,26	14,22	0,40	41,51	2,25	0,90	1,16	0,30	100
average	**38,05**	**14,68**	0,45	**11,26**	**30,00**	1,60	1,65	2,31	38,05

[1]partial structure of the partial deviations was calculated on the basis of the absolute values of partial deviation
Source: own elaboration

Table 2 shows the results of factor analysis of work profitability in the agricultural sector in Romania between 2007 and 2014. As can be concluded from the data, the positive trend of changes in work profitability in agriculture, measured with agricultural entrepreneurs' income (DR/ZN), was chiefly caused by two factors, i.e. greater productivity (W_1) and increased share of the operating surplus in the **factor income** (W_5), which points to reduced payroll costs. As results from the logarithmic method, between 2007 and 2014 on average the changes in productivity and reduced payroll costs determined the changes in work profitability by 38.05% and 30.0%, respectively. The data in Table 2 also show that the variation in work profitability in Romania was also considerably positively influenced by subsidies to agriculture (W_4), but it was negatively influenced by increasing depreciation costs (W_2). These factors determined the variation in work profitability in 11.26% and 14.68%, respectively.

The data in Table 2 also indicate that the other factors had marginal effect on changes in work profitability. The analysis of partial

deviations and their structure in tax costs (W_3), financial costs (W_6), lease costs (W_7) and employment structure indicator (W_8) indicates that on average these factors determined changes in work profitability only by about 0.45-2.31%.

Table 3 shows the EAA in Bulgaria between 2006 and 2014. As results from the data in the table, between 2007 and 2014 the income of the agricultural sector in Bulgaria, measured with the value of production at producers' prices, increased on average by 2.15% per annum. However, like in Romania, there was not any permanent rising tendency in the income and it was subject to many fluctuations. Apart from that, except 2008 in most of the years after Bulgaria's accession to the EU the income at producers' prices was lower than before the accession. On the other hand, in consequence of lifting subsidies to products, between 2007 and 2014 there was an increase in the income of the agricultural sector in real terms, measured with the value of production at base prices (on average by 1.89% per annum). At the same time, it is noticeable that between 2007 and 2009 subsidies to products significantly determined income in the agricultural sector in Bulgaria, as they amounted to 228-355 million euros.

The absence of a noticeable tendency can also be observed in changes in the gross value added. Between 2007 and 2014 it increased on average by 1.97% per annum. However, the dynamics of changes in the gross value added was slightly greater than the dynamics of changes in the value of production at base prices (1.89%). This means that the efficiency of intermediate consumption outlay increased. As results from the data in Table 3, like in Romania, during the entire post-accession period, the gross value added in the agricultural sector in Bulgaria was lower than before the accession. For example, between 2013 and 2014 it ranged from 4,491 to 5,203 million euros, whereas in 2006 it amounted to 6,178 million euros, so it was 19-27% greater. On the other hand, the increase in the net value added (on average 2.44% per annum) points to a relatively better dynamics of changes in the income efficiency of agriculture in Bulgaria. In consequence of a low increase in the depreciation costs (1.11%) between 2007 and 2014 the net value added increased on average by 2.44% per annum, so it increased at a faster rate than the gross value added (1.97%).

There was much higher increase in the income from factors of production than in the net value added in the agricultural sector in Bulgaria. The relatively strong dynamics of changes in this income category with high variation in individual years was chiefly caused by the amounts of subsidies and, to a lesser extent, by reduced taxes. Bulgaria's accession to the EU resulted in a nearly three-fold increase in the value of subsidies in real terms between 2006 and 2014. These changes were decisive to the dynamics of changes and income from factors of production. On average in the post-accession period its value increased by 4.70% in real terms per annum, but there was high variation in individual years (3,243-4,713 thousand euros). In the post-accession period there was a relatively noticeable decreasing trend in the remuneration costs in the agricultural sector in Bulgaria. On average they decreased by about 8% per annum. This means that the remuneration costs decreasingly reduced the income from factors of production. In consequence this resulted in a 10.4% average yearly increase in the operating surplus. It was significantly greater than the increase in the value of income from factors of production (4.70%).

As results from the data in Table 3. similarly to the income categories discussed above. in real terms the value of the operating surplus in the agricultural sector in Bulgaria was characterised by high variation in time. At the end of the period under analysis its value was similar to the value before the accession to the EU. Between 2007 and 2014 the agricultural sector in Bulgaria saw significant changes in the values of lease costs and financial costs and income. As far as the effect of reduction in the operating surplus is concerned. the lease costs were of primary significance as they increased from 38.4 million euros in 2007 to 96.6 million euros in 2014. i.e. more than 2.5 times. Such a high increase in the lease costs was chiefly caused by lower

dynamics of the increase in entrepreneurs' income (on average 9.89% per annum) than the dynamics of the increase in the operating surplus (10.41%). It is also noteworthy that during the period under analysis there was high variation in the agricultural entrepreneurs' income in Bulgaria.

Table 3. The Economic Accounts for Agriculture – agriculture in Bulgaria in 2004-2013 (real value in million €)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014/ 2006 (%)	R_g[1] (%)
Output at producer price	3,247.2	2,789.9	3,493.5	2,813.8	2,758.1	2,994.5	2,933.5	2,929.3	2,740.0	84.4	1.10
Subsidy on products	0.0	50.7	59.1	73.6	58.3	65.9	82.0	90.5	25.8	51.0	4.95
Taxes on products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Output at basic prices	3,247.2	2,840.5	3,552.6	2,887.4	2,816.4	3,060.4	3,015.5	3,019.8	2,765.9	85.2	1.17
Intermediate consumption	1,863.9	1,789.0	2,062.0	1,905.5	1,817.4	1,929.5	1,882.4	1,855.3	1,660.9	89.1	0.90
Gross value added	1,383.3	1,051.5	1,490.7	981.9	999.0	1,131.0	1,133.1	1,164.5	1,105.0	79.9	1.64
Fixed capital consumption	129.7	98.3	98.1	134.9	155.7	188.0	209.1	170.9	158.2	122.0	9.82
Net value added	1,253.6	953.2	1,392.6	846.9	843.3	942.9	924.0	993.6	946.7	75.5	0.62
Taxes on production	0.8	0.3	4.2	1.3	1.7	1.2	0.8	1.3	1.2	157.6	41.53
Subsidies on production	52.9	214.6	382.4	314.5	343.4	321.8	420.6	585.8	463.2	876.2	13.16
Factor income	1,305.7	1,167.5	1,770.8	1,160.1	1,184.9	1,263.6	1,343.7	1,578.2	1,408.7	107.9	3.39
Compensation of employees	137.7	138.0	149.7	173.0	159.3	175.8	192.1	216.5	206.3	149.8	5.48
Operating surplus	1,168.0	1,029.6	1,621.1	987.1	1,025.6	1,087.8	1,151.6	1,361.7	1,202.4	102.9	3.10
Rent paid	52.4	73.6	96.8	127.2	172.4	196.1	286.0	267.0	236.1	450.2	21.70
Interest paid	9.5	33.3	49.1	32.0	8.5	7.3	5.0	27.2	23.9	252.2	-8.33
Interest received	87.9	2.5	6.7	22.1	0.3	2.3	1.1	7.4	1.1	1.3	18.56
Enterpreneurial income	1,194.1	925.1	1,481.9	850.0	845.0	886.7	861.8	1,074.9	943.6	79.0	1.36
Total agricultural labour input (thous. AWU)	563.5	494.4	465.1	435.8	406.5	375.8	347.4	321.2	299.0	53.1	-5.18
Non-salaried agricultural labour input (thous. AWU)	480.0	421.1	393.0	364.9	336.8	303.2	272.9	245.6	221.0	46.0	-6.26
Work profitability (thous. €/AWU)	2.49	2.20	3.77	2.33	2.51	2.92	3.16	4.38	4.27	171.6	8.41
The share of subsidies in income (%)	4.4	28.7	29.8	45.7	47.5	43.7	58.3	62.9	51.8	1171	10.77

[1]average annual rate of change in the 2007-2014 years
Source: own elaboration based on the Economic Accounts for Agriculture

Apart from that. in most of the years under study (2007-2010. 2012) the income was lower than before the accession to the EU. In spite of these conditions and similarly to the agricultural sector in Romania. there was a significant increase in work profitability in the agricultural sector in Bulgaria. which was measured with the ratio between agricultural entrepreneurs' income and the number of unpaid employees. As results from the data in Table 3. between 2006 and 2014 the work profitability ratio increased in real terms from

1.48 thousand euros (2006) to 2.72 thousand euros (2014). i.e. by about 85%. Like in Romania. the favourable and dynamic increase in work profitability in the agricultural sector in Bulgaria resulted chiefly from reduced employment. During the period under analysis a 9.89% average yearly increase in the agricultural entrepreneurs' income corresponded to about 5% average yearly reduction of employment in agriculture.

Table 4 shows the results of factor analysis of work profitability in the agricultural sector in Bulgaria between 2007 and 2014. As can be concluded from the data. the positive trend of changes in work profitability in Bulgarian agriculture. measured with agricultural entrepreneurs' income (DR/ZN). was chiefly caused by two factors. i.e. greater productivity measured with gross value added per total number of employees in agriculture (W_1) and increased subsidies to agriculture (W_4). As results from the logarithmic method. on average the changes in productivity and subsidies to agriculture determined changes in work profitability in the agricultural sector in Bulgaria by 45.85% and 19.93%. respectively. The data in Table 4 also show that the variation in work profitability in Bulgarian agriculture was relatively strongly (11.35%) negatively influenced by lease costs (W_7).

Table 4. Factor analysis of changes in work profitability (DR/ZN) in Bulgarian agriculture in 2007-2014 years

Years	$\frac{WB}{ZO}$	$\frac{WN}{WB}$	$\frac{WN-PD}{WN}$	$\frac{DCZ}{WN-PD}$	$\frac{NO}{DCZ}$	$\frac{NO+SO}{NO}$	$\frac{DR}{NO+SO}$	$\frac{ZO}{ZN}$	$\frac{DR}{ZN}$
	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	
value of ratios									
2006	2.455	0.906	0.999	1.042	0.895	1.067	0.958	1.174	2.488
2007	2.127	0.907	1.000	1.225	0.882	0.970	0.926	1.174	2.197
2008	3.205	0.934	0.997	1.275	0.915	0.974	0.939	1.183	3.771
2009	2.253	0.863	0.998	1.372	0.851	0.990	0.870	1.194	2.329
2010	2.458	0.844	0.998	1.408	0.866	0.992	0.831	1.207	2.509
2011	3.009	0.834	0.999	1.342	0.861	0.995	0.819	1.239	2.925
2012	3.262	0.815	0.999	1.456	0.857	0.997	0.751	1.273	3.158
2013	3.625	0.853	0.999	1.590	0.863	0.985	0.801	1.308	4.377
2014	3.696	0.857	0.999	1.490	0.854	0.981	0.800	1.353	4.270
average	2.899	0.868	0.999	1.356	0.871	0.995	0.855	1.234	3.114
partial deviations									
2007/2006	-0.335	0.001	0.001	0.378	-0.034	-0.223	-0.079	0.000	-0.291
2008/2007	1.195	0.088	-0.008	0.117	0.109	0.012	0.039	0.023	1.574
2009/2008	-1.055	-0.239	0.004	0.218	-0.219	0.049	-0.228	0.027	-1.441
2010/2009	0.210	-0.052	-0.001	0.063	0.041	0.005	-0.112	0.025	0.180
2011/2010	0.549	-0.034	0.002	-0.131	-0.015	0.009	-0.038	0.072	0.416
2012/2011	0.245	-0.067	0.001	0.248	-0.014	0.004	-0.264	0.081	0.233
2013/2012	0.395	0.169	-0.001	0.331	0.025	-0.042	0.242	0.101	1.219
2014/2013	0.083	0.018	0.000	-0.282	-0.047	-0.019	-0.006	0.147	-0.107
average	0.161	-0.015	0.000	0.118	-0.019	-0.026	-0.056	0.060	0.223
structure of partial deviations[1] (%)									
2007/2006	31.92	0.07	0.06	36.02	3.19	21.25	7.48	0.02	100
2008/2007	75.16	5.51	0.49	7.36	6.86	0.72	2.44	1.46	100
2009/2008	51.72	11.71	0.21	10.71	10.73	2.41	11.18	1.34	100
2010/2009	41.21	10.26	0.24	12.33	8.11	0.97	21.90	5.00	100
2011/2010	64.61	3.94	0.26	15.39	1.72	1.10	4.52	8.47	100
2012/2011	26.50	7.31	0.12	26.83	1.49	0.40	28.57	8.80	100
2013/2012	30.24	12.96	0.10	25.31	1.93	3.23	18.50	7.72	100
2014/2013	13.76	2.98	0.00	46.90	7.78	3.18	1.02	24.38	100
average	**45.85**	7.53	0.21	**19.93**	5.67	4.10	**11.35**	5.38	100

[1]partial structure of the partial deviations was calculated on the basis of the absolute values of partial deviation
Source: own elaboration

The data in Table 4 also indicate that the other factors (W_2. W_3. W_5. W_6. W_8) had marginal or minimal effect on changes in work profitability in Bulgarian agriculture. These

factors determined changes in work profitability only by about 0.21-7.53%.

CONCLUSIONS

In the post-accession period the agricultural sectors in Romania and Bulgaria saw a significant increase in work profitability in real terms. Between 2007 and 2014 in Romania work profitability increased in real terms from 0.959 thousand euros to 2.725 thousand euros. i.e. by about 184%. whereas in Bulgaria it increased from 2.197 thousand euros to 4.270 thousand euros. i.e. by 94%. As results from factor analysis. the main determinants of changes in work profitability in agriculture in both countries were: favourable trends of changes in productivity and. to a lesser extent. production subsidies. hired labour costs. fixed assets maintenance costs and lease costs. As far as development perspectives are concerned. further improvement of profitability in the agricultural sectors in Romania and Bulgaria will primarily depend on progress in productivity. This means that the potential for further increase in the income of the agricultural sectors in these countries does not seem very realistic without dynamic structural changes. increase in the size of farms. reduction of employment and faster rate of technical and technological transformation. Although the instruments of the Common Agricultural Policy (CAP) in the form of production subsidies stabilise farmers' income to a certain extent. they cannot be exclusive determinants of the scale of structural changes in agriculture.

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ROMANIA'S SELF-SUFFICIENCY WITH REGARD TO MILK CONSUMPTION IN THE CONTEXT OF DOMESTIC SUPPLY RESTRUCTURING – TRENDS AND PERSPECTIVES

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Abstract

The paper identified the new opportunities for relaunching the Romanian milk and dairy consumption, from the perspective of domestic supply restructuring, having in view the support measures of the sector under the new NRDP (2014-2020). The method used for the elaboration of scenarios with regard to increasing self-sufficiency in milk and dairy products was based on statistical calculations of the average yearly growth rate and the dynamics index of the utilizable production, import and export of dairy products in milk equivalent, as well as production, import and export forecasts, having as data sources the publications of the National Institute of Statistics – Food Balance Sheets, Population's Consumption Availabilities, 2007-2014. The results reveal that the decrease of imports by an average yearly rate of 1.5%, together with the increase of utilizable production by an yearly rate of 3%, will lead to self-sufficiency increase to 96%, beginning with 2016, and this situation will be maintained until the year 2018. The conclusions highlight that in the period 2014-2018, Romania will be still dependent on dairy imports.

Key words*: milk consumption, production, self-sufficiency*

INTRODUCTION

As regards the dairy products, the world demand of EU cheese will considerably increase in the main importing countries by the year 2022 (e.g. by 65% in the United States, by 52% in Mexico and by 33% in Russia), while the demand of EU skim milk powder is expected to increase by 90% in China and 27% in Russia [7].
On the other hand, the removal of milk quotas in April 2015 will increase competition among Member States. In this context, the main objective of the paper was to identify new opportunities for relaunching the Romanian milk and dairy consumption, from the perspective of domestic supply restructuring, having in view the support measures for the sector under the new NRDP (2014-2020) and the increase of the Romanian milk sector competitiveness, as Romania has a long tradition in producing milk, due to its geographical position, with a large variety of relief, significant agricultural land areas and also pastures and meadows for raising cattle, sheep and goats[6]. As regards the packed cow milk consumption, according to Euromonitor International 2012 study, Romania is on the penultimate place in the European Union, with only 12.6 kg/capita/year, followed by Bulgaria, with 9.2 kg/capita/year, as compared to the average consumption of Western Europe of 67.5 kg/capita/year[4].

MATERIALS AND METHODS

The method used for the design of scenarios on the self-sufficiency increase in milk and dairy products was based on statistical calculations of the yearly growth rate and the dynamics index of utilizable production, import and export of dairy products in milk equivalent, as well as production, import and export forecasts, having as data sources the publications of the National Institute of Statistics – Food Balance Sheets, the Population's Consumption Availabilities, 2007-2014[2] and Tempo-online[8].

RESULTS AND DISCUSSIONS

Milk market liberalization in 2015 will mean a larger production in the West-European countries that already have well-established and developed production, collection and export systems. Practically, the large producers will suffocate the local producers' business, who will have to sell or to lose to the detriment of imports, and we can even expect disequilibria on the European market[3].

For the Romanian producers, the milk market liberalization will mean both a challenge and a threat. In order to adjust to the competition on the European Single Market, the Romanian milk sector needs support through investments in technology, equipment, biological material, in the conditions of a global conjuncture favourable to the consumption of dairy products, in which the world prices are expected to increase, on the basis of increasing demand from the developing regions.

The baseline scenario first evaluates the current situation in the evolution of milk production, imports and exports in milk equivalent, of the supply and consumption availability and of self-sufficiency, in the period 2007-2013 and the 2014-2018 forecast, starting from the consideration that the situation remains unchanged, the investigated indicators following the same trends.

Thus, in the period 2007-2013, the situation is the following (Table 1):

The milk and dairy production in milk equivalent with 3.5% fat (butter exclusively) had an average yearly level of 6089 thousand tons in the period 2007-2013 and it has been modified by -177 thousand tons on the average from one year to another, i.e. by an average yearly rate of -2.8%.

The total import of milk and dairy products in milk equivalent with 3.5% fat (butter exclusively) had an yearly average level of 438 thousand tons in the period 2007-2013 and it has been modified by 46 thousand tons on the average from one year to another, i.e. by an average yearly rate of +12.9%.

The total export of milk and dairy products in milk equivalent with 3.5% fat (butter exclusively) had an average yearly level of 96 thousand tons in the period 2007-2013 and it has been modified by 30 thousand tons on the average, i.e. by an average yearly rate of +35.6%.

The supply availability and the human milk consumption followed the same trends, being modified by an average yearly rate of -2.4%.

Table 1. Milk and dairy products in milk equivalent with 3.5 % fat (butter exclusively) 2007-2013

	2007	2008	2009	2010	2011	2012	2013
utiliz prod	6,733	6,687	6,406	5,710	5,789	5,628	5,673
dairy import milk equiv	261	348	457	445	522	492	539
dairy export milk equiv	35	43	67	91	96	121	218
supply avail.	6,952	6,997	6,776	6,126	6,207	6,002	5,992
human consumption	5608	5640	5156	4944	5007	4836	4875
self-sufficiency	97%	96%	95%	93%	93%	94%	95%

Source: Food Balance Sheets, National Institute of Statistics

It is also interesting to analyze the self-sufficiency degree evolution, as important indicator of food security, in the period 2007-2013. Thus, self-sufficiency permanently decreased from 97% in 2007 to 94% in 2012, to increase afterwards to 95% in 2013.

The self-sufficiency degree is calculated as the ratio of domestic production to consumption availability (i.e. production + import – export ± stock variation).

The forecast on the evolution of milk production, import and export in milk equivalent, of the supply availability and of consumption availability for the period 2014-2018 (5 years) started from the analysis of the period 2007-2013, calculating in this respect the average yearly growth rate (Table 2), the level and average increase for all the previously mentioned indicators (Annex 1, 2, 3).

Table 2. Statistical indicators for milk 2007-2013

Item	Utilizable production	Dairy import milk equiv.	Dairy export milk equiv.	Supply availability	Human consumption
Average yearly index %	97.2	112.9	135.6	97.6	97.7
Average yearly rate %	-2.8	+12.9	+35.6	-2.4	-2.3

Source: author's own calculations

As it has been mentioned before, in this scenario, the 2014-2018 forecast was made by considering that the variables follow the same

trend as that from the previous investigated period (Table 3).

Table 3. Milk and dairy products in milk equivalent with 3.5% fat (butter exclusively), 2014-2018

	Average index	2014	2015	2016	2017	2018	2018 / 2013 %
utiliz prod	0.971843	5618	5563	5509	5456	5403	-4.8
dairy imp. milk equiv	1.128695	545	551	557	564	570	5.8
dairy exp. milk equiv.	1.355639	221	224	227	230	233	7.0
supply availability	0.975535	5934	5876	5818	5762	5705	-4.8
human consump.	0.976925	4827	4780	4734	4687	4641	-4.8
self-sufficiency	-	95%	95%	95%	95%	95%	-

Source: author's own calculations

Thus, according to calculations, it results that compared to 2013, exports increased by 7%, imports by 5.8%, while production, supply availability and human consumption decreased by -4.8%, self-sufficiency being maintained at 95%.

Self-sufficiency increase scenarios

Besides the baseline scenario, we intended to design other 5 scenarios, in which we estimated an increase of the self-sufficiency degree for the period 2014-2018, on the basis of hypotheses presented below. We took into consideration the current and future policy measures addressed to the milk sector, the milk supply seasonality in Romania (difference between the winter and summer production volumes), sector fragmentation, the low productivity compared to that in the West-European countries, evolution of milk and dairy imports and exports in the period 2007-2013.

Internal policy measures

-***Stimulating association*** - *de minimis aid for the procurement of milk cooling tanks*, benefiting the agricultural producers, livestock farmers who own up to 5 dairy cow heads and are organized for this purpose into a single association form established at commune level (Government's Decision, November 2013).

The total value of financial support allocated for the year 2014 is 70,879 thousand RON (15,885,000 Euro), with a maximum value of support per association of 5,000 Euro (22,310 RON). This value includes the costs of procurement and installation of milk cooling tank with a capacity of maximum 1,000 litres/administrative-territorial unit organized at commune level, the training costs necessary for its utilization and well as the service costs for a period of 12 months from its installation.

As effects of this measure, we mention that by April 15, 2014, 270 communes from Romania submitted documents for the procurement of 399 milk cooling tanks, the requested capacity for the 399 tanks amounting to 308,470 litres, for 53,132 cows.

The requested amount totalled 1.5 million euro, i.e. 9.4% of the total value of financial support (there is the possibility to procure two tanks with lower capacity, of 500 litres each, in one commune).

-***Stimulating the increase of the livestock number and of production*** – *de minimis aid for the procurement of heifers from specialized breeds* (measure launched in 2014).

The support value is 5,000 RON/head, and the number of animals for which support applications have been already submitted is 1,740 heads (8.7 million RON from the state budget).

-***Premia*** – *National transitory aids (NTA)* in the livestock sector, bovine species, are granted from the state budget, through MARD budget, for: *scheme decoupled from production in the milk sector* benefiting the agricultural producers, natural persons or legal entities, who own, raise and operate production animals, identified and registered in the national system - this is granted for the milk quantity produced and registered for deliveries and/or direct sales in the milk quota administration system. The total value for the applications submitted in the year 2013 for the *scheme decoupled from production in the milk sector was* 96200 thousand RON (21,770 thousand euro)

Support measures from European funds

-***Specific aid for milk producers from less-favoured areas.*** The value of financial support for the less-favoured areas for the livestock sector, in the year 2014, is 39,824,205 Euro, of which for the dairy cows (89,709 heads), 22,427,205 Euro (56.3%), i.e. 250 euro/head and for buffalo cows (8,000 heads) 1,500,000 Euro, i.e. 187.5 Euro/head.

One of the main measures from the new

NRDP 2014-2020 refers to the financial support to family farms. Its purpose is agricultural production increase, the increase of the economic farm size and the increase of production sold by farmers on the market, to the detriment of self-consumption. The funds attracted through projects can be used for investments in: equipment, farm implements, buildings, procurement of animals.

Methodological hypotheses

-the maintenance and even supplementing the support measures for the milk sector under the new NRDP 2014-2020 are expected;

-the investigated indicators, in all the scenarios, refer to production, import, export; on their basis the supply availability, self-sufficiency degree and consumption per capita are calculated;

-the application of the measure regarding the de minimis aid for encouraging the producers' association and increase in number of dairy cows, as well as granting premia (complementary national direct payments) will have as plausible effect the increase of domestic milk production, the increase of production for processing collected from the farms and collection centres from the country, in the period 2014-2018;

-with the milk market liberalization in the European Union and the production quota removal starting with the year 2015, we expect the Western-European farmers, already prepared for this moment, to be on a much more favourable position than the Romanian farmers, as regards farm performance; thus, in the presented scenarios we considered a variable import evolution trend and a constant export evolution trend in dairy products for the period 2014-2018;

-we considered that the number of population remained constant in the period 2014-2018;

Scenario 1 – production increase by 10% (2% yearly average rate), import/export growth, constant self-sufficiency

In this scenario, we estimated an increase of utilizable production in the period 2014-2018 by 10% (2% yearly average rate), import and export increase by a yearly average rate of 1.1286%, and 1.3556% respectively (Table 4).

Table 4. Estimating the self-sufficiency degree, Scenario 1

Item	UM	2014	2015	2016	2017	2018	2018/ 2014 %
Utilizable production	thou tons	5,786	5,902	6,020	6,141	6,263	8.2
Import	thou tons	545	551	557	564	570	4.6
Export	thou tons	221	224	227	230	233	5.5
Supply availability	thou tons	6,111	6,229	6,351	6,474	6,600	8.0
Human consumption	thou tons	4,950	5,046	5,144	5,244	5,346	8.0
Consump/cap	Kg	233	237	242	247	251	8.0
Self-sufficiency	%	95%	95%	95%	95%	95%	-

Source: author's own calculations

As it can be noticed, even in the conditions of utilizable production increase from 5786 thousand tons in 2014 to 6,263 thousand tons in 2018 (by 477 thousand tons), the self-sufficiency degree will remain unchanged, i.e. 95%, the dairy consumption per capita increasing by 8%,

Scenario 2 – production increase by 15% (3% yearly average rate), import/export growth, constant self-sufficiency

In this scenario, we estimated an increase by 15% of utilizable production in the period 2014-2018 (3% yearly average rate), increase of import and export by an average yearly rate of 1.1286% and 1.3556% respectively (Table 5).

Table 5. Estimating the self-sufficiency degree, Scenario 2

Item	UM	2014	2015	2016	2017	2018	2018/ 2014 %
Utilizable production	Thou tons	5,843	6,018	6,199	6,385	6,577	12.6
Import	Thou tons	545	551	557	564	570	4.6
Export	Thou tons	221	224	227	230	233	5.5
Supply availability	Thou tons	6,167	6,346	6,530	6,719	6,913	12.1
Human consumption	Thou tons	4,996	5,140	5,289	5,442	5,600	12.1
Consump/capita	Kg	235	242	249	256	263	12.1
Self-sufficiency	%	95%	95%	95%	95%	95%	-

Source: author's own calculations

As in the previous scenario, only the utilizable production growth, even by 15% (3% yearly average rate), in the period 2014-2018 and maintaining the same import and export growth rates will not make it possible to increase the self-sufficiency degree, this remaining constant at 95%. The situation will change as regards the consumption per capita, which will grow by 12.1% in the investigated period.

Scenario 3 – production increases by 10% (2% yearly average rate), import decreases (1% yearly average rate), export increases, self-sufficiency increases in 2017

In this scenario, we estimated an increase of utilizable production by 10% in the period 2014-2018 (2% yearly average rate), import decrease by 5% (1% yearly average rate) and export increase by 1.3556% as yearly average rate (Table 6).

Table 6. Estimating the self-sufficiency degree, Scenario 3

Item	UM	2014	2015	2016	2017	2018	2018/ 2014 %
Utilizable production	thou tons	5,786	5,902	6,020	6,141	6,263	8.2
Import	thou tons	534	528	523	518	513	-3.9
Export	thou tons	221	224	227	230	233	5.5
Supply availability	thou tons	6,099	6,207	6,316	6,428	6,543	7.3
Human consumption	thou tons	4,940	5,027	5,116	5,207	5,300	7.3
Consump/capita	kg	232	236	241	245	249	7.3
Self-sufficiency	%	95%	95%	95%	96%	96%	-

Source: author's own calculations

Under this variant, even though the utilizable production has an increasing trend, by 2% each year, only the import decrease by 1% each year will determine self-sufficiency increase from 95% to 96% starting with the year 2017, while the consumption per capita will increase by 7.3% in the investigated period,

Scenario 4 – production increases by 15% (3% yearly average rate), import decreases (1% yearly average rate), export increases, self-sufficiency degree increases in 2017

In this scenario, we estimated an increase of utilizable production by 15% in the period 2014-2018 (3% yearly average rate), import decrease by 5% (1% yearly average rate) and export increase by 1.3556% yearly average rate (Table 7),

Table 7. Estimating the self-sufficiency degree, Scenario 4

Item	UM	2014	2015	2016	2017	2018	2018/ 2014 %
Utilizable production	thou tons	5,786	5,902	6,020	6,141	6,263	8.2
Import	thou tons	534	528	523	518	513	-3.9
Export	thou tons	221	224	227	230	233	5.5
Supply availability	thou tons	6,099	6,207	6,316	6,428	6,543	7.3
Human consumption	thou tons	4,940	5,027	5,116	5,207	5,300	7.3
Consump/capita	kg	232	236	241	245	249	7.3
Self-sufficiency	%	95%	95%	95%	96%	96%	-

Source: author's own calculations

Like in the previous scenario, self-sufficiency increases to 96% beginning with the year 2017, while the consumption per capita increases by 11.4% in the investigated period.

Scenario 5 – production increases by 15% (3% each year), import decreases (1.5% yearly average rate), export increases, self-sufficiency increases in 2017

In this scenario, we estimated an increase of utilizable production by 15% in the period 2014-2018 (3% yearly average rate), decrease of imports by a yearly average rate of 1.5% and the increase of exports by a yearly average rate of 1.3556% (Table 8),

Table 8. Estimating the self-sufficiency degree, Scenario 5

Item	UM	2014	2015	2016	2017	2018	2018/ 2014 %
Utilizable production	thou tons	5,786	5,902	6,020	6,141	6,263	8.2
Import	thou tons	534	528	523	518	513	-3.9
Export	thou tons	221	224	227	230	233	5.5
Supply availability	thou tons	6,099	6,207	6,316	6,428	6,543	7.3
Human consumption	thou tons	4,940	5,027	5,116	5,207	5,300	7.3
Consump/capita	kg	232	236	241	245	249	7.3
Self-sufficiency	%	95%	95%	95%	96%	96%	-

Source: author's own calculations

In this last scenario, which we consider the closest to the proposed goal, namely the fast relaunching of the self-sufficiency degree, the results reveal that the only modality to achieve this is to increase domestic production, together with the diminution of dairy imports. Thus, the self-sufficiency degree can reach 96%, beginning with 2016, yet remaining constant until 2018, sitution in which milk consumption per capita will also increase by 11.2% in the period 2014-2018.

CONCLUSIONS

The obtained results with regard to self-sufficiency degree increase for the product milk, in the period 2014-2018 (5 years), on the basis of the 5 scenarios, lead us to the following conclusions:

-in no scenario, the self-sufficiency degree will exceed 96% (in 2016 and 2017), compared to 95% in 2013;

-the continuation of import increase at a rate higher than the export rate in milk and dairy

products in milk equivalent, even in the conditions of utilizable production increase by 10%, 15% respectively, will make the self-sufficiency degree remain unchanged, at 95% respectively, similar to that in 2013;

-only the decrease of imports by a yearly average rate of 1.5%, together with the utilizable production growth by a yearly average rate of 3%, will lead to self-sufficiency increase at 96%, beginning with 2016, and this situation will be maintained until 2018.

Another important conclusion that can be drawn from the analysis of the milk production sector is that the exponential shock expected in 2015, with the removal of milk quotas, can be counteracted by organization and association into structures that can provide economic equilibrium throughout the production chain, from farm to final user.

That is why meeting the population's consumption needs with animal products from the domestic production and the creation of export availabilities, as well as the qualitative improvement of the Romanian consumption represent a main objective, which can be reached only by sectoral policy measures that should have in view the following[7]:

-establishment of competitive farms and the technological revamping of the existing ones by attracting investments and use of structural funds in livestock farming;

-quality improvement of milk and beef production both through the procurement of animals from superior breeds adaptable to our country's conditions, as well as the improvement of herds through the application of the latest selection and breeding methods;

-improvement of production performance, as well as the raising and operation conditions, in order to increase the relative share of livestock production in the agricultural output value;

-improvement of animal nutrition and feeding by ensuring nutrients with optimum caloric and protein content for the bovine species.

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ANALYSIS OF TOURIST TRAFFIC IN SLĂNIC PRAHOVA TO DEVELOP TOURISM IN THE AREA

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Abstract

The tourism analysis revealed that the Prahova county has a good tourism potential outstanding in terms of variety, density and importance of both natural attractions and cultural goods, and tourism infrastructure, but large disparities between different tourist areas were bounded across the county. In order to determine which might be the objectives of a strategy for tourism development and modernization of its related services, we conducted an analysis of traffic on tourism demand and supply at a guesthouse in the Slănic Prahova Town. The tourist traffic analysis was done by calculating certain torism indicators and interpretation of the results. The statistical data were provided by the tourist accommodation unit where the study was conducted and by National Institute of Statistics.

Key words: *average length of stay, spatial touristic planning, tourism supply and demand, tourist traffic density, occupancy of tourist accommodation establishments*

INTRODUCTION

The opportunities for the development of tourism activity are determined both by tourism potential and the geographical location of the village in the county [1].
Building the future highway Bucharest - Brasov as part of the European Corridor IV will have an impact on tourism activity by increasing the possibilities of integration into international tourist circuits and enhancing transit of persons who may be attracted local tourism offers [2].
Regional Development Strategy for the Region 3 South - Muntenia include main objective of tourism potential, being one of the counties of Prahova target this objective, which is a priority for tourism development and modernization services. Departments that will work towards this end are [7]:
- Rehabilitation of areas, monuments, buildings tourist modern physical infrastructure;
- Supporting private initiative in the growth and development of the tourism facilities to international standard services;
-Fitting areas with potential fisheries, hunting, ethnographic and special environment for the development of tourism;
- Attracting an increasing number of tourists by promotional measures in the country and abroad.
Focusing priority of tourism facilities in the Prahova Valley and poor utilization of the potential they hold other tourist areas, low occupancy of accommodation capacities and diversification and insufficient promotion of tourism are the main issues that are considered in setting goals for tourism.
Land use proposals are formulated based on specific objectives, aiming to correlate with proposals in other areas on which the development of tourism and [8]:
- Environmental protection, conservation and protection of natural resources and cultural heritage which constitutes the tourism potential;
- Coordination of tourism development with the overall economic development in order retraining the workforce redundant in the secondary to the tertiary sector;
- Modernization and development of the communication lines to ensure high accessibility to the main points of tourist interest, priority must precede other investments in tourism.

Attracting tourists in the Slănic Prahova, will contribute to the objectives fulfillement and use of the tourism potential of the area and also to a better tourism promotion. Default by promoting zonal values, number of tourists in the village Slănic Prahova would be much more developed.

Strategy for socio - economic development of Prahova county in the following period, drawn up by the County Council, shall, from these lines of action in the field of tourism, a number of specific objectives in line with the situation in the territory, namely [7]:

- Adapting to offer specific forms of tourism potential in each area of the county;
- Development and diversification of the tourist offer;
- Enhancement and introduction to a landscape of cultural tourist routes in the area;
- Development of business tourism and meetings.

MATERIALS AND METHODS

To achieve this study, we used statistical data on tourist flows, provided by INSSE, and tourist accommodation in which we conducted the study.

Analysis on tourism supply and demand, the ”Casa Pădurii” ("House of the Forest") pension we conducted a tour calculating certain indicators and interpretation of results. The study realized I could propose some strategies to develop tourism in the area [3,4,5].

RESULTS AND DISCUSSIONS

Analysis of tourist traffic on tourism demand and supply at the ”Casa Pădurii” ("House of the Forest")

Located less than an hour and a quarter of Bucharest, in the heart of the mountains, a great tourist area, ”Casa Pădurii” ("House of the Forest") is an ideal place to rest with family or group of friends and to enjoy a Full range of sporting and cultural activities.

It features restaurant, conference room, parking, courtyard with barbecue and patio, living room with TV.

Turist sights: Salt mines; Salt lakes; Crasna Monastery; Green Mountain.

It offers accommodation in 10 modern, comfortable and tastefully decorated, each with a private balcony with a beautiful view of the surrounding mountains. Each room has a fully equipped bathroom, dressing and LCD satellite TV.

To spend time in a pleasant way we provide:

- Sports fields (1 multipurpose sports field with synthetic turf, which can be transformed in tennis, basketball, football, volleyball or badminton, equipped with night).

- Ping pong;
- Leisure;
- Darts;
- Petanque;
-ATV;
-Mountain Bikes.

Facilities: Refrigerator, ping-pong, TV room, wireless internet, parking, garden / yard, sports ground, laundry, room service, terrace, patio in backyard, grill / barbecue, living room, dining room, fireplace, orchard, Playground, bar, restaurant, conference hall, holiday vouchers.

Room facilities: Internet in room, balcony, central heating, bath room, minibar in the room, TV room.

Slănic Prahova is a very popular tourism area, mainly due to its geographical treasures: the salt mines, salt lakes, Green Mountain, etc.

Salt mines: Slanic Prahova is renowned for its salt mines, Salina Salina Old and New. While in New Salina further extracted salt, old mine Old Salina is currently open to the public, being used as a place of leisure. Also, in one of rooms Old Salt separate, World

Championships takes place annually plane modeling.

Salt lakes: Another attraction is the salt lakes in Slanic (Baciului Baia, Baia Rosie, Green Lake). With a high concentration of salt, these lakes are used for various treatments.

Crasna Monastery: Krasna is a town situated close to Hermitage Krasna Slanicului.Traseul lasts 2.5 hours and 3 hours going through Grosani village Crasnei Schiulesti Valley. The return can be made to Maneciu Ungureni forest road.

Table 1. Tourism supply and demand indicators on Pension - "Casa Pădurii" ("House of the Forest")

Indicators	**2009**	**2010**	**2011**	**2012**	**2013**
Number of overnight stays (Romanian + foreign)	2946	1471	664	737	1084
Number of overnight stays (Romanian))	2825	1317	461	516	847
Number of overnight stays (foreign)	121	154	203	221	237
Number of Romanian tourists	1494	960	214	258	271
Number of foreign tourists	45	65	122	156	223
Total number tourists (foreign + Romanian)	1539	1025	336	414	494
Accommodation at pension "Casa Pădurii"	20	20	20	20	20
Total average stay (travel days)	1.914	1.435	1.976	1.780	2.194
The average stay of foreign tourists (travel days)	2.689	2.369	1.664	1.417	1.063
Romanian tourists Average stay (days interest)	1.891	1.372	2.154	2.000	3.125

Souce:Data from boarding house, NIS and own processing

Green Mountain: Green Mountain, also called Green Rock is the result of volcanic ash while strengthening geological layer disposed on flat surfaces perfectly developed.

The following indicators were analyzed and interpreted [3,4,5]:

Total average length of stay = Total overnight stays (Romanian+ foreign) / Total Romanian + Total foreign tourists (travel days)

Sm 2009= 2,946 / 1,539 = 1.914 days
Sm 2010= 1,471 / 1,025 = 1.435
Sm 2011 = 664 / 336 = 1.976
Sm 2012 = 737 / 414 = 1.780
Sm 2013 = 1.084 / 494 = 2.194

The average length of stay (Foreign tourists) = Foreign Overnight stays / Foreign tourists (travel days)

Sm ts 2009 = 121 / 45 = 2.689 days
Sm ts 2010 = 154 / 65 = 2.369
Sm ts 2011 = 203 / 122 = 1.664
Sm ts 2012 = 221 / 156 = 1.417
Sm ts 2013 = 237 / 223 = 1.063

The average length of stay (Romanian tourists) = Overnight stays Romanian / No Romanian tourists (travel days)

Sm tr 2009 = 2,825 / 1,494 = 1.891 days
Sm tr 2010 = 1,317 / 960 = 1.372
Sm tr 2011 = 461 / 214 = 2.154
Sm tr 2012 = 516 / 258 = 2.00
Sm tr 2013 = 847 / 271 = 3.125

A. ***Index of global tourist demand change***

Ct = *[(No. Romanian tourists + No. Foreign tourists) per current year/(No. Romanian tourists + No. Foreign tourists) per previous year]*100*

$$\Delta CG_{0-i} = \frac{CG_i}{CG_0} \cdot 100$$

where: CG_i- global tourist demand in year „i";

CG_o- global tourist demand in year „0".

Table 2. Index of global tourist demand change

Indicators	2009	2010	2011	2012	2013
Total tourists	1,539	1,025	336	414	494
ΔCG %	-	66.6	32.78	123.21	119.32

Source: Own calculation.

From the above table it can be seen that in the period 2012 - 2013 global tourism demand exceeded 100%, varying between 19.32% and 23.21% in 2013 in 2012, representing the maximum percentage growth of global tourism demand. The year 2011 had a downward trend in the global tourism demand fell by 67%.

B. ***Index of global tourist demand distribution***,

Ici = [No. Romanian tourists per current year / (No. Romanian tourists + No. Foreign tourists) current year]*100

Ice = [No. Foreign tourists per current year / (No.Romanian tourists + No. Foreign tourists) current year]*100

$$\Delta CI_{0-i} = \frac{CI}{CG} \cdot 100 \,;\; \Delta CE_{0-i} = \frac{CE}{CG} \cdot 100$$

where: CI - domestic tourist demand;
CE - foreign tourist demand;
CG – global tourist demand

Table 3. Index of global tourist demand distribution

Indicators	2009	2010	2011	2012	2013
No. Romanian tourists	1,494	960	214	258	271
No. foreign tourists	45	65	122	156	223
No. total tourists	1,539	1,025	336	414	494
ΔCI %	97.08	93.66	63.69	62.32	54.86
ΔCE %	2.92	6.34	36.31	37.68	45.14

Source: Own calculation

From previous calculations it can be seen that the largest number of tourists coming to the hostel are Romanians, while the number of foreigners came upon a maximum of 45% of the total number of tourists who will be staying at the hostel in 2013.

C. ***Index of (domestic and foreign) demand variation in time*****:**

ICI = (No. Romanian tourists per current year/No. Romanian tourists per previous year)*100

ICE = (No. Foreign tourists per current year / No. Foreign tourists per previous year)*100

$$ICE_{0-i} = \frac{CE_i}{CE_0} \cdot 100 :$$

$$ICI_{0-i} = \frac{CI_i}{CI_0} \cdot 100$$

where: ICE_{o-i} - index of foreign demand variation;

ICI_{o-i} – index of domestic demand variation.

Table 4. Index of (domestic and foreign) demand variation in time

Indicators	2009	2010	2011	2012	2013
No. Romanian tourists	1,494	960	214	258	271
No. foreign tourists	45	65	122	156	223
ICI (%)		64.26	22.29	120.56	105.04
ICE (%)		144.44	187.69	127.87	142.95

Source: Own calculation.

The analyzes made above we can see that domestic demand and foreign tourists had increased over 100%. Domestic tourism demand had a downward trend, from 78% in 2011. Foreign tourist demand had the largest increase in 2011, to 87.69%.

D. The monthly concentration coefficient is calculated by dividing the number of tourists recorded during the highest-traffic month by the total number of tourists during a year A_t

Cc = [No. Tourists per each month / (No. Romanian tourists + No. Foreign tourists) per year of calculation]*100

$$C_c = \frac{LM}{A_t}$$

Based on calculations, "House of the Forest" was glad to accommodate a higher number of tourists in January, July, August, December, and the maximum coefficient concentration monthly was in August when boarding analyzed the threshold of 0.162 concentration tourism.

Table 5. The monthly concentration coefficient

Total number of visitors for each month of the year 2013			
Types of tourist accommodation	No. total tourists/ month	No. total tourists/ year 2013	Cc
January	60	494	0.121
February	23	494	0.047
March	26	494	0.053
April	30	494	0.061
May	28	494	0.057
June	45	494	0.091
July	48	494	0.097
August	80	494	0.162
September	44	494	0.089
October	30	494	0.061
November	32	494	0.065
December	48	494	0.097

Source: Own calculation.

E. Indicator of total accommodation capacity evolution between „0" and „i"

I_{LC} = (No. beds per current year / No beds per previous year)*100

$$\Delta LC_{0-i} = \frac{LC_i}{LC_0} \cdot 100$$

Table 6. Indicator of total accommodation capacity evolution

Indicators	2009	2010	2011	2012	2013
Total capacity of the hostel accommodation	20	20	20	20	20
ΔLC (%)		100	100	100	100

Source: Own calculation.

Number of beds in the period 2009 - 2013 is 20, so the accommodation capacity is constant evolution.

F. Share of hotel (B&B) capacity of total accommodation capacity:

$$Icc = \frac{LC}{LH} \cdot 100$$

where: LH - number of beds in hostels, on the village;
LC - total capacity of hostel accommodation.

Table 7. Share of hotel (B&B) capacity of total accommodation capacity

Indicators	2009	2010	2011	2012	2013
LC	10	10	10	10	10
LH	20	20	20	20	20
Icc (%)	50	50	50	50	50

Source: Own calculation.

"House Forest" pension has a capacity of 10 rooms that remain unchanged from 2009 until 2013 and the total number of beds remains the same for years 5 years, 20 seats.

G. Index of customer evolution between „0" and „i":

Iec = (No. Romanian tourists+No. foreign tourists per current year) / (No. of Romanian tourists+No.foreign tourists per previous year)*100

$$\Delta T = \frac{TH_i}{TH_0} \cdot 100$$

where: TH_i - tourists in hotels in year „i";
TH_o – tourists in hotels in year „0".

Table 8. Index of customer evolution

Indicators	2009	2010	2011	2012	2013
No. total tourists/pension	1,539	1,025	336	414	494
ΔT (%)		66.60	32.78	123.21	119.32

Source: Own calculation.

In 2012 the highest trend observed customers at the hostel, exceeding 4 percent during 2013.

H.Index of overnight stay evolution:

I_N = (No. overnight stay per current year / No. overnight stay per previous year)*100

$$\Delta N = \frac{NH_i}{NH_0} \cdot 100$$

where: N-overnight stay.

Table 9. Index of overnight stay

Indicators	2009	2010	2011	2012	2013
No. Total overnights/pension	2,946	1,471	664	737	1,084
ΔN (%)		49.31	45.14	110.99	147.08

Source: Own calculation.

Evolution of overnight stays index had a downward trend in 2009-2011, with 55% below 100%. In the period 2012-2013 the number of overnight stays increased and their evolution peaked in 2013 of 47%.

I.Pension occupancy indicator

Reflects the use of supply for a given period of time, i.e. hotel activity depending on its capacity:

$$G_0 = \frac{NH \cdot 100}{LH \cdot Z} = \frac{NT \cdot S}{LH \cdot Z} \cdot 100$$

where:
G_o - occupancy, percentage;
NH - number of overnight stays;
LH - number of beds in pension;
Z - number of supply days = 365 days;
NT - number of tourists;
S - average length of stay.

Table 10. Pension occupancy

Indicators	2009	2010	2011	2012	2013
No. Total overnight/pension	2946	1471	664	737	1084
Total seats hostel accommodation	20	20	20	20	0
Number of supply days	365	365	365	366	365
G_o (%)	40.36	20.15	9.10	10.07	14.85

Source: Own calculation.

Occupancy pension "Forest House" had a downward trend in 2009-2011, from an occupancy of 40% in 2009 reaching an occupancy rate of 9% in 2011. In the next two years, the degree of the guest house's occupancy has grown slightly, reaching almost 15% in 2013.

J. Tourist traffic density

Tourist density indicator in relation to population density

$$D_{t_{i-0}} = \frac{T_{t_{i-0}}}{Population}$$ **(tourists / no. inhabitants)**

where:
T_{i-0} - total Romanian+foreign tourists;
Pop - local population.

Tourist traffic density relative to Slănic Prahova population dropped from 0,234 tourists / No. inhabitants in 2009 to 0,052 tourists / No. residents in 2011. In 2013, tourist traffic density in relation to population, had a slight increase of 0.079 tourists / No. inhabitants.

Table 11.Tourist density indicator in relation to population density calculation of city Slănic Prahova.

	2009	2010	2011	2012	2013
Population	6,580	6,511	6,421	6,326	6,232
Tourist arrivals	1,539	1,025	336	414	494
D_t (tourists/no. inhabitants)	0.234	0.157	0.052	0.065	0.079

Source: Own calculation.

K.Tourist density indicator in relation to area

$$D_{t_{i-0}} = \frac{T_{t_{i-0}}}{Surface}$$ (tourists / km^2)

where:
T_{i-0} - total Romanian+foregin tourists;
S - town/village (county) area/surface

Slănic Prahova city area is 40 km^2.

Table 12. Tourist density

	2009	2010	2011	2012	2013
Tourist arrivals	1,539	1,025	336	414	494
D_t (tourists/km^2)	38.48	25.63	8.40	10.35	12.35

Source: Own calculation.

Tourist relative to the surface density of Slănic Prahova, fell to 38 tourists/km^2 in 2009, 8.40 tourists/km^2 in 2011, reaching 12.35 tourists/km^2 in 2013. The evolution of the oscillating period.

CONCLUSIONS

Analysis of free travel on tourism demand and supply at one of the hostels in the locality Slănic Prahova, showed that in recent years the low tourist traffic in the area.
A first conclusion is the fact that, Prahova county and town Slănic Prahova, at this moment have a huge tourist potential, but is very poorly utilized.
Conservation of cultural heritage could go hand in hand with tourism development, but careful monitoring is needed to ensure conservation maintaining high standards. In addition, tourism can be a tool for rural development in these conditions is vital involvement of local communities in this area.
A second conclusion is related to poor promotion of tourism potential that, over the last twenty years there has been sporadic times chaotic, without having a spectacular result, only small temporary results. So, by promoting sustainable tourism fairs nationwide through media and promotional materials, bear in mind this objective.
Tourism can be to achieve revenue source, but this requires investment.

There is thus a circle that revolve endlessly two important factors:

- Achieving quality in tourism services to attract visitors;
- Investment measure to have what attracts them.

If these factors are realized, then we can say that tourism is a source of continuing income.

According to some assessments relating to image formation in tourism can conclude that tourist satisfied, satisfied where he spent the holiday by sharing information, their value may influence other five potential tourists to spend in the future, holiday stay on site, while unhappy with the quality of tourist services especially tourism staff, ten influence potential tourists.

In this context, *a third conclusion* may be related to the behavior of providing tourism services in terms of fairness and solicitude, it is decisive in creating a positive image of the tourist destination.

To develop tourism in this area need some strategies to generate revenue for both the local population and for the economy as a whole. These strategies are also needed for tourists to spend their free time more pleasant.

Strategy makes an original contribution towards the integration of economic, social and environmental conditions that occurs in space Prahova, in the context of European and global cooperation. The immediate objective is to formulate a policy framework for the development and sustainable management of the tourism industry in terms of natural and cultural resources. To ensure asserting and promoting the tourism potential of Prahova and income generation through tourism development.

Given that tourism is considered as the invigorating economic activity may be one for the entire Romanian economy, I think this is just an analytical study responded to the need for information that should flow from and to the tourism sector. A prime tourist zone as the Prahova comes to emphasize the need for such research and statistical analysis, just the desire to combine in a more effective tourism supply with demand.

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BUILDING A HOUSE - BETWEEN TRADITIONAL MATERIALS AND PATENTED ORGANIC MATERIALS

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Abstract

Ecological and patented a traditional or modern? These are the two options you have at your disposal a beneficiary when engaging in adventure called "dream house". As usually happens, in this case, opinions are divided, because in both cases there are advantages and disadvantages. To make the best decision regarding the construction of a house, it is necessary that each beneficiary to document thoroughly and choose the knowledgeable, the solution that best suits your needs and, not least Its budget. Other issues that need to be considered are the peculiarities of the land, which will be located in the building, usable area which will also architectural style they prefer beneficiary.
Lately in our country this type of construction, wood, green, took a considerable boom, leaving behind traditional methods of building a house. It gained widespread Romanian real estate market demand for people to build or buy a house on wooden structure that is more resilient and sustainable and earthquakes. In this study we will present the positive and negative, of building a wooden house or a house brick.

Key words: *brick, bearing structure, beams, loading technique, load-bearing walls, masonry, monolithic casting, wood*

INTRODUCTION

In a decision should be known that a wooden house is cheaper, even with 50% against one brick, but that maintenance of wooden houses, in time, generate higher costs. Also, experience has shown designers and builders, that brick house is more lasting and withstand unexpected events such as fires, but is less friendly in terms of creating a thermal environment pleasant both in winter, cat and in the warm. The pros and cons adds that a wooden house is more flexible and has lower seismic risk, but a brick house is attacked by decay, ants and humidity. In addition to the arguments mentioned, must also be taken of the particularities of the land and the costs that can afford a beneficiary.
A wooden construction is clearly a good choice for those who want to move into a new home in record time, given that it runs Radic in a period of between one and three Monday. In addition, heat losses were calculated by the specialists as 30-40% lower than in brick houses [3]. As proof, wooden houses are extremely popular in the Nordic countries, where effectively fight a cold. About they need to know they are very functional, because their inner space can easily be divided or changed, as have a light structure and therefore does not require too many supporting pillars [1]. Regarding benefits, also noted a fact: traditional wooden houses can be built on weak soil or sandy [8]. If no trump the latter failed to convince, we will say only that doctors considered "healthy" because wood is a 100% natural element, breathe, so it made dampness and condensation shelter.

MATERIALS AND METHODS

In the study, we used as materials, wood and brick, two of construction materials frequently used in execution of houses. As a research method we used comparative method, the advantages and disadvantages of each construction material. Comparison of the two construction materials, and present certain specific characteristics, helps in choosing the recipient of the construction material for the

implementation of your own home. The construction material, its quality, its usage and the costs of each construction material, are very important in the implementation of a house.

RESULTS AND DISCUSSIONS

A very important aspect of building a house is the choice of construction materials, both those related to the achievement of the resistance structure and finishes. Regarding the support structure which gives stability and strength of the entire construction, should the beneficiary, requiring manufacturers to use only approved and certified building materials, providing a guarantee of quality and work well done.

Wood house.Among the oldest green building include wood houses. They are made of wood in various types of structures (modular, logs, panels, etc.), better withstand earthquakes and foundations require much lower volume and cost.

Logs houses. They are made of two types of wood: Roundwood calibrated (ie the log is processed at the same size) and calibrated logs (the log has approximate dimensions). Log houses are massive, in fact, traditional houses made of rough wood processed manually [3]. These amounts generally on concrete foundations, but are made entirely of massive trunks of wood, previously untreated, but peeled. The entire building is made of logs and shaped by overlapping and joining their ends by plane manually, which ensures a very resistant structure of the house mechanically (and effective protection against seismic). Is inserted between the mating surfaces of mineral wool for thermal and sound insulation. Then the wood is treated to gain resistance against harmful microorganisms.

Laminated wood beams houses. They are made of wooden beams Glulam, namely: beams compact timber obtained by combining pieces of lumber in the first phase in the form of blades, which in turn are glued together in special conditions of temperature and pressure [6] . The advantage is that are more stable over time (not subject to specific deformation of solid wood) can have large sections and lengths, and provide easy decorating the walls, exposing only regular wood surfaces.

Laminated wood framed home. The assembly of structural elements creates a network of beam-column where all parts are predimensioned and processed in the factory. Fixing the foundation wooden structure is made by special fixture which isolates total surface of the timber concrete [3]. They can be filled with large glass panels or insulated panels (sandwich).

Houses self-supporting (sandwich). This type of structural frame houses independent, role being taken over by prefabricated bearing walls. Assembly is done with screws. Besides the resistance structure includes wall sandwich insulation layer, vapor barrier, facilities and routes within and outside layers of finish. You can choose any type of finish as in standard construction. Among the advantages can be mentioned: high resistance to earthquakes, a wide variety of shapes and sizes, lower execution costs.

Wooden houses presents a number of advantages observable. The production cost is lower than the housing made of other materials. Then, no air conditioning is not too costly, given that a well-insulated wooden house proves to be sufficiently cool in summer and warm enough in winter. All this leads to reduced consumption of fuel and energy, emission of pollutants is therefore diminished.

A wooden house is cheaper, sometimes by almost half, but maintenance is demanding her time [4]. A brick house is more durable and resistant to fire, but it is colder in winter and warmer in summer than in a wooden house. A wooden house is more flexible and less dangerous in case of earthquake, but a brick house is attacked by caries, overrun by ants etc. [4].

The advantages of wooden houses:

- ***Are cheaper by 30-40% than those of brick***; materials used are cheaper and their degree of industrialization that can be prefabricated to a greater extent and cause the price to be lower;
- ***Runs fast in a month***, more than three months;
- ***Are flexible and lightweight***, and are not dangerous in case of earthquake;

- ***Good thermal insulation*** is colder in summer and winter warmer; Heat losses were calculated by experts as 30-40% lower than brick houses; Nordic people prefer this technology, which demonstrates that they are effective in fighting very low temperatures; Norwegian and Swedish houses are made as sandwich method;
- ***Inner space can easily be divided or modified***; the house light, does not require too many pillars, making the inner space to be easily modeled. not demanding in terms of terrain type that can be placed; being lightweight wooden houses can be built and poor or sandy land, facilities can be hidden in walls; walls being prefabricated and wooden houses were built usually by type projects could be envisaged route cable wires or utility lines.

(When buying a property looks over which it emphasizes is the presence of utilities. It refers to running water, gas, electricity, Internet, cable TV and access to the sewage system of a house or possibility to make the connection to these services for a particular field.).

The wood used to construct the houses would have to meet some technical conditions of use are not complied with by all manufacturers and all companies providing building materials:

- the wood comes from the provider you have a few weeks left to dry
-wood insert, then in special ovens for drying, electronically controlled kilns where wood is until you reach the optimal humidity of 14-16%.
-gives wood is planned on all sides in this phase and you see all hidden defects. Through this process, the wood loses 26% by volume and is the size of 15 × 4.5 cm.
- the wood is cut to the size of the project and numbered and then to be able to easily build panels the size of the project.
-the wood is completely submerged in the bath where the substance of treatment against insects and fungi.

The joints should use special fasteners, galvanized and approved items bearing the CE marking. Obviously, the cost of these engaging elements are 3 times more expensive than classical nails, staples and which are also used in other parts of the builders.

Unfortunately, in our country, do not meet the standards and rules of construction for homes made of wood.

The construction of wooden houses using material and technical and execution standards already approved in more developed countries, the price is about 400 € /mp + VAT.

The houses made of wood, various structures and forms can be achieved and cellar, garage. Foundation such a home is like a classic, all concrete and reinforced concrete reinforcement. The cost of foundations in a wooden house, is about 50 € /mp.

Finally, foreigners say they are healthier. Wood is a natural, environmentally friendly; In a masonry house may appear damp, condensation. It is said that a wooden house "breathe" and does not suffer from the vapors.

Disadvantages of wooden houses:

- ***"Live" less than brick***; builders view that the life of a house of wooden panels is 20-30% shorter than the one of brick, however, there are wooden churches and old houses built of wood massive, who resisted while more than palaces built of stone in the cities;
- ***Does not ensure a perfect sound-proofing***;
- ***Maintenance time is painstaking and demands money***; at an interval of five to six years should be checked carefully and make any necessary repairs; In addition, all elements of structural and nonstructural wood should be treated against insects and whether or log paneling on the outside, they should be varnished;
- ***Cannot be too high***; a wooden house should not have more than two floors, because at a height greater stability is shaky house.

Brick house. As it was reminded the wooden houses, a brick house is quite expensive (more expensive than one made of wood even 50 percent), it requires no maintenance expenses as high as those of wood.

Also, a house brick cope better with unexpected events such as fires, but is less efficient in terms of creating an environment so pleasant heat in winter and in the warm.

These buildings can be improved in terms of heat through systems engineering construction

(creating an air vertically between two layers of masonry, which prevents the transfer of energy between inside and outside). In addition, these homes can benefit from a classic insulation system.

Brick houses are durable, resisting for more years than those made from other materials (eg wood), but it is not recommended to be built on weak soil or sand. It should be noted that a house of brick is higher seismic risk and is less flexible, but is not affected by moisture or by pests [5].

If you want a large house with several floors, a brick home is a good choice because, if built correctly, no problems of stability.

The resistance structure must cope with brio own weight of the house, and seismic forces, weather and vibrations. It takes its own weight plus the payload capacity (people and furniture) through floors and beams, walls and columns and send that through the foundation, a pass on the ground [2].

Depending on your budget, the architecture desired and, not least, personal taste, Framework, a case can be made either of reinforced concrete frames or frames of wood or wooden wall, or the supporting walls of brick.

In Romania, the most used system is the monolithic reinforced concrete frames. This is made up of a network of horizontal elements (beams) and vertical (columns) monolithic reinforced concrete slabs stiffened by horizontal reinforced concrete.

Concrete is the cheapest building material resistance and, unlike wood or metal, does not require special treatment (flame retardant or antiseptic). In addition, preparation and application made easy work directly on site without requiring any additional equipment. One disadvantage is prolonged attain full capacity of the port.

Fittings, those steel rods embedded in concrete, plays a pivotal role in taking the efforts that occur during an earthquake, increasing in strength and gives it elasticity needed to cope with shocks [3].

For residential buildings, single-family or duplex, you can choose any type of structural frame: reinforced concrete frames structure with wooden frames or wooden walls, the structure of the supporting walls of brick (the panels of masonry are framed reinforced concrete little poles and belts), etc.

There are many structural variants from which to choose:

- ***Brick structure houses the bearing*** (full brick or brick goals); - Houses concrete structure: columns and beams;

-***Monolithic structure houses***: pour reinforced concrete walls (hence the novelty of those modules that make up the future of expanded polystyrene wall, which lay the rebar and the concrete is poured)

- ***Wooden structure wood***: pillars and beams (the floors are all wooden beams or concrete slabs may be);

- ***Metal structure houses***: pillars and beams. The combinations may occur if structures on pillars and beams and have exterior walls of: brick, hollow brick, concrete, sandwich panels, panels of corrugated sheets, panels of wood or PVC, prefabricated and bulkheads in: brick, hollow brick, concrete, drywall boards.

What is important especially structure and the material it is made it? depending on what you want to have spaces in new home (openings, glass surfaces, number of levels, whether or not a basement), architect and structural engineer will recommend a certain type of structure.

Each structure has restrictions. Here are a few to get an idea about what discussed:

In a supporting structure of brick house you cannot have large openings - up to 2.5 m, whether we speak of an empty window, door or living space. You cannot "forget" a wall between the living and dining unless you reduce the total area. And if you want more levels should thickened walls in order to have stability and strength. If the structure of columns and beams is the most flexible, so I showed above and can be combinations.

In terms of timber frame house, standardized models that bring our demands should be resized to seismicity. Do not ignore the fact that Romania is in a seismically active area, with a threshold value below that of Japan and the west coast of the United States, this is being reflected in a series of conditioning manufacturer.

Thus, *a structure of reinforced concrete*

pillars and beams appropriately sized reinforcement combines the flexibility of reinforced concrete with compressive strength of concrete [7]. A wood frame house cannot withstand the same loads and mechanical stresses as one of the concrete structure unless resizes or use structural columns and beams of wood. Every choice and change can bring added cost, everything is done strictly related to space travel home.

The advantages of brick houses:

- ***They are more durable***, have a longer life than a house of wood; resistance structure of the house is stronger, while requiring repair walls, but less than a house of wood;
- ***Can support any type of roof***, including tiles; tile material is considered "hard", which must be supported by a strong house with a durable structure; even if it seems an antiquated method, the tile has many advantages: it takes time, it is good insulator and is resistant to rain;
- ***Allow a very wide range of finishes***; the walls inside and outside, can be painted with lime or washable paint or wallpaper can be painted or covered with plasterboard and wood paneling;
- ***Are resistant to pests, insects and rodents***, without the need for special treatments, do not need more maintenance work in the current time; is painting the walls over two to three years, repair a chipped corner of the house that was over ten years, throwing a dash of lime on exterior walls over 15 years. All these are nothing compared to doping and chemicals every five years;
- ***Are better silencing***; in other words, it provides greater privacy of the home, interior space;
- ***Can be constructed by traditional methods with cheap labor***; almost every man knows how to do a brick wall and do not know yet, can learn quickly, running only on a worker such work.
- ***Can be built as high***; house in the project do not have height restrictions due to the chosen material; homes may have only one level, but five-six floors or blocks can turn into skyscrapers, they have a resistance structure of reinforced concrete.

Disadvantages brick houses: take a long time for execution, the interior cannot be changed easily, because the resistance structure, are "cold" and require more power or heating fuel, earthquake fall faster than wood . The cost of these houses is higher than wooden ones.

CONCLUSIONS

Regarding the implementation of a wooden house, building firms which respects the material runs constructively with European standards and the constructive method used is quality standards. Engaging elements of the wood, are very important for the stability and durability of timber frame houses. For this reason the companies working for foreign beneficiaries, the quality of these elements do not give up, even if the manufacturing cost is higher and execution.

The price of a wooden building can only be determined on a project basis. In the absence of any project cost estimate can only be approximate due to several factors such as:

• real geometry of the structure can cause higher or lower consumption of construction materials, workmanship material additional or different losses;

• cannot be considered exact degree of finish desired by the customer nor the quality of construction materials, factors that are extremely significant because of the great diversity of building materials market.

The place where the building will be located by influencing its price needs insulation, noise resistance requirements or different mechanical stresses (earthquakes, winds, snow etc).

In general US house prices by type of wood is 60-70% of the brick houses.

In France, as in other European countries, there are standards, rules and regulations in respect of the implementation of wood falls. Such builders and manufacturers of building materials must meet all these standards and regulations.

Unfortunately, in our country, did not engage anyone to regulate rules and standards for the execution of a wooden house. Likewise, for companies producing materials and wooden construction elements, there is a standard of

quality in this area.

In our country, we can build a wooden house, under any circumstances, even if executed in own or with a company. Only working for foreign firms comply with the rules and standards but the costs are higher.

On the other hand, brick homes remain the most cherished of Romanian, as the Europeans. Each year, according to statistics, in Europe, more than two million new buildings for housing are constructed of brick, which represents 60% of all new housing. The most ardent supporters of this way of building houses are Latins, particularly Italians and Spaniards, who rarely They make a house of different materials. Brick homes are built with more weight, take more time, but they have a longer life.

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BIOMASS YIELD AT MAIZE UNDER DIFFERENT TECHNOLOGICAL CONDITIONS

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Abstract

The aim of the paper is to present the biomass yields at maize under different technological conditions (two soil tillage, respectively ploughing and harrowing, and two preceding crops, respectively maize and sunflower) in the specific growing conditions from South Romania. In this respect, researches were performed in field experiments located in South Romania (44°29' N latitude and 26°15' E longitude), under rainfed conditions in the year 2014. Six maize hybrids were studied under two soil tillage (ploughing and harrowing) and under two preceding crops (maize and sunflower). The biomass determinations were performed in the early dough-dough plant growth stage, respectively in the growth stage when the maize biomass is of importance to be used as substrate for producing biogas. The results revealed that ploughing and maize as preceding crop have determined the highest fresh and dry biomass yields.

***Key words*:** *biomass, maize, preceding crop, soil tillage, yield*

INTRODUCTION

Biomass presents an increasing importance as source of fuels (solid, liquid and gas) [1]. Among different sources of biomass, the crop biomass both as energy crops or crop residues is one of great importance [4]. Energy crops used for biogas production should provide high dry matter yield and high methane output per area unit, but also they should be easy to cultivate, i.e. to be tolerant to weeds, pests, diseases, drought and frost, and to be able to grow with low nutrient input [2]. Maize (*Zea mays* L.) is one of the plants which fulfil these requirements, this having a high potential of producing biomass.

Maize can be used as source of biomass for producing biogas both as energy crop or crop residues. In fact, maize is considered to be one of the most important sources of biomass for producing biogas. But producing biomass is affected by the environmental, biological and technological factors, all these factors having to be well and correctly managed by the maize grower.

The biomass of maize plant is depending on a sum of growth factors among which the cultivated hybrid, plant population, row spacing and soil conditions have a significant influence on the accumulation of the above-ground biomass and its repartition between plant components [3]. One of the conditions to produce biomass in an efficient way is the use of the most appropriate cultivation techniques [4]. Among the cultivation techniques, the preceding crop within crop rotation and soil tillage are of great importance.

Crop rotation is considered to be a way of increasing the yields without bearing any costs. However, even when crop rotation is practiced, yields can be limited if particular crops are grown frequently [5].

Concerning the soil tillage, many farmers are converting to reduce tillage systems to reduce soil erosion and field-work time requirements, and to remain eligible for government programs [5]. Tillage is one of the highest power-required processes of agricultural production, and in addition, the high cost of energy today forces farmers to find alternative economic tillage [6].

The aim of this paper is to present the biomass yields at maize under different technological conditions (two soil tillage, respectively ploughing and harrowing, and two preceding

crops, respectively maize and sunflower) in the specific growing conditions from South Romania.

MATERIALS AND METHODS

Researches were performed in field experiments located in South Romania, respectively at Moara Domneasca Experimental Farm belonging to the University of Agronomic Sciences and Veterinary Medicine of Bucharest (44°29' N latitude and 26°15' E longitude). The field experiments were performed under rainfed conditions in the year 2014.

For the period April-August 2014, the average temperature was of 18.8°C, while the multiannual average temperature for this period is of 18.5°C. For the same period, the sum of rainfall was of 408.0 mm, while the multiannual average rainfall is of 313.2 mm.

The specific soil from Moara Domneasca area is reddish preluvosoil, with a humus content between 2.2 and 2.8%, a clay loam texture, and a pH between 6.2 and 6.6.

Six maize hybrids were studied, respectively: ES Method (FAO precocity group 380), ES Antalia (FAO precocity group 450), Korimbos (FAO precocity group 530), Janett (FAO precocity group 540), Mikado (FAO precocity group 550), ES Feria (FAO precocity group 550).

Every hybrid was studied under two soil tillage, respectively ploughing and harrowing, and under two preceding crops, respectively maize and sunflower.

Sowing was performed on 30th of April 2014, at row spacing of 50 cm and at plant density of 80,000 plants.ha^{-1}. Fertilization was performed with 106 kg.ha^{-1} of nitrogen and 60 kg.ha^{-1} of phosphorus. The weed control was performed by the help of herbicides, which were completed by one manual hoeing.

Each variant consisted in six lines with a length of 10 m.

In each experimental variant the maize plants from half of square meter (four plants, respectively the plants along one meter of row length at the row spacing of 50 cm) were cut at soil level and were weighed immediately in the field in view to be determined the fresh biomass yield, respectively the yield of above-ground biomass. One average maize plant for each variant was taken into the laboratory and dried in the oven at 80°C for 24 hours in view to be determined the dry biomass yield.

Determinations were performed in three replications in the early dough-dough plant growth stage, respectively in the growth stage when the maize biomass is of importance to be used as substrate for producing biogas. The data are presented and analyzed in the paper as average values for the six studied maize hybrids and are referring to the fresh and dry biomass as above-ground biomass.

RESULTS AND DISCUSSIONS

Fresh and dry biomass yield at maize registered different values according to preceding crop and soil tillage.

The highest fresh biomass yields were registered under ploughing as soil tillage and after maize as preceding crop (Fig. 1). Under these conditions, the average fresh biomass yield was of 59.02 tons.ha^{-1} for the six maize hybrids and the three replications for each hybrid, with a maximum value of 74.13 tons.ha^{-1}.

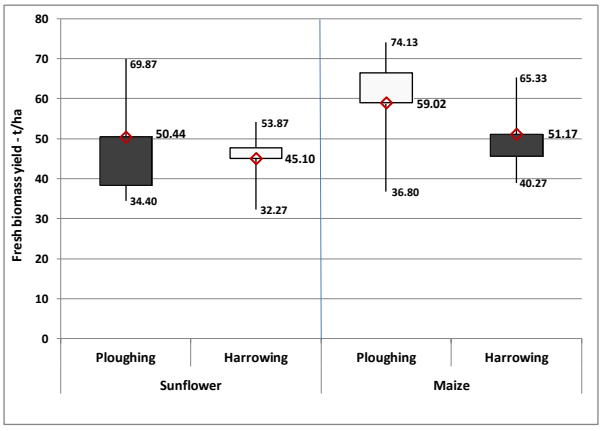

Fig. 1. Fresh biomass yield at maize under different preceding crops and soil tillage (average values and limits of variations for each experimental variant)

Ploughing conditions determined the highest fresh biomass yields compared to harrowing, but also the highest variation of fresh biomass yields (Fig. 1).

Thus, under ploughing conditions the fresh biomass yields varied between 36.8 and 74.13 tons.ha^{-1} for maize as preceding crop and

between 34.4 and 69.87 tons.ha^{-1} for sunflower as preceding crop.
Under harrowing conditions the fresh biomass yields varied between 40.27 and 65.33 tons.ha^{-1} for maize as preceding crop and between 32.27 and 53.87 tons.ha^{-1} for sunflower as preceding crop.
As average values, the highest fresh biomass yields were obtained under ploughing conditions (54.85 tons.ha^{-1}) compared to harrowing conditions (48.22 tons.ha^{-1}).
Also, the highest fresh biomass yields were obtained after maize (54.99 tons.ha^{-1}) as preceding crop compared to sunflower (47.70 tons.ha^{-1}) (Fig. 2).

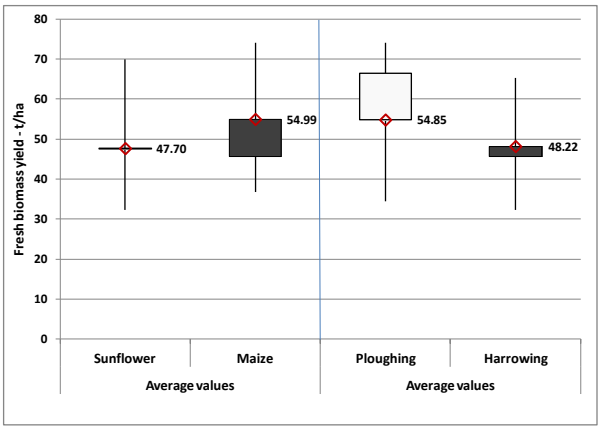

Fig. 2. Fresh biomass yield at maize, as average values for different preceding crops and soil tillage

As in the case of fresh biomass yields, the highest average dry biomass yield was registered under ploughing as soil tillage and maize as preceding crop (Fig. 3).
Thus, under these conditions, the average dry biomass yield was of 20.76 tons.ha^{-1} for the six maize hybrids and the three replications for each hybrid.
But, the maximum value for the dry biomass yield was registered under ploughing as soil tillage and sunflower as preceding crop, respectively 27.64 tons.ha^{-1}.
Also, as in the case of fresh biomass yields, ploughing conditions determined the highest dry biomass yields compared to harrowing, but also the highest variation of dry biomass yields (Fig. 3).
Thus, under ploughing conditions the dry biomass yields varied between 15.40 and 25.92 tons.ha^{-1} for maize as preceding crop and between 12.65 and 27.64 tons.ha^{-1} for sunflower as preceding crop. Under harrowing conditions the dry biomass yields varied between 14.64 and 21.18 tons.ha^{-1} for maize as preceding crop and between 11.17 and 20.56 tons.ha^{-1} for sunflower as preceding crop.

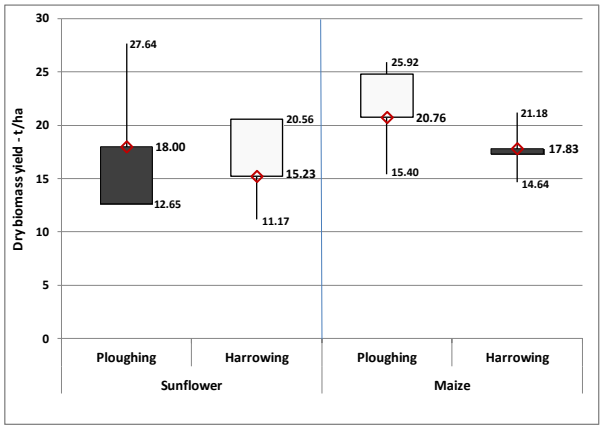

Fig. 3. Dry biomass yield at maize under different preceding crops and soil tillage (average values and limits of variations for each experimental variant)

As in the case of fresh biomass yields, the highest dry biomass yields as average values were obtained under ploughing conditions (19.38 tons.ha^{-1}) compared to harrowing (16.53 tons.ha^{-1}).
Also, the highest dry biomass yields were obtained after maize (19.29 tons.ha^{-1}) as preceding crop compared to sunflower (16.62 tons.ha^{-1}) (Fig. 4).

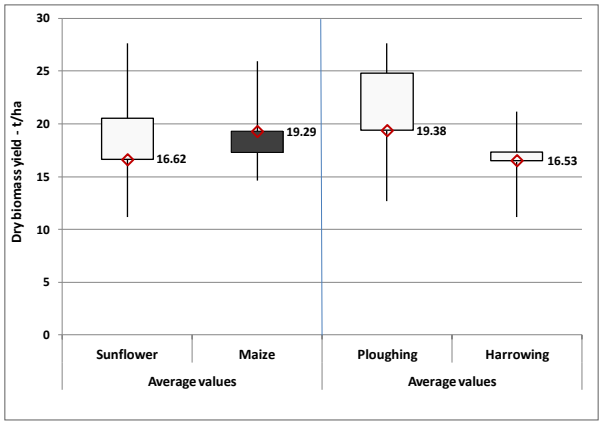

Fig. 4. Dry biomass yield at maize, as average values for different preceding crops and soil tillage

In average for the six maize hybrids and the three replications for each hybrid, under different soil tillage conditions and under different preceding crops, the share of dry

biomass on plant components varied as follows: between 31.3 and 33.7% for stalk, leaf sheaths and tassel; between 17.3 and 17.7% for leaf blades; between 43.0 and 44.5% for ears; between 6.0 and 6.9% for husks (Fig. 5).

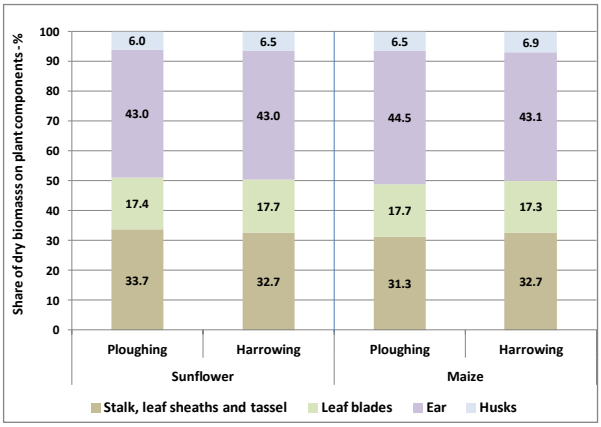

Fig. 5. Share of dry biomass on maize plant components under different preceding crops and soil tillage

As average values, between the two preceding crops (maize and sunflower), maize determined a higher share of dry biomass for ears (43.8%) and husks (6.7%), while sunflower determined a higher share of dry biomass for stalks, leaf sheaths and tassel (33.2%).

Between the two soil tillage (ploughing and harrowing), ploughing determined a higher share of dry biomass for ears (43.7%), while harrowing determined a higher share of dry biomass for stalks, leaf sheaths and tassel (32.7%) and tassel (6.7%).

It is interesting to notice that the share of dry biomass for leaf blades was the same (17.5%) for all the experimental variants (Fig. 4).

Fig. 6. Share of dry biomass on maize plant components, as average values for different preceding crops and soil tillage

CONCLUSIONS

Ploughing has determined the highest fresh and dry biomass yields compared to harrowing, but also the highest variations of the yields.

Among the two studied preceding crops (maize and sunflower), maize determined the highest fresh and dry biomass yields.

The combination of ploughing and maize as preceding crop has determined the highest fresh and dry biomass yields.

Also, this combination of ploughing and maize as preceding crop as technological conditions has determined the highest share of dry biomass on ears.

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THE CAUSES OF DISORDER'S DEVELOPMENT AMONG FARMERS AS A RESULT OF MECHANIZED TASKS

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Abstract

Nowadays, in agriculture there are many different sources of accidents and risks developing disorders in musculo-skeletal system. Farmers are often exposed to the possibility of overloading the musculo-skeletal system due to many different activities performed in farms. Based on these circumstances, the studies were conducted aiming as main objective to investigate the causes of disorders in farmer's musculo-skeletal system. Therefore, a survey was conducted on 96 farms. It turned out that many farmers transport the loads only manually. Due to many various tasks performed in farms, farm workers adopt an uncomfortable body position very often: forward inclination of the spine and head, sitting without back support and often kneeling. It generates pains of the upper limbs and legs or stiffness of hands. Based on these results it is very important to perform each agricultural activity very careful and paying attention to other worker during work process in the same farm.

Key words**:** *farmer, musculo-skeletal disorders, safety, tractor*

INTRODUCTION

Work on a farm it is described often as high complexity - during working day the farmer performs a series of diversity activities that often require different skills. The natural consequence of this type of work is exposure to a high number of dangerous and troublesome factors. All this leads to the fact that farming is described as area of high number of accidents [2, 10, 19]. An accident in agriculture is defined here as such an event which is caused by external circumstances, was related to agricultural activity and caused injury [22, 23]. Besides work-related accidents in farming, farm workers are often exposed to some disorders. Whereas an accident in agricultural is always unexpected, the symptoms of human disorders appear after a longer period of work and are associated with troublesome factors accompanying these activities [20]. These considerations make the prevention of disorder's symptoms among farmers much more difficult than preventing accidents in agricultural work.

MATERIALS AND METHODS

Taking into account some reasons given in the introduction, it is necessary to indentify the risk of human disorders connected with farming profession.
This analysis was conducted in selected works that generate relatively high risk of developing musculoskeletal disorders.
The objective of the article was to evaluate a risk of appearing disorders among farmers as a result of performing a different tasks in individual farms.
The study was conducted in randomly selected farms located in the province of Łódz and Lower Silesia.
A questionnaire consisted of 30 questions (16 open and 14 closed).
The study was performed in 96 individual farms and took form of a direct interview generally among farmers and their families involved in process of agricultural production. The research was entirely anonymous and the age of the surveyed farmers ranged from 25 to 65 years.

RESULTS AND DISCUSSIONS

Nowadays a tractor is an essential element of each modern farm. During many operation with the tractor farmer is exposed to a number of dangerous risk. As a matter of fact is that the share of tractors in the total number of accidents is low, but the consequences of such events are relatively serious [4]. A part of agricultural accidents involving tractor doesn't consider the tractor drivers, but people standing near the vehicle attaching a machine to the tractor while the tractor is moving. The most common accidents include the person being driven over by tractor or caught by the vehicle in motion. In order to reduce the risk of accident, the tractor drivers should take a special care, always before driving make sure that people not involved in agricultural operations are safe [17, 18]. Figure 1 shows the answers of farmers to questions concerning a safe start driving of the tractor.

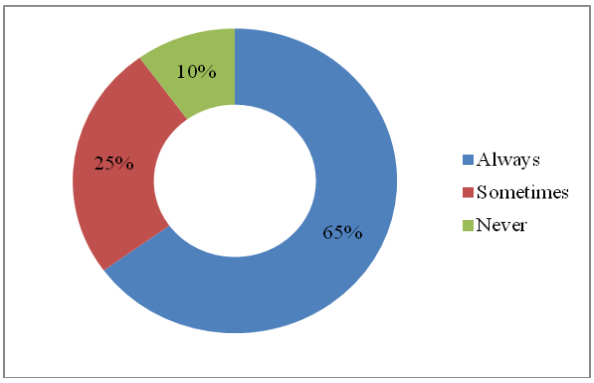

Fig. 1. The distribution of answers to the question of whether the farmers make sure that not involved people in work accompany the farmer while starting the vehicle. Source: own study

Based on the survey (Fig. 1) it found that 65% of surveyed farmers "always" before starting the tractor make sure that other people don't accompany them. This is a key issue in prevention of accidents involving machinery and vehicles. For 10% of the farmers this issue don't matter, because in their farms very often children and elderly people are exposed to direct risk. The rest of the respondents stressed that this issue is determined by many different factors such as good work organization or know-how, because only in some situations they are willing to pay attention to persons in the area of tractor driving. In addition to the risk of accidents associated with the use of tractors, farmers are exposed to troublesome factors, that in the long term lead to the disorders symptoms. The method of tractor use, may leads among farmers to musculoskeletal-skeletal disorders. This is caused by the forced position of the body while driving the tractor. Figure 2 summarizes the types of work that were often mentioned by farmers as heavy because of the stress on them spine.

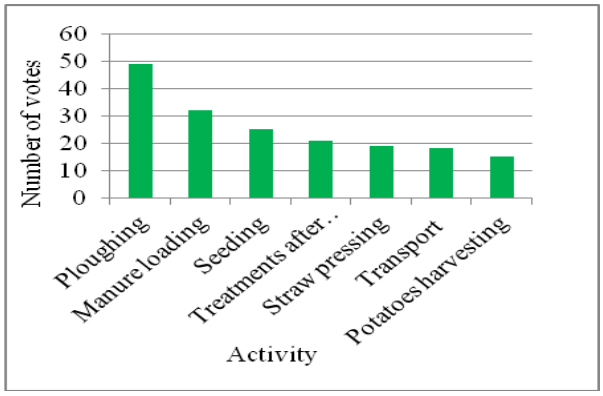

Fig. 2. Cultivation techniques performed with tractor and resulting in disorders of farmer's musculo-skeletal system. Source: own study

According to Fig.2. ploughing is an activity that most respondents (49 farmers) indicated as troublesome. A significant number of people (32) mentioned that loading manure is a potential source of discomfort associated with tractor driving. A small group of farmers indicated transportation works and a collection of agricultural potatoes with the use of combine - respectively 18 and 15 replies. Based on these results it can be concluded that the pain of the spine among tractor drivers is the most experienced in the performance of plowing.

Safety of agricultural machinery is the most important issue for 72% of respondents (Figure 3); firstly because of the level of safety for men during contact with the machine and secondly because of the work performance, i.e. the elimination of machine breakdowns which could occur over time and interrupt the work. Approximately 1/5 of the respondents do not see the need for safety checks on the machinery and the remaining group does not have any problems with

machine safety.

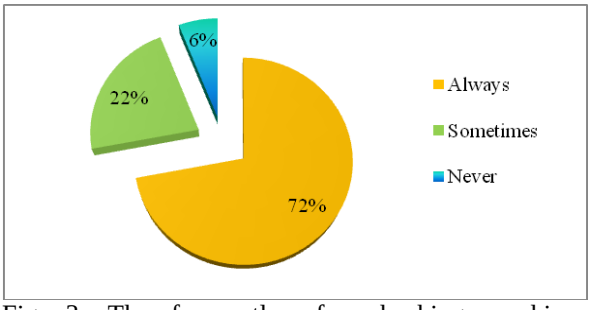

Fig. 3. The frequently of checking machinery condition in safety aspect. Source: own study

Farmers are often exposed to the possibility of overloading the musculo-skeletal system due to the farming work complexity. Such a possibility of developing disorders may be manifested by pain sensations during the execution of specific works. Figure 4 summarizes activities indicated by farmers as those which most often lead to pain in their musculo-skeletal system. It turns out that the work identified as the most onerous is the manual transport of loads, among which is the carrying of the bags containing mineral fertilizer and animal feed (53 responses).

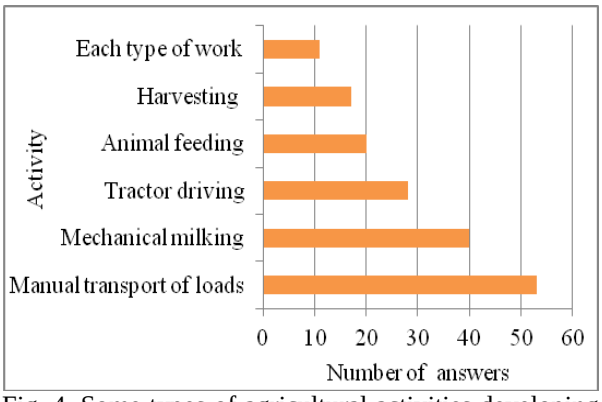

Fig. 4. Some types of agricultural activities developing musculo-skeletal disorders. Source: own study

Other onerous works include (mechanical) milking and tractor driving. Harvesting was also specified by many respondents (17 people), and each type of work was indicated by every tenth farmer. The nuisance of mechanical milking of cows does not result from heavy loading, but from the repeatability of operations performed in a forced body position - washing udders and fitting milking cups take most of the time in milking [12]. In turn, tractor driving indicated by farmers as onerous (without indicating a specific type of work) should be attributed primarily to the previously described specific design of the tractors (lack of sufficient shock absorbing properties and power steering in the case of older tractors). It should be noted that the design of tractors is constantly modernised with the emphasis on improving ergonomics and safety of use [3]. Because farmers identified manual handling of loads as taking the first place in terms of nuisance, another question in the survey was dedicated to this activity. Figure 5 summarizes replies pertaining to feelings during the manual handling of loads.

The analysis of the graph allows observing that 18% of respondents indicated the stiffness of hands and forearms as inseparable elements of lifting, 16% pointed to pain in the upper limbs and 14% to the forward and sideways inclination of the body. The effects that are the least likely to be felt include: tingling of the limbs - 6% and the so-called "cold limbs" effect - 5%.

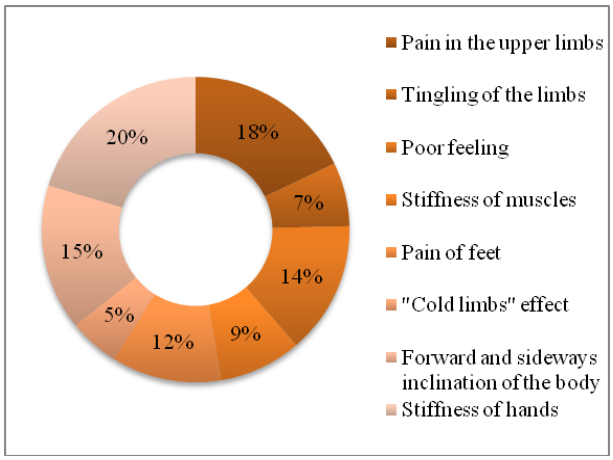

Fig. 5. Feelings among farmers during a manual transport of loads. Source: own study

The nuisance which was most often mentioned (hands and forearms stiffness and excessive inclination of the body) may be associated with taking a wrong position in the lifting of heavy loads - it was demonstrated that many farmers perform this type of work "in the traditional way" without taking safety standards into account [5, 20].

Nuisance related to the handling of loads can be minimized by following the recommendations and standards, as well as

through the use of appropriate technical measures [1, 20]. The farmers' awareness of the possible consequences of incorrect handling of loads is of a key importance here. Figure 6 summarizes the responses to the question on how to move 50 kg weights.

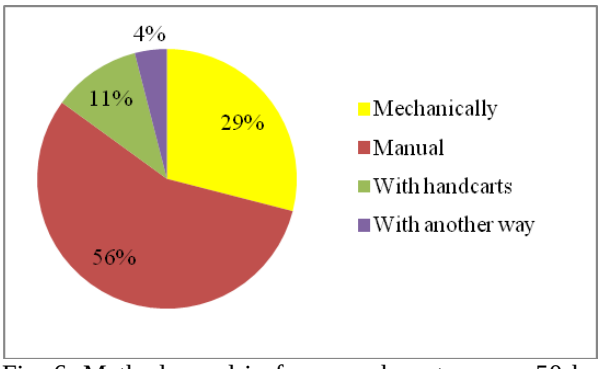

Fig. 6. Methods used in farms on how to move 50 kg weights. Source: own study

The analysis of the above table allows concluding that as many as 56% farmers do not have adequate technical solutions to support the transfer of loads from one place to another. It is not a problem for 29% of farmers who have the transport work done mechanically (e.g. with the use of conveyors). Handcarts are regularly used in 11% farms, and in the remaining group the loads handling is performed with the help of another person, as shown in Figure 5. When assessing the above statement it can be concluded that a large number of farmers are not aware of the potential effects of manual handling of loads or they do not realize the benefits from the use of technical measures in loads handling activity. The body position during work is one of the most important elements influencing the development of disorders in the musculo-skeletal system [5, 20]. Figure 7 shows responses of farmers as to the most uncomfortable body positions adopted while performing various works. In their responses they listed many "uncomfortable" body positions which resulted from the specific nature of the activities.

The most frequently mentioned threats to the motoric system of farmers include sideways twisting of the torso (19% of the responses), forward inclination of the spine (13%), holding upper limbs in a forced position (14%) as well as keeping feet and flexing legs (10% responses for each).

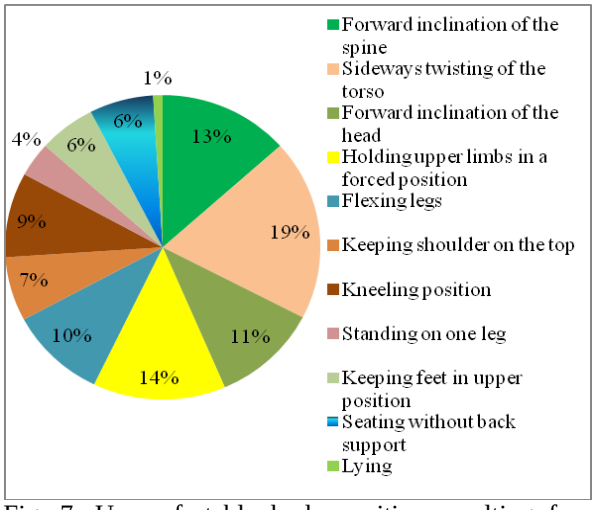

Fig. 7. Uncomfortable body position resulting from specific nature of the activities. Source: own study

Standing on one leg was rarely mentioned (4%), while tilting the head from the vertical position and seating without back support constituted 6% of the responses for each of the activities. Kneeling position was also considered uncomfortable by 9% of the respondents.

Based on the result analysis regarding the risks and inconveniences associated with the use of tractors, it can be concluded that the awareness of farmers on this issue is continuously improving - it is consistent with the observations offered in the works by Pawlak [17, 18]. It should be noted that even 15 - 20 years ago the percentage of farmers who disrespected risks associated with the use of tractors was higher than it is today [4]. The development in the design of tractors is of great importance here, due to which it is possible to improve the safety and ergonomics of tractor usage [3, 7, 21].

Not only in Polish farming a large number of accidents is related to the use of machinery and equipment [9, 13, 16]. As in the case of tractors an increase in the amount of news about dangers associated with improper use of machinery and equipment on the farm is observed - this trend is consistent with the analyses performed periodically by the Agricultural Social Insurance Fund [9, 10, 11]. The financial condition of the farm is

important. It was demonstrated that a better economic situation allows improving the age and the condition of the machinery, which directly translates to the improved safety for farmers [6, 14].

The observations of farmers about the nuisance of individual works are partly consistent with those reported by other researchers. In works 4 and 5 the manual handling of loads is indicated as an activity of a high nuisance which may lead to developing disorders. This trend seems to be confirmed by the results of this study, where the manual handling was identified as the most burdensome for farmers. Some discrepancies with the literature data appear in the case of milking operation, which scored second place in terms of nuisance. In work 12 it was demonstrated that the milker's operation is not marked by a significant nuisance. However, in paper 15 it was stated that the milker's work is subject to high risk of developing musculo-skeletal disorders.

The analysis of nuisance associated with manual handling of loads gave reasons to conclude that the inconveniences most often experienced during this operation are the stiffness and excessive inclination of the body. The most common cause of this type of ailment is the incorrect technique when moving loads and consequently the absence of proper habits when performing these activities. This hypothesis is consistent with the results reported by other researchers [5, 20]. It was also found out that most farmers do not use technical solutions to move loads, which obviously increases the risk of developing musculo-skeletal disorders. Other studies demonstrated that the manual handling of loads is one of the main causes of musculo-skeletal disorders [1].

CONCLUSIONS

The conducted studies determine the most dangerous activities connected with driving a tractor and resulting in disorders of musculo-skeletal system. Among many different types of agricultural work, manual transport of loads generates most often pain among farmers. There were described farmer's feelings during the manual handling of loads. Many farmers indicated a stiffness of hands and pain in the upper limbs as a consequence of uncomfortable position during agricultural activities. The most frequently mentioned risk were connected with forward inclination of the spine and sideways twisting of the torso. It turned out that many farmers don't check a machinery condition before using it. It leads to many different accidents in farms. The conducted research will allow for development of favorable working conditions for farmers who don't meet safety condition. It is very important to workers and farm owners to reduce a risk developing a disorders in musculo-skeletal system, because the body position during work is one of the most important elements influencing the pain during work.

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ANALYSIS OF THE OPINION OF THE AGRICULTURAL PRODUCERS FROM THE FRUIT TREE GROWING SECTOR ON THE INTENTION TO JOIN IN AN ASSOCIATIVE FORM

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Abstract

The association in horticulture is the only way to succeed in this segment of agriculture, and generally designed to ensure fair incomes for farmers, coupled with their workload, however, bringing added value and in the Romanian economy. In this paper, the fruit tree growers were identified in relation to those issues, and answered a questionnaire. Before acting, to convince farmers in Romania to be part of an associative form, we must realize how they perceive the concept of association, and how to find the ideal solution to convince them that the association does not deprive them of their land, they will remain owners of the fruit tree plantations, and the association will help them to become more competitive in a free market.

Key words: *agriculture, the association in horticulture, fruit growers, Romania*

INTRODUCTION

After the events of 1989, the attention of the Romanian specialists and researchers in the field of agricultural economics was focused on cooperation, many of them sustaining that this is the main way to revive the Romanian agriculture, given the pressures of this very importance sector of our national economy [4].

Based on the theme, the relaunch of the agricultural sector generated an avalanche of papers on different aspects:

- condition of agriculture after 1989 and the effects of land reform [2];
- the situation and aspects of cooperatives in some European developed countries [10];
- studies on cooperatives before the 1st World War, in the interwar period or even at the beginnings of modern cooperatives in Romania [9];
- the signalled need for the development of cooperatives in agriculture [7];
- the harsh criticism on the Land Law of 1991, which, by its nature, is limited and incomplete, because of its content and uninspired application which fragmented the land in millions of arable plots etc. It led to the creation of one of the most disastrous situations for the Romanian agriculture pulling it back for decades [5];
- farm issues [8];
- the urgent need to create a legislative framework favourable to the development of viable and competitive agricultural holdings [6];
- rural development in general [1];
- the need for state support [3].

In the Romanian agriculture, the association existed before 1989, being applied by the socialist system by means of the agricultural cooperatives established by the confiscation of the agricultural land owned by farmers.

After the dissolution of the socialist regime, the land was given back to the old owners according to the Land Law issued in 1991. But this led to the division of the agricultural land in small plots which has become a big problem in the Romanian agriculture, as the modern technologies could not be applied. More than that, it has appeared the farmers' fear to join in associative forms and this fear still persists mainly among the older farmers.

Currently, the association started with timid steps and uncertainty among farmers, registering an upward trend in the latest period compared with the period immediately following the revolution. These increases

were favored by the measures taken by the Ministry of Agriculture and Rural Development, which facilitates the absorption of European funds by forms of association, consisting primarily of producer groups and cooperatives.

In The National Rural Development Program in the period 2014-2020 were developed two sub-measures addressed exclusively to the fruit growing sector, including the fostering of association to obtain such financing.

By identifying the vision and opinions on association in the field of horticulture, we can determine the true reasons which make this process to be a difficult one.

Unfortunately, at present, the fruit growing sector, as well as the whole agricultural system in Romania is characterized by an excessive fragmentation of farms / orchards and by the small farm size because they are subsistence and semi-subsistence farms. In addition to these two aspects, we can mention the lack of irrigation, which could contribute to non-constant productions, due to the weather condition, the population aging in the rural areas, the young people who prefer to migrate to urban centres and not to practice agriculture/horticulture.

MATERIALS AND METHODS

To identify the vision of farmers on the association in the fruit growing sector, it was set up a questionnaire including 29 questions. The sample of individuals was represented by a total of 100 farmers in all regions, classified by region of origin, size of holding, forms of ownership, age and farm type.

The questions were focused mainly on the farmers' vision on how to conduct business in the form of association, their opinion on the legislation, the existing policies, rules for consultation and information and finally to analyze the farmers' opinions on the decisions drawn within the Trainers' Association.

Evaluation of the survey data was performed using association Test (Chi-square, Hi or $\chi 2$). This test involves checking the hypothesis of association between: the responses to a questionnaire on alternatives of questions and checking a particular set of data that can follow a known statistical distribution. The socio-economic problems apply after making some contingency tables the data are classified by one, two or more segmentation variables. It allows to highlight the existence /non-existence of a link between the collectivities of the association created by the segmentation of the studied variables. In this paper we present the most relevant information on the association of fruit growing sector.

RESULTS AND DISCUSSIONS

According to Table 1, from the total of 100 respondents, 30 % were from the South - Muntenia region, 25 % from the South-West - Oltenia region and 13 % from the North West area. At the opposite pole, there were the West and North-East regions with a rate of 8% and the regions Bucharest-Ilfov (4%) and the Central part (4%).

Table 1. Distribution of interviewees by age and region

How old are you?					
Region	**Years**				**Total**
	< 30	**30 – 45**	**46 – 60**	**> 60**	
Region Bucuresti - Ilfov	0%	4%	0%	0%	4%
Region Central	0%	0%	0%	4%	4%
Region North-East	4%	0%	4%	0%	8%
Region North - West	0%	4%	4%	5%	13%
Region South - East	0%	4%	4%	0%	8%
Region South - Muntenia	5%	5%	15%	5%	30%
Region South - West Oltenia	0%	5%	15%	5%	25%
Region West	0%	0%	4%	4%	8%
Total	**9%**	**22%**	**46%**	**23%**	**100%**

Source: Data from the questionnaire.

In terms of age, we find that 46% persons were between 46 and 60 years old, followed by those aged over 60 years. As one can notice, the young people under 30 years and between 30-45 years old represented only 31%.

Regarding the accession to an associative form, about 36 % respondents of the questioned ones replied that they want to adhere to a form of association, 5% persons take into account this possibility, while 59% persons said that they do not want to adhere to a form of nationally recognized association.

The reluctance of the respondents to be part of an associative form is determined mainly by the lack of information. People do not know the real advantages of the association and do not agree to be part of such an organization.

Those who wish to join an associative form are orchardists in the South - Muntenia and South-West - Oltenia. These fruit growers are directly interested to be part of an association, primarily because they saw or heard how is running a business in a fruit growing association in the developed countries of Europe (Poland, France, Italy etc.). Conversely, those who do not want to be part of an associative form are farmers from the regions Bucharest-Ilfov, Center, North-East and West.

Table 2. The structure of farmers based on their opinion on the wish to join an associative form in the fruit growing sector

Do you want to adhere to an associative form?				
Region	**Yes**	**I will think about it**	**No**	**Total**
Region Bucuresti - Ilfov	4%	0%	0%	4%
Region Central	0%	0%	4%	4%
Region North-East	4%	0%	4%	8%
Region North - West	4%	0%	9%	13%
Region South - East	0%	0%	8%	8%
Region South - Muntenia	10%	5%	15%	30%
Region South - West Oltenia	10%	0%	15%	25%
Region West	4%	0%	4%	8%
Total	**36%**	**5%**	**59%**	**100%**

Source: Data from the questionnaire.

If we analyze the intention of farmers to join an associative form depending on the surface, we see that most interested to be part of an association are the orchardists whose farms have an area between 5 and 20 hectares, between 2 and 5 hectares and those who have between 20 and 50 hectares. The ones who are less interested in the association are those holding a fruit tree plantation of less than 2 hectares and those whose holdings is larger than 50 ha.

Table 3. The structure of farmers in the fruit growing sector based on their opinion on joining an associative form according to orchards size

Do you wish to adhere to an associative form?						
Once owned harvesters area						
Specification	**Unit Size**	**Yes**	**I will think about it**	**No**	**Total**	
		No.	**No.**	**No.**	**No.**	**%**
< 2 ha	No.	0	5	32	37	37%
2 – 5 ha	No.	12	0	12	24	24%
5 – 20 ha	No.	19	0	5	24	24%
20 – 50 ha	No.	5	0	5	10	10%
> 50 ha	No.	0	0	5	5	5%
Total	No.	36	5	59	100	100%
	%	36%	5%	59%	100%	
Standardized residue						
< 2 ha	No.	**-3.65**	**2.32**	**2.18**		
2 – 5 ha	No.	1.14	-1.10	-0.57		
5 – 20 ha	No.	**3.52**	-1.10	**-2.43**		
20 – 50 ha	No.	0.74	-0.71	-0.37		
> 50 ha	No.	-1.34	-0.50	1.19		
Chi-square calculated =	**50.46*** **	**The critical value (theoretical) =**		13,36	p > 0.1(*)	
				15,51	p > 0.05(**)	
Degrees of freedom (df) =	8			**20.09**	**p > 0.01(***)**	
Cramer's V =	**0.50**	**Pearson's C =**		**0.58**		

Source: Data from the questionnaire.

The statistical association test (Chi-square = 50.46***; The critical value = 20.09 with a probability <0.01) on the opinion of those who want to join an associative form, depending on the area of orchards taken into property of those surveyed. There is a significant difference between the opinion of those who want to join an associative form and the surface of orchards. The analysis of R (residue standardized) showed significant differences regarding the holdings size: the farmers with less than 2 hectares considered all the three answers and the ones owning between 5 and 20 hectares are divided about joining an associative form. However, it was concluded that the opinion of those who want to join an associative form is influenced by orchards surface they hold (Table 3).

The Pearson's C and the Cramer's V, showed that between the opinion of those farmers who want to join an associative form and orchards surface (Pearson's C = 0.58; Cramer's V = 0.50) there is a significant relationship. Regarding the purpose followed to join an associative form, 32% questioned persons answered „supply", 22% persons answered "trade", 18% replied "storage" and 28 % answered "processing". As one can see, the orchardists' answers to this question reflected the real needs of the fruit growing sector. The main weaknesses of the fruit growing sector in Romania remain input supply and processing (Table 4).

Table 4. The structure of farmers in the fruit growing sector based on their purpose to join an associative form by region

Which is the purpose of your accession to an associative form?					
Region	**Supply**	**Trade**	**Storage**	**Processing**	**Total**
Region Bucuresti - Ilfov	4%	0%	0%	0%	4%
Region Central	0%	0%	4%	0%	4%
Region North-East	4%	0%	4%	0%	8%
Region North - West	5%	0%	0%	8%	13%
Region South - East	4%	4%	0%	0%	8%
Region South - Muntenia	5%	10%	10%	5%	30%
Region South - West Oltenia	10%	0%	0%	15%	25%
Region West	0%	8%	0%	0%	8%
Total	**32%**	**22%**	**18%**	**28%**	**100%**

Source: Data from the questionnaire.

In Bucuresti-Ilfov region, 4% of the interviewees answered that farm input oblige them to associate each other. Those who believe that supply should be provided by the association are those belonging to the South-

West Oltenia and North-West. Those who believe that marketing is the reason to be associated were from Muntenia and South-West of Romania. Those farmers from the South-East and North-Muntenia believed that the association should help them to better assure the products storage. The farmers from the North-West and South-West Oltenia believes that the association should assure fruit processing.

Of those who have a fruit tree plantation of less than 2 hectares, 28% persons said that the accession to an associative form should solve the problem of Supply and 9% persons answered that the association must help them in the product marketing. Those farmers whose orchards exceed 50 hectares believed that the association should process the fruits obtained in the association.

Those farmers who have between 2 and 5 hectares believed that the four variants should be the goal of the accession to an associative form, while those who have between 2 and 50 hectares considered that the storage and processing is a goal in joining the organization's profile (Table 5).

The orchardists whose farms have between 5 and 20 hectares of orchards had the opinion that the association should assure the marketing, storage and processing of the fruits.

Table 5. The structure of farmers in the fruit growing sector based on their purpose of joining an associative form by orchard size

Which would be the purpose of your accession to an associative form?							
Once owned harvesters area							
Specification	**Unit size**	**Supply**	**Trade**	**Storage**	**Processing**	**Total**	
		No.	No.	No.	No.	No.	**%**
< 2 ha	No.	28	9	0	0	37	37%
2 – 5 ha	No.	4	8	8	4	24	24%
5 – 20 ha	No.	0	5	5	14	24	24%
20 – 50 ha	No.	0	0	5	5	10	10%
> 50 ha	No.	0	0	0	5	5	5%
Total	No.	32	22	18	28	100	100%
	%	32%	22%	18%	28%	100%	
Standardized residue							
< 2 ha	No.	**4.70**	0.30	**-2.58**	**-3.22**		
2 – 5 ha	No.	-1.33	1.18	1.77	-1.05		
5 – 20 ha	No.	**-2.77**	-0.12	0.33	**2.81**		
20 – 50 ha	No.	-1.79	-1.48	**2.39**	1.31		
> 50 ha	No.	-1.26	-1.05	-0.95	**3.04**		
Chi-square calculated =	**87.93*** **	**The critical value (theoretical) =**			18.55	p > 0.1(*)	
					21.03	p > 0.05(**)	
Degrees of freedom (df) =	12				**26.22**	**p > 0.01(***)**	
Cramer's V =	**0.54**	**Pearson's C =**			**0.68**		

Source: Data from the questionnaire.

The statistical association test (Chi-square = 87.93***; the critical value = 26.22 with a probability <0.01) reflected the opinion of the farmers from the fruit growing sector on the purpose of joining an associative form based on the area of the fruit tree plantation. It was noticed a very significant link between the opinion of the farmers in the fruit growing sector on the goal of accession to an associative form and the orchards surface. The R (residue standardized) showed that the farmers owning less than 2 ha would aim to join an association for supply, storage, food processing, and the ones owning between 5and 20 ha aim sourcing and processing, the farmers owning between 20-50 ha need supplying and the ones with over 50 ha wish products processing. Therefore, the answer to this question was determined by the orchard surface owned by farmers.

Between the goal of accession to an associative form and the orchards surface we found a Pearson's C = 0.68 and Cramer's V = 0.54., reflecting that the surface owned by farmers is an important decision factor to join an associative form (Table 5).

Regarding the profit distribution in the associative form, 48% of the interviewed persons answered that the decision should be drawn by the majority, while 38% considered that the profit should be distributed based on the decision of all the association members and 14 % persons thought that the profit should be automatically reinvested (Table 6).

Among those who believe that profit should be reinvested automatically, about 14 % belonged to the South Muntenia region, while those who believed that the decision should belong to the majority, 15 %, belonged to the South-West Oltenia.

Table 6. Structure of farmers based on their opinion on profit distribution in the associative form by region

How should the profit be distributed in the associative form?				
Region	**By decision of the majority**	**By decision of all members**	**It should be automatically reinvested**	**Total**
Region Bucuresti - Ilfov	0%	0%	4%	4%
Region Central	4%	0%	0%	4%
Region North-East	8%	0%	0%	8%
Region North - West	4%	9%	0%	13%
Region South - East	8%	0%	0%	8%
Region South - Muntenia	5%	15%	10%	30%
Region South - West Oltenia	15%	10%	0%	25%
Region West	4%	4%	0%	8%
Total	**48%**	**38%**	**14%**	**100%**

Source: Data from the questionnaire.

Those farmers who considered that the profit should be distributed by the majority of the association members had small and very small farms, less than 2 ha and between 2 and 5 hectares. The farmers who believed that the decision should be taken unanimously were represented by those owning less than 2 hectares.

Regarding the distribution of profit within the Association related to the orchard surface, the statistical association test (Chi-square = 60.79*** and the critical value = 20.09 with a probability <0.01) proved that there is a very significant link between the growers' opinion on the of profit distribution and the surface of orchards on the studied topic and the analysis of R (residue standardized) observed significant differences especially between those growers with areas less than 2 ha and the ones owning orchards larger than 50 ha who believed that profit should be reinvested. Some farmers with 20-50 ha thought that profit should be distributed according to the decision of the majority. Therefore, the profit distribution is conditioned by the orchards surface owned by respondents (Table 7).

Table 7. Structure of growers based on their opinion on the profit distribution in the association by holding

How should the profit be distributed in the association?						
Once owned harvesters area						
Specification	**Unit size**	**By decision of the majority**	**By decision of all members**	**It should be automatically reinvested**	**Total**	
		No.	No.	No.	No.	**%**
< 2 ha	No.	18	19	0	37	37%
2 – 5 ha	No.	16	4	4	24	24%
5 – 20 ha	No.	14	10	0	24	24%
20 – 50 ha	No.	0	5	5	10	10%
> 50 ha	No.	0	0	5	5	5%
Total	No.	0	0	0	0	0%
	%	0%	0%	0%	0%	0%
Standardized residue						
< 2 ha	No.	0.06	1.32	**-2.28**		
2 – 5 ha	No.	1.32	-1.70	0.35		
5 – 20 ha	No.	0.73	0.29	-1.83		
20 – 50 ha	No.	**-2.19**	0.62	**3.04**		
> 50 ha	No.	-1.55	-1.38	**5.14**		
Chi-square calculated =	**60.79*** **	**The critical value (theoretical) =**		13,36	p > 0.1(*)	
				15,51	p > 0.05(**)	
Degrees of freedom (df) =	8			**20.09**	**p > 0.01(***)**	
Cramer's V =	**0.55**	**Pearson's C =**		**0.61**		

Source: Data from the questionnaire.

Also, the interpretation of Pearson's C respectively Cramer's V confirmed that between the growers' opinion on the profit distribution in the association and the area of the orchards that respondents hold there is a significant link (Pearson's C = 0, 61, Cramer's V = 0.55). But there is no link between the growers' opinion regarding the profit sharing in the form of association and the orchards area (Table 7).

CONCLUSIONS

Unfortunately, the word "association" has left deep scars on Romanian farmers, who after 25 years refuse or do not really know the benefits and advantages offered by association. This has emerged from the questionnaire and most of the respondents were represented by orchardists of over 60 years and whose level of knowledge is quite limited. However, those

who are not interested to join an association are those whose surface is below 2 hectares, therefore they have subsistence and semi-subsistence farms, and those whose farms have over 50 hectares.

The main purpose of the association is supply and processing. If they belong to an association, the farmers could get inputs at lower prices because they can buy a larger quantity and therefore production costs will be lower. Also, the products processing within an association creates value added to the products produced, and this contributes to a higher selling price and sales.

The better promotion and dissemination of the association advantages could help farmers to be aware of the offered facilities and decide easier to join, and this will contribute to the development of agriculture and the economy of Romania. The association is one of the viable solutions to relaunch the Romanian agriculture.

The development of a National Strategic Plan for Agricultural Development on medium and long term need to take into consideration those aspects which the creation of associative forms in agriculture and horticulture.

ACKNOWLEDGMENTS

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SURFACE PRESSURE DISTRIBUTIONS FOR PEARS AT A CONSTANT VALUE OF LOAD

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Abstract

The paper presents the results of surface pressure measurements for pears subjected to creep testing. The study was conducted in the Laboratory of Agrophysics at the Agricultural Engineering Institute of Wrocław University of Environmental and Life Sciences. The load was applied using an Instron 5566 testing machine equipped with a strain gauge head of a measuring range up to 1 kN that allowed measuring the strength with an accuracy of 1 N, and the offset with an accuracy of 0.05 mm. The machine was controlled by a computer with BlueHill software which enabled the recording and analysis of test results. The head feed speed until it reached the predetermined value of preload was 1.8 mm·min^{-1}. A sensor of the Tekscan system with number 5076 was fitted in the testing machine working area to enable continuous observation of the contact surface of the tested fruit with the working element of the testing machine as well as measurement of the surface pressures. The contours and distributions of surface pressures were determined at subsequent stages of the creep test. The maximum and the average values of surface pressures were found to be markedly reduced in the course of the test. The surface pressures distribution in the tested load range was found to take shape typical of contact cases of an elastic character, with the maximum value measured in the central contact zone. At the end of the test there was a slight equalization of pressure distribution on the contact surface of the fruit with the working element of the testing machine. The contact surface area of the maximum surface pressure values clearly increased. The measurements were carried out at three initial load values for 5 repetitions. After initial studies the measuring time at constant load was set at 1200 seconds.

Key words**:** *compression, creep, pears, surface pressure, the time factor*

INTRODUCTION

The growing of pear dates back to Persia, from where they were taken to Rome. Pears reached Europe relatively late, around the 17th century. The largest plantations of the fruit can be found in Belgium and France. The latest data of the US Department of Agriculture (USDA) show that in the season of 2013/2014 the world's production of pears should amount to 21.87 million tones. In the season of 2014/2015 the European Union's production of pears amounted to 2.25 million tones, which put Europe in the second position after China, which is the largest producer of pears in the world. The largest European producers such as Italy, Spain, Belgium, Netherlands and Portugal grow 85% of pears produced in the European Union [7,11]. Pears take the fourth position among the most favoured fruit consumed in the European Union. Depending on buyers' preferences, they can choose from approximately 60 varieties of pears grown around the world. The fruit is elongated and oval. Depending on the variety, it has approximately 50-60kcal in 100g. The 100g portion of pear contains 84g of water. The fruit are rich in vitamins A, B1, B2, B6, C and PP. They contain potassium, magnesium, boron, iodine, sodium, calcium, phosphorus, and iron. Pears help reduce fever, have anti-inflammatory properties and the juice reduces blood pressure. The fruit is widely used in cosmetics as an additive for creams, masks, lotions and shampoos [11]. In order for the fruit to retain freshness and flavor for a long time, it is necessary to store them in

appropriate conditions [10]. Picked from the trees, they continue to breathe, transpire and develop diseases. As a result of these factors the fruit deteriorate, their flesh softens, their peel wrinkles and they begin to decay. The ideal storage temperature of pears ranges from -1 to +1 °C. During transport, warehousing and storage the fruit is exposed to mechanical damage, which can lower its quality and bring loss for growers and exporters. For this purpose a study was carried out by A.F. Bollen [4] and G.L. Barchi [1]. The reduction of loss in the area of export and production translates to higher profitability of production [9]. This problem has been dealt with by Berardinelli A. et al [7], who searched for the varieties that would be the most resistant to damage during transport and storage.

The influence of the firmness of pears on the shelf life was studied by Garcia J.L. [5]. It turned out that discoloration is correlated with the size, ripeness and shelf life of fruit [3]. Peel discolouration due to long storage poses a serious problem in the post harvest processes. This phenomenon significantly reduces the value of fruit [8]. The mechanical properties of pears were also studied by [3] and [6]. It turned out that pears exhibited better mechanical properties immediately after harvest and they retained the properties until January if stored in a cold store in normal atmosphere (temperature -0.5°C); furthermore they could retain the properties even 2-3 months longer in the controlled atmosphere (CA) conditions.

The aim of the study was to:

-Draw contours and surface pressure distributions for "Lukasówka" pears under constant load and taking into account the time factor

-Determine surface pressure distributions in a selected cross-section in individual steps of the creep test.

MATERIALS AND METHODS

The study was conducted in the Laboratory of Agrophysics at the Institute of Agricultural Engineering at Wroclaw University of Environmental and Life Sciences. The Instron 5566 testing machine was used in the study. The unit was equipped with a strain gauge head of a measuring range up to 1 kN which allowed measuring the strength with an accuracy of 1 N, and the offset with an accuracy of 0.05 mm. The machine was controlled by a computer with BlueHill software that allowed the recording and analysis of test results. The head feed speed until it reached the predetermined value of preload was 1.8 $mm \cdot min^{-1}$

The pears under study were the "Lukasówka" variety purchased in Trzebnica from a group of producers of fruits and vegetables ("Grupy Producentów Owoców i Warzyw Trzebnickie Sady Sp. z o.o."). Until purchase the pears had been stored in a cold store at a temperature of -1 to +1 in pallet-boxes. The purchased pears were selected for a similar shape, size and weight. The average weight of the surveyed fruit was 215gr. Maintaining a constant moisture content of the tested material was ensured throughout the study.

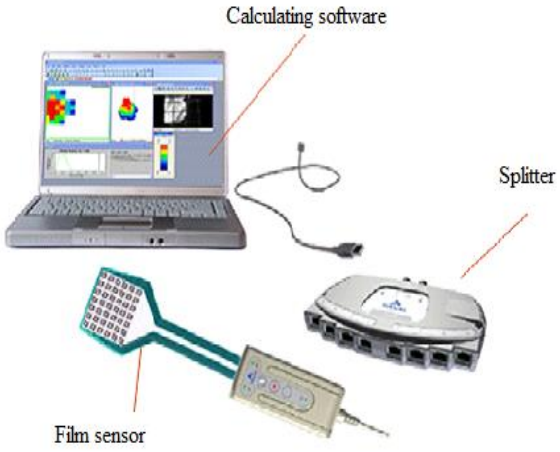


Fig. 1. Tekscan measuring system
Source: www.tekscan.com

The first measurements aimed to determine the load limits in the compression test. The breaking force value F_{max} was determined as the basis for calculating the value of the initial load in the creep test.

The surface pressures were measured with Tekscan system that enabled continuous observation of changes of the surface of contact between the tested fruit and the operating element of the Instron testing machine. The system consisted of a film

sensor (pressure mapping sensor), fruit holder, splitter and computer software which allowed recording of the results of tests performed at a sampling frequency of approximately 1000Hz. It also allowed for subsequent analysis of the gathered data.

Table 1. Technical data of 5076 film sensor

Sensor dimensions		Longitudinal direction		Transversal direction		Number of sensels	Density of sensels
Height	Width	Spacing	Quantity	Spacing	Quantity	(pcs)	(pcs/cm^2)
(mm)	(mm)	(mm)	(pcs)	(mm)	(pcs)		
83.8	83.8	1.9	44	1.9	44	1936	27.6

Source: www.tekscan.com

The sensor that was used in the study, of the manufacturer's number 5076 (Figure 1, Table 1), consists of a set of two layers of parallel electrodes separated with a layer of polyester film. The electrode intersection points form sensels that enable to determine the value of the loading force and the surface area of contact between the tested fruit and the working element of the testing machine. During the test, the system recorded force values, surface pressure distribution and surface pressure contours as a function of time.

After initial studies the measuring time of 1200 seconds was assumed at a constant load ratio. Increasing the measuring time above 1200 seconds did not affect the nature of changes in surface pressure as a function of time.

As the samples for testing were prepared very carefully, the shape related error, as a systematic error, can be neglected.

The force measurement, the contact surface area measurement and the surface pressure values were determined using Tekscan system with the following parameters: system accuracy <± 4%, linearity error <± 3%, repeatability of the results <± 3.5%, hysteresis <± 4.5% and the drift <5%.

RESULTS AND DISCUSSIONS

Figure 2 shows an exemplary process of compressing the whole fruit until complete destruction. The compression test was replicated ten times at the measuring head speed of 1.8 mm min^{-1}. The received maximum force F_{max} for pears amounted to 782N and the corresponding displacement Δl_{max} amounted to 21.47mm. Based on the measurements, the initial sample load F_0 was determined together with the corresponding displacement of the sample loading element Δl_0.

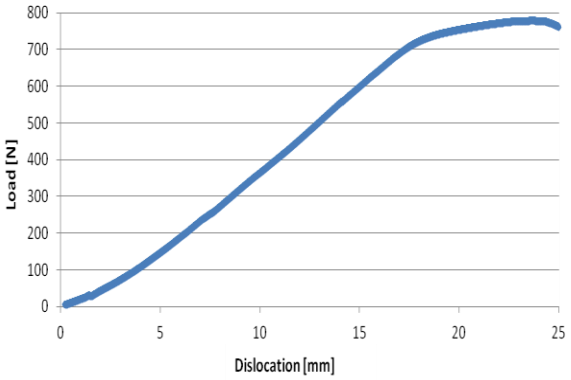


Fig. 2. Exemplary process of compressing the whole pear until complete destruction
Source: author's own research

Table 2 shows the parameters of the exemplary creep test on pears at the initial load equal to 30% of the breaking force F_{max} which was obtained in the process of compressing the whole fruit.

Table 2. Initial parameters of the process of compressing pears

Initial parameters	Initial loading	Initial displacement
30 % F_{max}	F_{030} =234.6N	Δl_{030} =6.44mm

Source: author's own research

Figure 3 shows the graph of the creep test for pears. The creep test started after 150 seconds from the start of measuring, after achieving the initial loading of F_{030} =234.6N.

Figure 4 shows the course of changes in mean surface pressures during the creep test on pears in 1200 seconds.

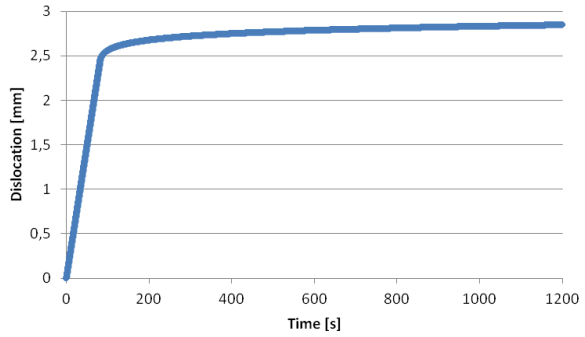


Fig. 3. The progress of the creep process
Source: author's own research

At the start of the test, after achieving the initial load F_{030} (at time t_0 = 180 sec.) the average surface pressure was p=0.429MPa, and at the end of the test (at t = 1200 sec.) it was reduced to p=0.392MPa. This means that the surface pressure decreased throughout the test at the rate of $3.6 \cdot 10^{-5}$ MPa·s^{-1}. The biggest drop in pressure values was recorded in the first phase of the creep test (until t_1 = 500 sec.) and it progressed at the rate of $7.0 \cdot 10^{-5}$ MPa·s^{-1} to then decrease to a value of $2.6 \cdot 10^{-5}$ MPa·s^{-1}.

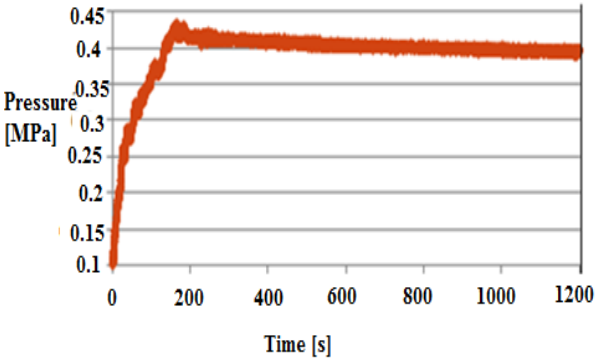


Fig. 4. Changes to the average values of surface pressures during creep test
Source: author's own research

Slightly different progress of changes was observed in maximum surface pressure values during the creep test (Figure 5). At the start of the test, the average p_{max}= 0.638 MPa, and at the end of the test the value went down to p_{max}= 0.592 MPa at a rate of $4.5 \cdot 10^{-5}$ MPa·s^{-1}. The highest rate of decrease of the pressure values was observed in the first phase of the test (until t_0 = 180 sec.) and it amounted to $11.8 \cdot 10^{-5}$ MPa·s^{-1}, which was almost twice as much as in the case of average pressures. In the remaining part of the test the rate significantly decreased and amounted to $1.8 \cdot 10^{-5}$ MPa·s^{-1}.

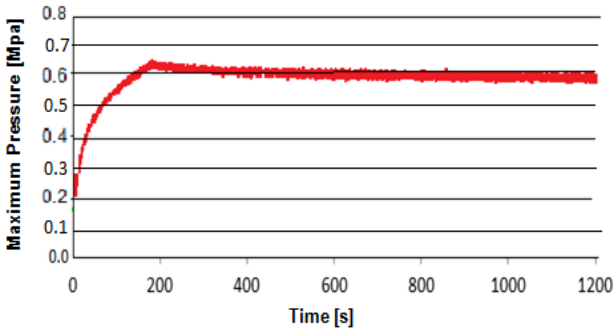
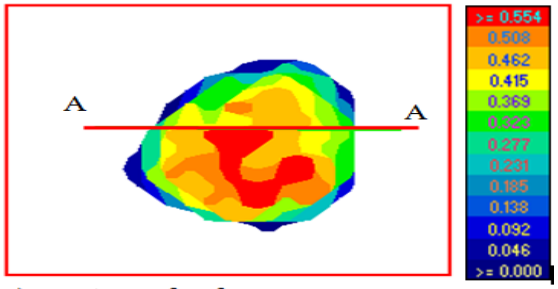
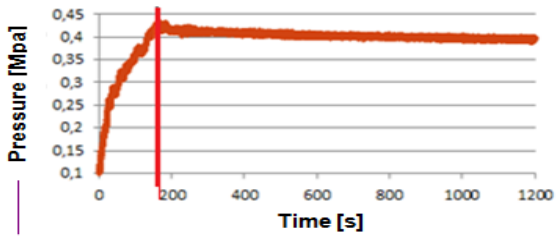


Fig. 5. Changes to the average values of surface pressures during creep test
Source: author's own research

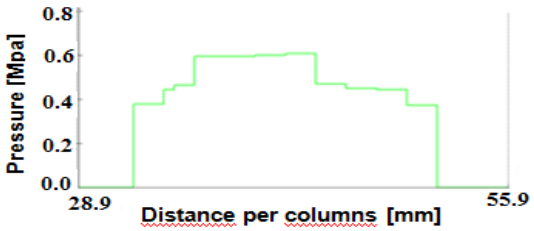
Figure 6 shows the contours and surface pressure distributions at the start of the test (at time t = 180 sec.).



a) Contours of surface pressures



b) Changes to the average values of surface pressures during creep test

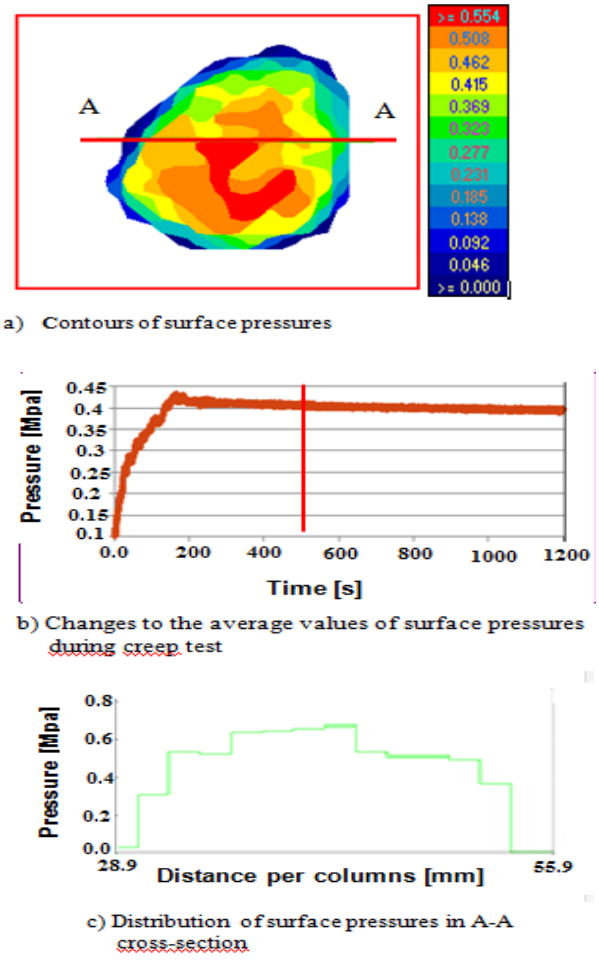


c) Distribution of surface pressures in A-A cross-section

Fig. 6. Contours and distributions of the average values of surface pressures Δt=180 sec.
Source: author's own research

The maximum pressure values are identified in the vicinity of the central zone of the contact (Fig. 6a) and their distribution in the A-A cross-section with a characteristic peak in the middle part indicates the resilient nature of the contact. The maximum surface pressure values p_{max}=0.623MPa are recorded in the central contact zone, and the average values are p=0.429MPa. Distributions of surface pressures at the A+A cross-section (Fig. 6c) are of a regular shape with a distinct maximum at the contact point.

Figure 7 shows contours and surface pressure distributions at t=500 sec. from the start of the test. It was the period of the biggest decline in the value of the maximum surface pressures.



a) Contours of surface pressures

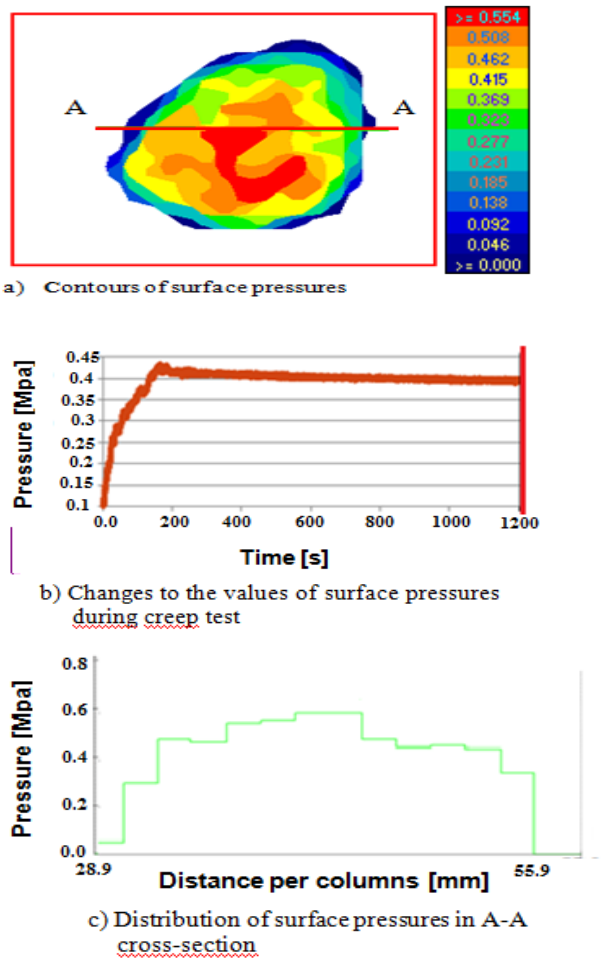
b) Changes to the average values of surface pressures during creep test

c) Distribution of surface pressures in A-A cross-section

Fig. 7. Contours and distributions of the average values of surface pressures ka Δt=500 sec.
Source: author's own research

The compensation of pressures can be clearly seen on the surface of contact of a pear with the working element of the testing machine. The maximum surface pressure zone was enlarged (Fig.7a) and the distribution in the A-A cross-section (Fig.7c) flattened. The maximum surface pressure values near the center of the contact zone decreased to the level of p_{max}=0.604MPa, and the average surface pressure values decreased to p=0.407MPa.

After 1200 sec., in the last phase of the creep test (Fig. 8), the contours and surface pressure distributions did not change significantly (Fig. 8a).



a) Contours of surface pressures

b) Changes to the values of surface pressures during creep test

c) Distribution of surface pressures in A-A cross-section

Fig. 8. Contours and distributions of the average values of surface pressures ka Δt=1200 sec.
Source: author's own research

The maximum values, still located in the central part of the contact of the fruit with a testing machine, decreased slightly (p_{max}=0.592MPa), as well as the average values (p=0.392MPa). Surface pressures distributions at the A-A cross-section (Fig. 8c) flattened, which indicates the compensation of pressure values across the entire contact surface. The form of surface pressure

distribution in the A-A cross-section similar to an even function demonstrates a lack of destruction of the pear flesh. The contact surface is still of a resilient nature. The appearance of permanent deformations resulting from the destruction of the cellular structure of tissue would be revealed through the reduced surface pressure values in the central zone of the contact (Herold et al., 2001). As a result, the greatest pressure values would appear in border areas of the contact surface and the smallest in the central zone. The compensation of pressure values across the entire contact surface during the test is caused by migration of water in the intercellular spaces from the zones with the highest pressure value towards the zones where these pressure values are lower. The average pressure value decreased due to the increase of the contact surface area from $A=501mm^2$ at the beginning of the test to $A=584mm^2$ at the end.

CONCLUSIONS

The value of the average surface pressures throughout the entire creep test lasting 1200 seconds decreased from 0.429MPa to 0.392MPa. The value of the maximum surface pressures throughout the entire creep test lasting 1200 seconds decreased from 0.636MPa to 0.592MPa. The contact surface area throughout the entire creep test lasting 1200 seconds increased from $A=501mm^2$ at the beginning of the test to $A=584mm^2$ at the end. The distribution of surface pressures throughout the test for A-A cross-section forms a shape that is characteristic of contact items for resilient materials – with maximum values located in the central zone. The values of pressures across the entire contact surface of a pear and the working element of the testing machine clearly compensate after approximately 40% of the test duration time.

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RESEARCH ON QUALITY ANALYSIS OF AN ASSORTMENT OF FIVE TYPES OF HONEY IN ROMANIA

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Abstract

This paper emphasized the natural qualities of the five types of honey (Coriandrum sativum, polifloral, mana honey, Robinia pseudoacacia, and Tilia sp.), which were produced without any intervention from the beekeeper side. It si known that sometimes beekeepers supply the bees with a kind of sugar syrup which is processed into a low-quality honey. The analyzes pointed out that the bees collected the nectar from flowers alone and then turned sucrose into glucose and fructose nectar. All the studied honey varieties were natural, even organic, because they had a water content below 20%. This was because of the bees 'capacity' to put honey comb cells preserved only after the water has been evaporated up to this proportion. There are several kinds of honey, so in this study we analyzed five types. These types depend on what kind of flowers the bees have collected nectar from (nectar and pollen they collect and honey but only resulting from the processing of nectar).

Key words**:** *natural honey, quality analysis*

INTRODUCTION

Honey is a natural product derived from a complex floral nectar of plants, bee-enriched own substances. Bees produce honey and manna frequently[1].
Natural honey is the sweetest and miraculous product of nature resulting from processing by honey bees into nectar or other sweet substances found in all kinds of honey (manna of vegetable or animal origin, fruit juices), by their transformation under the enzymatic action of saliva and gastric juice of the bees [2, 6, 7, 8].
During the storage of the nectar of cells, the water which is in addition will be removed by ventilation.
After this, the honey is ready for consumption (honey should be consumed only if it contains 20% water) [3,7].
The physical-chemical and microscopic quality conditions (pollen spectrum) are subject to honey STAS 784/2-1989 in Romania.
The European rules are more lenient for honey on the physical-chemical quality conditions [4, 5].

MATERIALS AND METHODS

Before starting to analyze the honey is it required to homogenize the sample.
This supposes to shake it with a glass rod or a spoon until it becomes smooth. In order to melt the previously crystallized honey it should be heated at a temperature of 45°C and then mixed.
Water determination. The water content can be determined in two ways: in the refractometer by drying in an oven. On the lower prism of the refractometer apply a drop of honey in the sample and then immediately close the camera.
With the mirror directs a beam of light through the prism moving the rack until dark side reach the center of the visual field where visual lines intersect. Then, read the refractive index of the ladder (Table 1) [9].
In some refractometers, in addition to index of refraction of the scale, it is expressed as a percentage of the dry matter content or water. The refractometers which are determined only by the refractive index, the percentage of dry substance or the water content, is determined by means of a refractometer accompanying table.

If the analysis is determined at a different temperature of 20°C, the water content correction is obtained by subtracting water by 0.07 per degree of temperature above 20°C and 0.07 by adding water for each degree of temperature below 20°C.

Photo 1. Preparing samples for analysis honey (original photo)

Acidity determination. The sample of honey is diluted with water titrate with 0.1 N sodium hydroxide in the presence of phenolphthalein, and the acidity calculated and expressed in ml of sodium hydroxide 1N to 100 g honey. In a cylindrical glass Weigh out 10 g of honey, diluted with 50 ml of water and titrated with 0.1 N sodium hydroxide in the presence of 2 or 3 drops of the phenolphthalein solution until a pink color persisted for 30 seconds,
In Table 2. it is presented the calculation and expression of results.
Acidity is calculated with the following formula:

$$\text{Acidity} = \frac{V \cdot 0,1}{10} \times 100 = V$$

Determination of the Gotham Diastatic Index. The natural bee honey has several enzymes. Amylase is the enzyme with the highest resistance to heat treatment, being the last to be destroyed. Based on this characteristic, amylase can be used as a general assessment test (enzyme or diastatic index) for natural honey quality. Natural honey, brutally subjected to heat treatment, will have low even zero diastatic index values [9].
Diastase index is the basis for determining amylase activity. The diastatic index is defined as the number of ml of a 1% solution of starch which was converted to dextrin for one hour, at 45°C and optimum pH, the amylase contained in 1 g of honey [5,6].

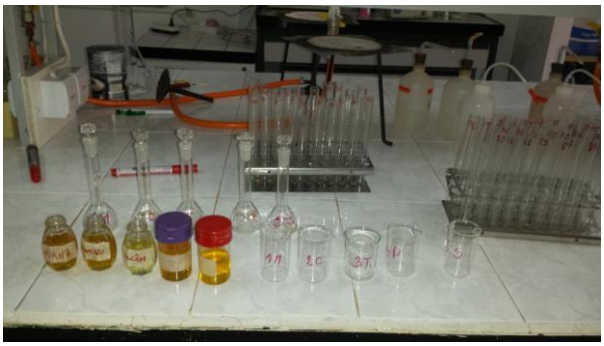
Photo 2. Specimen preparation and solution analysis (original photo)

The diastatic index is defined as the number of milliliters of a 1% solution of starch which was converted into dextrins over 1 hour at a temperature of 45°C, in the presence of a specific enzymatic activator (CL-on of sodium chloride) and the optimum pH of the amylase contained in 1 g honey.

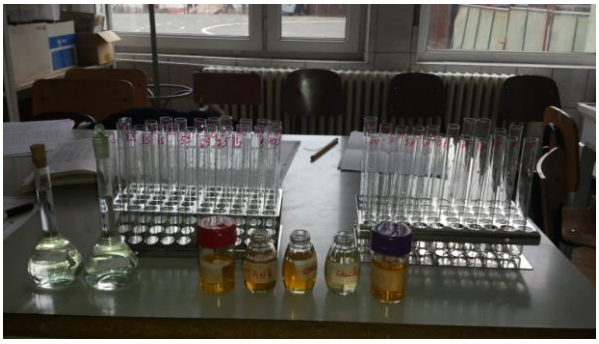
Photo 3. Preparation of samples for determining the diastatic index (photo. orig.)

Starch, 1% freshly prepared (the day running analysis) in a glass cylinder was weighed 1g of starch, and then it was added about 75 ml of water and heated on a sieve of asbestos, homogenizing continuously by means of the glass rod, to boiling and clarification. Pass solution into the 100 ml flask and after cooling with water to volume, and mix.


Photo 4. Placing tubes in the water bath at 45°C (original photo)

In a glass cylindrical Weigh out 10 g of honey were dissolved in 50 ml of water, neutralized with sodium carbonate in the presence of the paper indicator and bring the flask to a volume of 100 ml with water (1 ml containing 0, 1 g of honey). Honey well stirred solution is placed in test tubes (numbered 1-10) decreasing amounts, according to Table 3. Each test tube pipette 0.5 ml of acetic acid and 0.5 ml of sodium chloride. The content of each tube with water volume of 11 ml, is presented in Table 3. An amount of 5 ml of 1% starch solution was added to each test tube, then it was mixed again by repeatedly turning the contents and then the tubes were immediately placed in a suitable stand in the ultra-thermostate controlled at 45°C. Water from ultra-thermostat exceeded 1 cm or 2 cm liquid level in the tube. From this moment timed for 1h. As long as the time expired, the tubes were immediately cooled in ice water to stop amylase activity, and then they were arranged in the increasing order in the support. Finally, in each tube it was added a drop of iodine solution and mixed by inversion.

Calculation and expression of the results

The threshold of the amylase activity is given by the blue color which firstly appears in the tube. For calculation, before it is in the deemed tube (containing honey immediately above) which is usually colored in dark purple.

The Diastatic Index value is taken from the table, or calculated using the formula:

Diastatic index $= \frac{5}{v} \times 10$

Where:

-The figure 5 means the number of ml of 1% starch solution

-V-volume of honey solution from the tube in ml.

To determine the diastazic index there were weighted about 5-7 g of the five varieties of analyzed honey. The results put in evidence the analytical balance to 4 decimal points as follows: *mana honey* -4.8621 g, *Coriandrum sativum honey* - 6.6512 g, *Robinia pseudoacacia honey* -5.0301g, *Tilia sp.honey* -5.2434g, *polyfloral honey* -6.3518 g.

RESULTS AND DISCUSSIONS

The content of H_2O was <20%, which notes that honey is adulterated.

Photo 5. Determination of water by refractometer (original photo)

Table 1. The water content and dry substance

Type of honey	Refractives index	H_2O (%)	Substance Dry(%)
Coriandrum sativum	1.4965	16	82.2
Robinia	1.4915	18	80.2
Mana	1.4920	17.8	83.1
Polyfloral	1.4910	18.2	81.0
Tilia	1.4905	18.4	82.1

Photo 6. The result in acid after analysis (original photo)

Table 2. The acidity of honey

Hooney Type	Honey (g)	NaOH	The acidity of honey in 100g
Polyfloral Honey	6.353	1.8	2.8
Tilia Honey	5.398	1.6	2.9
Mana Honey	10.482	3.43	3.27
Coriandrum Honey	9.182	1.74	1.89
Robinia Honey	10.264	1.55	1.51

In the tubes with the least content of honey, the starch was not completely hydrolyzed, and the blue color was present. The tubes in which

the starch hydrolyzate was full, there is a range of colors: white, yellow, orange, red tic, purple, violet.

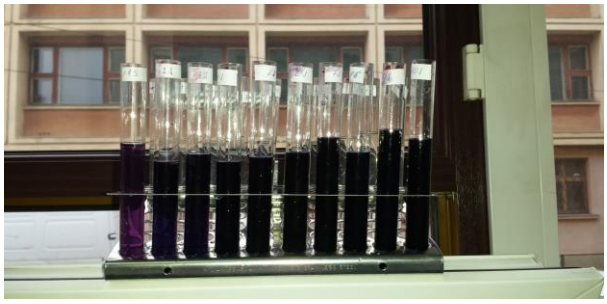

Photo 7. Robinia honey (orginal photo)

Photo 8. Mana honey (original photo)

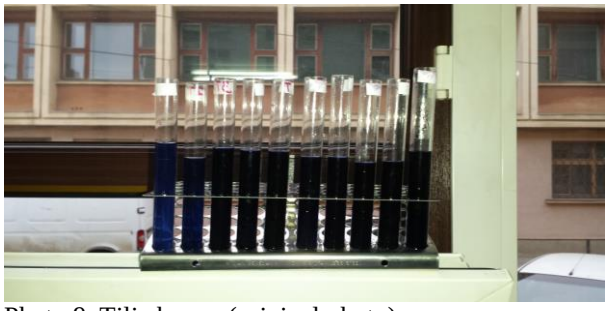

Photo 9. Tilia honey (original photo)

Photo 10. Coriandrum honey (original photo)

Result: diastatic index ≤ 5

Following the analysis we noticed that was crystallized honey; and to melt it it was supposed to a controlled heat treatment (maximum temperature of 45°C.).

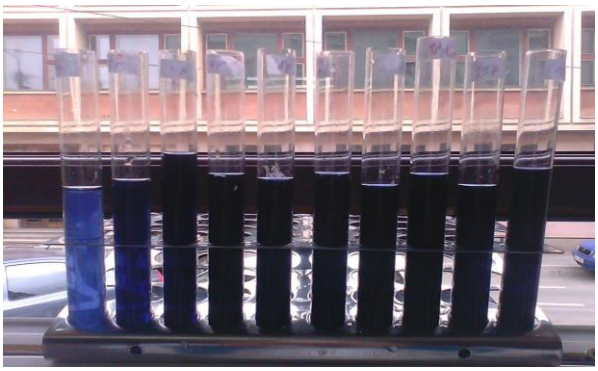

Photo 11. Polyfloral honey (original photo)

Table 3. The Diastatic Index for the 5 types of honey

Honey Type	Honey (ml)	Diastatic Index
Robinia	4	10.9
Mana	6	17.9
Tilia	4	10.9
Polyfloral	5	13.9
Coriandrum	7	23.8

CONCLUSIONS

The most famous honey type is the *Robinia pseudoacacia* honey, so we thought to be one of the varieties of honey obtained and analyzed late in April or early in May 2014. This honey had a white color and a specific aroma of *Robinia pseudoacacia*.

Another analyzed honey type was the lime harvest achieved by June 2014 knowing that the environmental conditions of the past year were unfavorably, this assortment of honey production was quite low. It depended on the weather and the temperature outside, the heyday of linden trees in the village.

The different types of the analyzed honey were collected by bees in the apiary in the summer of 2014, from the meadows on the outskirts Sibiel [10]. After the organoleptic examination, we can say that it had the best taste.

The manna honey came from trees such as fir, spruce, oak, beech, and from sweet excrement of aphids. This is the only honey of a dark brown color, very sweet and aromatic than the variety of sweet juice collected by bees.

As an exception from the varieties of analyzed honey, the *Coriandrum sativum* honey derived from plant species of the same name, which have a very strong taste and flavour.

All the five analyzed honey varieties were natural, and we can say that they could be considered organic honey. And the areas, where the picking was run, were not affected by air, water and soil pollution.

Regarding the water content, coriander honey has the lowest percentage (16%), followed by the manna (17.8%), acacia (18%) and the polyfloral honey (18.2%) and the highest water content had the lime honey (18.4%).

The content of dry matter was the higest in dew honey (83.1%), followed by *Coriandrum sativum* (82.2%), lime (82.1%), polyfloral (81%) and the lowest *content had Robinia pseudoacacia* honey (80.2%).

The acidity analysis can be interpreted as follows: 1.51 *Robinia pseudoacacia* honey, 1,89 *Coriandrum sativum* honey, 2.8 *polyfloral*, 2.9 *Tilia sp*., 3,27 *manna*, the highest acidity, meaning the number of NaOH ml obtained titration in the presence of phenolphthalein.

The results for the diastatic index were: 10.9 *Robinia pseudoacacia and Tilia sp.,* 13,9 *polyfloral*, 17.9 *manna* and 23.8 *Coriandrum sativum*, the highest index.

As a conclusion, *Coriandrum sativum* honey was the oldest sample subjected to analysis of the 2013 batch of honey.

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METHOD OF ANALYSIS FOR THE DETERMINATION OF HEAVY METALS FROM WINE

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Abstract

In this paper, the procedures were estimated to improve the reproducibility and selectivity of the method and determine the influence of different analytical parameters (pH, electrolyte composition, deposition time and potential, this ligands). Detection limit of copper in samples of white wine and red Blaj (Romania) was 2-4 ppm, reflecting a deviation of 1.5-2,0%. The results mentioned in this paper were compared with the results obtained using the classical method of atomic adsorption. The sensitivity of the method is twice smaller than the detection of Pb2- ions.

***Key words*:** *analysis, heavy metals, products, wine*

INTRODUCTION

Lead contamination is a consequence of wine with use of facilities of this metal in wine production [8,9]. The normal limit recommended for lead in wine is 200 mg/L [7], considerably higher than the maximum limit for drinking water in different countries, given the relative consumption of water and wine. Regarding the maximum admissible concentration of copper in wine, it must be kept below 0.3-0.5 mg / L [3].

In the recent years, the methods of "stripping" were increasingly and frequently used in the food industry for the control of trace metal ions both in food and in wine [1,4].

The main source of copper in wine is a consequence of the practice of adding copper sulphate (II) sulfide odor remover that emit. The large amount of residual copper is linked to an increased degree of oxidative be damaged, leading finally to brown coloring in wine, especially white wine [2,3]. Copper (II) may contribute to the wine disorder phenomenon which becomes visible only after bottling. Knowing the chemical forms of copper into the wine rather than knowledge of its total concentration may be the best indicator for the degree of deterioration of the wine.

The method involves two steps [4]:

• Stripping when oxidation occurs free ions or metal ions on the surface of mercury; current oxidation is proportional to the concentration of metal ions.

• Preconcentration, which consists of applying a constant reduction potential for a while, when there is accumulation of metal on the electrode surface adsorption of mercury: Men + + us → Me (Hg).

MATERIALS AND METHODS

To control ammeters can use a device connected to the computer, BAS 100W equipped with Controlled Growth Mercury Electrode (CGME West Lafayette, USA) and a portable analyzer for trace elements (PTEA -WAGTECH) equipped with carbon electrode vitreous (CV), covered with a fine film of mercury. For the determination of cyclic voltammetry it is necessary to use a classic three-electrode cell (El-CV; EC-wire Pt ER Ag/AgCl). The results of the spectrophotometric and electrochemical control have been made with a UV-VIS device unique computer assisted β Helios.

The work was performed in two stages: in the first part was devised method stripping L71 and the second part was heel proper analysis

of the concentration of copper in commercial wines from Blaj.

Before the first use and at the beginning of each workday, the CV electrode was cleaned with an aqueous suspension of A12O3 powder (0.25 μm) on a fabric polished and cleaned by sonication for 3 minutes. The experiments determined the concentration of copper ions which will be presented in details in the next paragraph.

RESULTS AND DISCUSSIONS

The optimization of the stripping method on synthetic solutions.

To improve the selectivity and reproducibility of the method (see right calibration Fig. 1) it is needed to follow the influence of mercury droplet size - Fig.2 and time of accumulation – Fig. 3, the current bit in synthetic wine solutions. The wine synthetic solution has the following composition: volume 12% ethanol solution, saturated potasium tartrate and brought to pH 3.2 with tartaric acid.

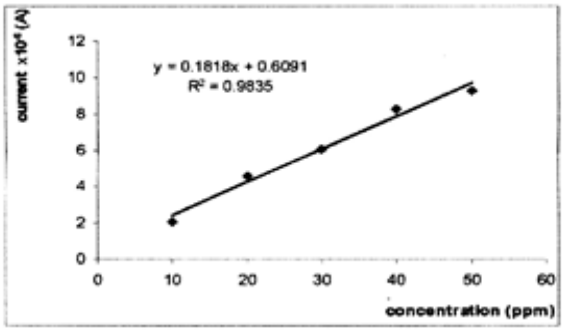

Fig. 1. The right calibration - Dimension Data polarography

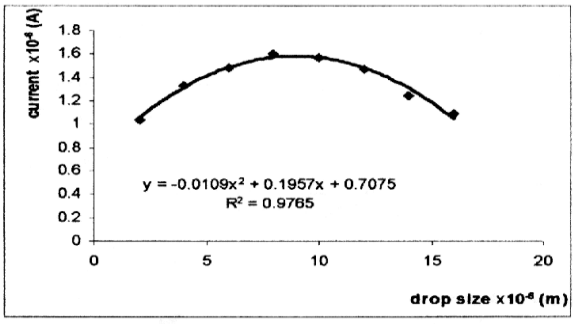

Fig. 2. Influence of mercury droplet size mercury droplet 6 microns; v 10 mVsec-1.

Reproducibility response of ammeters (R_2 = 0.97) corresponding to a standard deviation of 4.5% for 6 determinations. Addiction is described by the equation y = + 0.7075 - 0,0109x2 + 0,1957x and maximum current was obtained for mercury droplet size 8-10 μm.

Regarding the storage time, it can work at a value of 500 s thereof - Fig.3, depending also on the concentration of copper in wine.

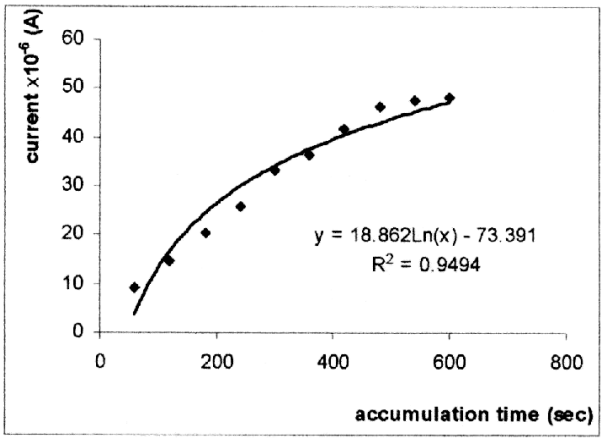

Fig. 3. The influence of time accumulation on the current

The detection limit for copper ion is 0.05 ppm (R = 0.9992), but in the presence of Pb2- Joni detection limit increases to 1.5 ppm.

Control of copper concentration in wines from Blaj

The potentiometers stripper was used to measure the concentration of labile and total copper in wine and tomatoes [5,6].

The conditions were optimized for a supporting electrolyte having the following composition: 1 mol / L HCl and 0.5 mol / L CaCl2. It was noted that mercury oxidizes more convenient than oxygen, and to determine labile copper concentration it was necessary to change the agent.

It was observed that red wine "bind" added lead quickly, demonstrating that the wine has a great capacity to lead complex.

A similar effect was observed in case of white wine, but the degree of lead complexity was lower than for red wine.

The aim of this study was to examine the ability of stripping potentiometers as direct technique for determining in-situ labile copper concentration in wine.

Determination of copper in labile wine

The stripping curve was recorded as described above the total concentration of copper.

Quantification was achieved from a right calibration generated by introducing incremental additions of copper from a base model coming as the test sample.

Determination of total copper in white wine

The dilute wine (20 mL) containing about 50 mg/ L copper was mixed with the electrolyte-2.0 mol/L HCl, 1.0 mol/L $CaCl_2$ and 600mg/L Hg (II) - in the electrochemical cell.

An enrichment of 700 mV potential was applied 300-500 seconds, depending on the concentration of copper in the tested sample. There was no need for venting (removal of oxygen) as the oxidant was used major Hg (II).

After stripping, the electrode is at a potential of 100 mV for 15 seconds to clean and stabilize the new film of mercury. The potentiostatic stops and the stripping curve is recorded to the potential range of 900-100 mV.

Table 1. Total copper and labile white wine stripping analyzed by potentiometer and controlled via flam photometer

Wine type	AAS (mg/L)	Total Copper (mg/L)	The dilution factor of total	Labile Copper (mg/L)
Feteasca Alba	0.28+0.01 (5)	0.23 +0.01 (8)	8	0.18 +0.01(3)
Sauvignon		0.27 + 0.01 (7)	4	
Traminer	0.27+0.01 (8)	0.23 +0.01 (9)	20	0.18 ± 0.01 (2)
Riesling	0.69 + 0.05 (3)	0.65 + 0.02 (10)	20	
Pinot gris	0.64 + 0.01 (6)	0.53 + 0.03 (4)	8	0.52 ± 0.01 (3)
		0.67 + 0.01 (5)	4	

Table 1 presents the results for total copper determined in various wines using the optimized enrichment potential of 700 mV for 500 seconds. From the table it is observed that the sample dilution factor is an essential parameter of determination.

For a high dilution factor, the total copper concentration is underestimated by potentiometer stripping compared to the flam photometric AAS (Atomic Adsorption Spectrophotometry). Varying the use of additional cycles enrichment and enrichment/enrichment stripping for a short time, there were obtained improved results.

To overcome this dilemma, the dilution factor was changed so that the concentration of copper in the test solution always be greater than 50 mg/L.

Under these conditions, for all wines, no significant differences at 5% results by potentiometer stripping and by flam photometer.

CONCLUSIONS

The methodology can be applied also for beer and other alcoholic beverages.

The stripping potentiometric analysis is a simple analytical procedure to monitor copper in wine.

The application of stripping potentiometers to determine the speciation is still limited, especially because the usual methodology requires the addition of high concentrations of Hg (II) as a chemical oxidant.

The stripping voltammetry was used for the anode (VSA) because the decomposition of the samples is often necessary to remove the interfering substances before the measurement step.

The concentration of copper in Traminer, Pinot Gris and Riesling exceeds the recommended limits (0.3-0.5 mg / L [2]).

As the need to monitor other metals in wine will probably increase in the future, it needs a simple analytical method that can simultaneously determine the content of lead and cadmium. The preliminary determinations (unpublished results) showed that this is possible.

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SOCIAL DEVELOPMENT OF RURAL WOMEN BY ICTs

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Abstract

Development is a process involving major changes in social structures, popular attitudes of the people, national institutions, accelerating economic growth, reducing inequalities and eradicating absolute poverty. Social development is one of the four dimensions of sustainable development. Direct and indirect impacts of the social development can affect the other dimensions of sustainable development. Hence, it is important to understand the factors affecting social development. The aim of this study was to investigate the social development of rural women by ICTs processes in rural areas. The statistical population of this study consisted of 5018 women that have been lived in rural areas in Shahreza Township in Iran, to be using Cochran formula, 190 rural women selected and the satisfied random sampling used for select of samples. This study was conducted to examine the validity of the questionnaire using Cronbach's Alpha Coefficients for the different sectors after a preliminary study for each of the indices greater than 0.7 were calculated separately. Regression analysis results obtained show that the three variables: rural women's economic independence, awareness about ICT services and the amount use of the ICT services that provided for rural women by rural ICT offices, entered in the regression analysis and explain 59% of the variable affect the social development of rural women.

Key words*: Iran, social development, regression, rural women*

INTRODUCTION

About half of the rural population is included of rural women. Use of ICT processes in the context of gender analysis could be improved the women empowerment and rural development process in developing countries. ITC are key promoting community connectivity in contemporary society (Novo-Corti and et al, 2014) .[10] Information and communication technology (ICT) is a principal driver of economic development and social change, worldwide (Kozma, 2005). [6] Some researchers believed that ICTs can be mechanisms that enable developing countries to leapfrog stages of development. Information and Communication technologies (ICT) have a potential for economic growth and social empowerment (Ebo, Amosa and Adenusi, 2012). [4] Development is a process involving major changes in social structures, popular attitudes of the people, national institutions, accelerating economic growth, reducing inequalities and eradicating absolute poverty (Todaro, 2006**).** [14] Some of these changes are very fast in such a way that increasingly today, the Information and Communication Technology (ICT) as a development tool used to be. (Rubinoff, 2005). [12] Information and communication technology has led to significant changes in the way people live, work, interact, and learn to be active (Nechita and Timofti, 2011). [9]
Developing countries are now aware of the benefits derived through adoption and use of ICTs but there are many serious challenges which must be addressed and chief among them are:
Inadequate communications and power infrastructure
Shortage of ICT facilities and ICTs skills
Inadequate institutional arrangements
Limited financial resources
Inadequate public private partnership
Limited data management capacity
Inadequate horizontal and vertical communication
Inadequate bandwidth nationally and on the

Gateway

Some of the above challenges can be addressed through public-private smart partnerships

ICT infrastructure by itself is not sufficient for the dissemination of knowledge and information to occur through it. Access to ICT infrastructure must be accompanied by access to ICT services. In this respect, the other challenge is how to make ICT services both affordable and available in venues or modes that are convenient to smallholder farmers (Yimer, 2015) [15].

The rapid proliferation of information and communication technologies across the globe in recent decades has fostered the rise of scientific and business interest in the problems of uneven information and communication technology (ICT) usage and information society (IS) building among and within the countries of the world (Schlichter and Danylchenko, 2014). [13] General ICT as a tool to combat poverty, which enables rural women in order to improve the delivery of social services and increase the level of information to support food security and equal opportunity for all some people and raise strategy of innovative knowledge in the fields of agriculture must move (Bakhshizadeh and et al, 2010). [3] The ICT centers were also to create an enabling environment for research and tele-working to increase employment opportunities. (Alibaygi and et al, 2011).[1]

A number of aspects come together in rural women to make them more vulnerable and increase the difficulties of full inclusion in the labor market and socialization. Then, the risk of exclusion of labor market increases dramatically because of addition of rural work. Many developing countries have not adopted Information and Communication Technologies (ICTs) to the fullest possible extent as a means of achieving increased socio-economic development by entering the knowledge economy (Rahman et al., 2013). [11]

There is no doubt that, as a group, women are hit hardest by all aspects of the potential isolation mentioned above. Moreover, there are two factors of social workforce exclusion which combine with the female condition. First, women living in rural areas have less access to goods and services, social relations, knowledge and use of ICT (due to the distance from densely populated urban centers) and lack of infrastructure. Second, rural women play important support roles in the farming and livestock sectors. This not only takes time, but also on many occasions renders women's contribution invisible because it is informal in nature (Novo-Corti and et al, 2014).[10]

Nancy (2000) social development involves human rights, the right to development and the right to high quality services, as well as the communication knowledge and accountability necessary for social development. [8]

Novo-Corti and et al (2014) [10] investigated the role of ICT to break the walls of social exclusion of women rural. The result of research showed that since internet has become an important tool for women' social and labor inclusion some measures must be implemented to avoid this gender digital divides. The main barriers to the Internet penetration in women social life were employment, education and income. In the particular case of rural women, employment is frequently poorly paid, low-status or below their capacities. Thus, for rural women, to combine work or educational activities with everyday responsibilities is, in practice, very complicated since women are focus on agricultural activities related to farms or livestock. Also the results of this research showed that rural women are aware of the key role played for ITC on their way to achieve the participation on decision making process as well as in social life and labor. ITC helped them improve their social relationships, self-esteem, access to training and information, social participation, level of inclusion and integration in the labor market. Finally, some social and economic policy recommendations are proposed to increase ITC penetration and reduce social exclusion of this group from a triple perspective: access, skills and attitudes to the ITC. In particular, public policies measures are searched to reduce gender inequalities through ICT, increase their presence in the labor market; access to better

training; better harmonize work and family; develop new forms of self-employment; telecommuting or network companies; greater economic independence to make purchases on the web or simply as an instrument of social interaction and entertainment (Novo-Corti and et al, 2013).[10] Estes (2001) [5] believes that social development in search of material and social welfare of people at all levels of society.

Keoleian & Andersoon (2008) [2] declined the social development index included to: population, quality of life, health, education, employment. Also Todaro (2006) [14] categorized the social development index in to: quantitative and quality indicators, quantitative indicators included to: population growth rate, lower life expectancy, higher living standards, productivity, lower mortality rates, proportional distribution of income, high levels of employment, participation and quality indicators included to: freedom of choice and self-esteem. Matsui (2004) [7] believed the social development can be summarized in such as indexed: standard of living, right in the heart of awareness, poverty reduction, with long life, health, equality and justice.

MATERIALS AND METHODS

This study is an applied research carried out by the survey method.

The statistical population consisted of 190 rural women in Shahreza township of Esfahan Province in Iran.

The questionnaire-by-interview method was used for data collection.

To examine the reliability of the questionnaire, a pilot test was conducted on 30 rural women, and the Cronbachs Alpha coefficients for the different variables on Likert type scales were calculated.

The results of the Alpha coefficients, shown in Table 1, indicated that the selected scales were appropriate.

RESULTS AND DISCUSSIONS

The demographic results of the study showed that respondents' mean age was 53 years. The average size of households was 5 people (3 children). Also the average of awareness about rural offices services was 9 from 30 (30.5%) and also the average of the amount use of the ICT services that provided for rural women by rural ICT offices was 7 from 30 (24.9%). The index of rural women's economic independence was 34%.

Table 1. Reliability Analysis (Cronbach Alpha Coefficients)

Scale Name	No. of items	Alpha Value
Index of knowledge and partnership	11	0.864
Index of quality of life	6	0.790
Index of satisfaction of the local area resident	4	0.831
Index of Social Justice	5	0.802
Awareness about rural offices services	14	0.841
Use of the ICT services by rural women	14	0.799

Table 2. Descriptive Statistics of Some Characteristics of rural Women

Variables	Mean	SD
Age	35	6.82
Number of children	3	1.57
Rural women's economic independence	34%	20.46
Awareness about rural offices services	9.166	4.23
Use of the ICT services by rural women	7.464	2.51

Pearson correlation was used to test the relationship social development of rural women's and other variables. According to Table 3, there are positive correlations between rural women's economic independence, awareness about rural offices services and use of the ICT services by Social development of rural women.(Table 3)

Step by step multiple regression analysis was used to analyze the impact of ICT on the social development of rural women's. According to the results, in first step, the variable of the rural women's economic independence 0.588 coefficient of

determination was taken into analysis.

Table 3. Correlation between and other variables

Variables	Correlation coefficient	Significance
Rural women's economic independence	*0.160	0.027
Awareness about rural offices services	0.184*	0.011
Use of the ICT services by rural women	0.442**	0.000

*Significant at 0.05 level
**Significant at 0.01 level

This variable specified 34.5% of the changes related to the dependent variable. At the tow steps variable of awareness about rural offices services was analyzed.
This variable specified 14% of the changes related to the dependent variable. At the three steps variable of the use of the ICT services by rural women was analyzed.
This variable specified 11% of the changes related to the dependent variable. Analyses of these total variables showed that they specify about 58.8% of the changes related to social development of rural women.

Table 4. Factors affecting the social development of rural women

Variables	B	SBE	Beta	T	Sign.
Fixed coefficient	37.054	11.200	-	15.090	0.000
Rural women's economic independence (x1)	0.856	3.471	0.583	12.199	0.000
Awareness about rural offices services (x_2)	0.763	1.342	0.355	7.472	0.000
Use of the ICT services by rural women (x_3)	0.801	1.021	0.328	6.907	0.000

Analyzing β of the changes showed that the rural women's economic independence (0.583) was the most influential variable to effect in social development of rural women. Other results are shown in tables (4) and (5).

Table 5. Stepwise regression analysis of factors affecting the social development of rural women

Steps	R	R2
1	0.588	0.345
2	0.695	0.483
3	0.767	0.588

According to the regression coefficient the regression line equation could be written as:

$$Y=37.054+0.856(x_1)+0.763(x_2)+0.801(x_3)$$

CONCLUSIONS

Information and Communication technologies (ICT) have a potential for economic growth and social empowerment.
Women living in rural areas have less access to goods and services, social relations, knowledge and use of ICT.
It seems the increase accesses to ICT services for rural women could be effected the social development of them.
The result of this research showed that there are positive correlations between rural women's economic independence, awareness about rural offices services and use of the ICT services by Social development of rural women.
In other ways by increase the awareness of rural women about the ICT services could be exported the amount of use of them will be improved and finally this parameters could be improved the social development of rural women.
Although the rural woman's economic independence is a key parameter to social development of rural women.
The result of research showed that the average of index of rural women's economic independence was 34%.
This index is low in Iranian rural women. The regression analysis also confirmed this variable is a key important variable to develop of social empowerment for rural women. It seems the strategically solution to improve the social development in Iranian rural women is to increase their accessibility to Information Communication Technology.
In this Strategy the rural ICTs offices' have the key important role.

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DETERMINANTS AND PROFITABILITY OF HONEY PRODUCTION IN IKWUANO LOCAL GOVERNMENT AREA, ABIA STATE, NIGERIA

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Abstract

The study analyzed the determinants and profitability of honey production in Ikwuano Local Government Area of Abia state, Nigeria. Beyond the broad objective, the study specifically sought to analyze the socio economic characteristics of honey producers in the study area, examine the returns associated with honey production, estimate the production, analyze the determinant of honey production in the area and identify the constraints of honey producers in the area. A total of 60 respondents were randomly selected and interviewed in Ikwuano Local Government Area from which data and information were elicited. Multiple regression, descriptive statistics, Cobb Douglas production function and profitability analysis were used to analyze the data collected. The result shows that bee farmers in the study area combine honey production with others jobs, raise their capital themselves and mainly use family members as source of labour. Inadequate capital was highlighted as the major constraint to honey production in the study area. The coefficients of age, sex, income and household size were positively related to the quantity of honey produced and the gross margin of N47,183.33 shows that honey production is very lucrative in the study area and should be encouraged among farmers in Ikwuano Local Government Area.

Key words**:** *honey production, profitability, socio- economics*

INTRODUCTION

The discovery of crude oil in Nigeria in the late 1950's adversely affected the agricultural sector of the Nigerian economy. The once booming agriculture in Nigeria especially in the 1940s and early 1950s became a shadow of itself. The groundnut pyramids in the North disappeared, cocoa products in the Western region declined drastically while palm products from the Eastern region were localized [5]. Due to the recent decline in crude price, there is an urgent need for diversification of the economy in order to avert the looming crisis. In the bid to diversify the Nigerian economy, the Nigerian government has shifted emphasis to non-oil sectors of the economy which agriculture is chief.

Apiculture (Honey production) which is an aspect of agriculture presents an untapped natural resources that will help revive the dwindling economy of Nigeria, alleviate poverty and improve the standard of living in the country. Apiculture can be defined as the science and art of bee keeping while bee keeping includes the collection and taking care of bees, pollination of field crops by bees, the study of bee product and the breeding of bee for honey production either in small or large scale is known as bee keeping. Beekeeping for honey production is a profitable agricultural enterprise nowadays in all parts of the world including Nigeria. It is an important foreign exchange earner for those that export honey and beeswax. Following the production trends, China is the number one honey exporter in the world, selling $246,550,000 (12.0% of total natural honey exports in the world) closely followed by Argentina with $212,637,000 (10.3%) and New Zealand at third $139,316,000 (6.8%) [2], this show how valuable this enterprise is especially in the countries where it has been embraced a long time and has been a source of revenue and export in these countries. The experience of apiculturist in developed economy shows that commercial apiculture is a money spinner. However, beekeeping as a commercial venture is still largely unexplored

in Nigeria in large scale production, and the country meets domestic demand for honey mostly by importation from producer countries and locally by bee hunters [2].There is a growing consumption of honey and other bee products because of its high values in maintaining good health and in treatment of various diseases. With the current growth in domestic consumption of honey in Nigeria coupled with mechanized agriculture in most part of Nigeria, resulting in large crop acreage, the future of apicultural enterprise is very bright as the demand for honey and pollinators is bound to increase. It could provide food, nutritional, and livelihood security to the rural work force on an ecologically sustainable basis. Apiculture can be practiced as a hobby, a part time or full-time occupation. At times depending on how it is practiced, it could be seen as an art, a science, a technology or a vocation and can be practiced by those who are not conventional farmers. Bees, the main player in Bee-farming are four winged flower feeding insects that live in all the crannies of the world. They are social insects and live in groups. Honey bees are important and beneficial economic insects, as they produce honey and pollinate crops. Honey is a natural food produced by bees from nectar or secretion of flowers. Honey has a content of 80-85 % carbohydrates, 15-17 % water, 0.3 % proteins, 0.2 % ashes, and minor quantities of amino-acids and vitamins as well as other components in low levels of concentration. These properties including using honey for various medications made it an essential and high economic commodity [1]. Bee farming is relatively cheap to manage, as the major production is undertaken by the bees, while man does the harvesting. It is the only agricultural practice that does not need large expanse of land, water, feed and fertilizer to thrive. Beekeeping offers opportunities for empowering and developing the rural populace by making them self-reliant and depend less on the government. They can be economically empowered through the various benefits derivable from beekeeping like; the quality of land required is less important because hives are placed either on the trees or on the ground. Beekeeping is an agricultural and forest based decentralized industry and does not displace persons from their villages. It is a sustainable form of agriculture that can provide rural people with a source of much needed income and nutrition therefore they have economic reasons to retain the natural habitat or modify it to boost honey product because it has potentials to increase yield such as other agricultural products [3]. Honey, bee wax and other by-products are highly demanded by households, hospitals, commercial outlays, pharmaceuticals and cosmetic industries as a good supplement, medicinal or complement in the production of other products. Honey can be used for the treatment of wounds, burns, cataracts, skin ulcer and scabies. Bee wax is used in the production of cosmetics, candles, polishes, etc. Pollen from the flowers are sold to perfume industries, also used dietary or nutritional supplement in foods due to its high medicinal and nutritional properties. In Ikwuano, only few individuals are involved in honey production. This study aims to get relevant information on honey production in the study area through the following objectives: analyze the socio economic characteristics of honey producers in the study area. Examine the returns associated with honey production. Estimate the production, analyze the determinants of honey production in the area and identify the constraints of honey producers in the area.

MATERIALS AND METHODS

The study area was Ikwuano Local Government Area which is located South East part of Umuahia Urban Zone. It is transverse by the Umuahia to Ikot Ekpene federal road. It extends from the fourth mile stone Umudike to the twentieth mile stone which is the Abia State boundary with Akwa Ibom State.

The total land mass is estimated at about 40,059 miles.

Farming is the major occupation in the area and they produce mostly cassava, melon, cocoyam, vegetable and other annual crops. It has an average temperature of 260C with maximum and minimum temperature of 320E and 220C respectively.

It also has an altitude of 122m above sea level, which tends to make it good for agriculture and apiculture as well.

Due to the limited number of people involved in honey production in Ikwano sixty (60) respondent were randomly selected and interviewed.

The data were collected from primary source. The primary data was collected using a well structured questionnaire.

Data analysis

The Objectives were analyzed using descriptive statistics, gross margin analysis or income statement analysis, production function and ordinary least square (OLS).

The model for production determinants was as follows:

(Log Y=b0+ b1logx + b2logx2 + b3logx3+b4logx4 + b5logx5 + U)

where:

Log y= quantity of honey produced per producer in Kg

Logx = labor in man days

Logx2= capital available for production

Logx3= rent in naira

Logx4= number of bee hives

Logx5= distance to production unit

U= error term

Secondly, the model for the analysis of the socio economic factors affecting honey production was stated as follows:

Y= f (r1, r2, r3, r4, r5, r6, r7, r8, e)

Where:

Y= quantity of honey in kg

R1= age of the bee keeper in years

R2= sex (male 1, female 0)

R3= education of the bee keeper in years

R4= income of the bee keeper in naira

R5= experience of the bee keeper in naira

R6= membership to cooperative society (yes 1, No 0)

R7= household size in numbers

R8= credit access (Access 1, No access 0)

E= error term

RESULTS AND DISCUSSIONS

From Table 1 one can see that 25% of the respondents are students, 32% are civil servants, 25% teachers and 18% are farmers. And 83% of the respondents undertake honey production on a par time basis this shows that honey production can be combined with other jobs this collaborates with the results of Babatunde [3].

Table 1. Socio economic characteristics of respondents

Variables	frequency	Percentage
Occupation		
Student	15	25%
Civil servant	19	32%
Teacher	15	25%
Farmer	11	18%
Total	60	100
Nature of job		
Par time	50	83%
Full time	10	17%
Total	60	100
Labour source		
Family	31	52%
Hired	21	35%
Friends	8	13%
Total	60	100
Use of honey		
Income	42	70%
Food	10	17%
Medicine	3	5%
Industrial	5	8%
Total	60	100
Harvesting period		
Jan- march	16	27%
April- June	25	42%
July- sept	5	8%
Oct- dec	14	23%
Total	60	100
Source of capital		
Personal savings	41	68%
Friends	7	12%
Cooperative	7	12%
Loans	3	8%
Total	60	100

Source: Field survey

Also, from Table 1, one can see that 52% of the respondents use their family members as source of labour, 35% hire labourers and 8% use the help of their friends as source of labour. This shows that honey production is not labour intensive. Much money is not spent on labour as friends and family members can be used. This is supported by the findings of Babatunde [3]. A greater proportion of the respondents (68%) used their personal savings as a source of capital, 12% borrowed from friends, another 12% got their finance through

cooperative society and only 8% used loans as a source of capital this shows that not much money is required to start a honey production business as honey bees can easily produce their own food. From the table, 70% of the respondents produce honey for income, 17% as food, 5% for medicine, and 8% use honey industrially. This proves that honey production is a lucrative and can be a source of livelihood. 42% of the respondents harvest their honey between January- March period, 27% harvest between April- June, 8% harvest around July- September and the remaining 8% do theirs by October- December.

Table 2. Cost and return of honey production in Ikwuano local government area.

Items	Value	Cost as percentage of Total cost
Gross revenue from honey	5,400,000	-
Mean value	90,000	-
Gross revenue from bee wax	60,000	-
Mean value	1,000	-
Total revenue	5,460,000	-
Total gross mean revenue	91,000	
VARIABLE COST		
Attendant	61,000	2.3
Harvesting/ processing	600,000	22.8
Transportation	60,000	2.28
Bottles	300,000	11.41
Labeling	30,000	1.14
Attractants	300,000	11.41
Total variable cost	1,351,000	51.34
Total mean variable cost	22,516.67	
FIXED COST		
Depreciation in capital input, interest on loans, rent, taxes, and insurance	1,278,000	
Total fixed cost	1,278,000	48.6
Mean fixed cost	21,300	
Total cost (TVC+TFC)	2,629,000	
Profitability indicators		
Net income (TR-TC)	2,831,000	
Gross margin	47,183.33	
Gross return per naira invested	1.08	

Source: field survey

This shows that can be all year round and has its peak during the dry season as plants produce flower and nectar is abundant. This is in line with the findings of Babatunde [3].

The total revenue of honey production in Ikwuano local government area according to the data collected was N5,460,000. Total variable cost summed up to be N1,351,000 which had the percentage (51.34). Harvesting cost was the highest variable cost possessing the total percentage of 22.8 which was followed by cost of bottles and attractants having the same percentage of 11.41, bee attendant was with a percentage of 2.3 and transportation having 2.28 while labelling cost had a percentage of 1.14.

The total fixed cost was N1, 278,000 having a total percentage of 48.6. Three profit indicators were estimated. The net income amounted to N2,831,000. The gross margin amounted to N47,183.33, and gross margin per naira was 1.08. The result from this data shows that honey production is profitable in the study area.

Table 3. Socio-economic factors of honey production in Ikwuano local government.

Explanatory variables	Linear function
Constant	12.984 (1.972)**
Age (R1)	0.559 (5.061)***
Sex (R2)	0.009 (0.114)
Educational status (R3)	-0.090 (-0.034)
Income (R4)	0.179 (2.728)***
Experience in years (R5)	0.000 (-1.952)**
Membership to cooperative(R6)	0.068 (0.575)
Household size (R7)	8.001 (2.737)***
Credit access (R8)	-1.400 (-4.000)***
R2	0.784
F-ratio	(16.087)***

Source: field survey

Note: *** implies significant at 1% level; ** implies at 5% level and * implies significant at 10% level.

From the table above, the significant factors of honey production in the study area include

Age, Income, experience in years, Household size and credit access.

Age of the honey producers was significant at 5% probability level; age was positively related to the quantity of honey produced. This is against the apriori expectation of negative relationship but the result can be accepted because honey production in the study area is practiced more by aged men and women who take the business as retirement or par time business in the study area.

Income of honey producers signed positive with the quantity of honey produced at 1% probability level. This implies in honey produce will increase the income of the framer.

Experience of the framer related positively with honey produced at 5%risk level. This shows that farmers ride the experience curve in decision making which increase the output of the framer.

Household size was significant at 1% and positively related to output. This implies that as household size increases, output increases. This is against the result of Mbah [4]. This is because families in the study area mainly use household members as a means of cheap labour and if the family is large, it has cheap labour and more hands to work in the farm and most bee framers in the study use family members more as workers in the farm.

Credit access was significant at 1% and signed negative to output. This shows that due to high interest rates, it increases the cost of production which goes a long way to reduce the farmers output.

The linear function was selected of the four functional forms having the best fit with R^2 value of 0.784, F-ratio of 16.784 with relatively more significant variables.

From Table 4, one can see that labour was signed negatively and is significantly related to the amount of honey produced at 5% probability level. This implies that as the number of labourers increase without a corresponding in the number of bee hives, the output is bound to decrease.

Also the amounted if capital invested in the honey venture related positively with production. The factor is significant at5% probability. This implied that as the capital invested in the business increases, the output of the honey production increases also.

Rent was negatively related with production. This factor was significant at 10% probability level. This shows that the framers do not pay rent for the place the bee hives are kept; the hives are kept in their farms or places where they are not charged.

Table 4. Analysis of determinants of honey production in Ikwuano local government area.

EXPLANATORY VARIABLES	COBB DOUGLAS
Constant	92.821
	(1.782)*
Labour	-1.276
	(-1.974)**
Capital	0.501
	(0.207)*
Rent	-0.938
	(-2.471)**
Number of bee hives	-4.042
	(-0.796)
Distance to production unit	-1.943
	(-3.266)***
R^2	0.363
F-ratio	(6.040)***

Source: Field survey

The distance to production unit was negatively related to the output of honey at a significant level of 5% level of probability. This means that as much as the framers output, he will still travel the same distant to the production unit.

Table 5. Distribution of constraints in the study area

Constraints	frequency	Percentage
Inadequate capital	15	24
Inadequate tools	5	8
Inadequate loan	10	17
High interest rate	9	15
Theft	1	2
Inadequate skilled manpower	10	17
Swarming	4	7
Much rain	4	7
Pest and diseases	2	3
Total	60	100

Source: field survey

From the table above, 24% of the respondents have the problem of inadequate capital to finance honey production enterprise. 8% complained of inadequate tools. 17% have no access to loan facilities while15% obtained

loan at a very high interest rate. Only 2% of the respondent complained of theft which shows that theft is not a problem in honey production. 17% experienced the problem of shortage of skilled manpower, 7% experienced swarming and heavy and frequent rainfall respectively and 3% of the respondent complained of pest and disease attack.

CONCLUSIONS

The study has shown that honey production is not only profitable but equally viable in the study area; it is evident in the gross margin obtained from the study.

It is also evident from the study that promotions of agriculture development has the potential in alleviating poverty in the country and the economy of Nigeria from being a mono-economy.

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ASSESSMENT OF NORTH INSURGENCY AND PERFORMANCE OF FOOD DEALERS IN ABIA STATE, NIGERIA

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Abstract

Large quantity of the food consumed in Abia State comes from the Northern part of the country. The insurgence in the north has created an atmosphere of panic and this has affected agricultural production and trade in the northern region. This study assessed north insurgency and the performance of food dealers in Abia state, Nigeria. Specifically this study examined the constraining experience of the food dealers due to insurgence, examined the frequency of travelling to the north by the food dealers and analyzed the cost effect of the insurgency on the performance of food dealers in Abia State. The towns of Aba and Umuahia were selected for the study because of the huge presence of food marketers. A multi stage random sampling technique was adopted to select the food dealers. Firstly, a purposive selection of two major markets in the towns of Aba and Umuahia which include Ariara Main Market and the Ubani Ultra Modern Market Umuahia. . In order to give each of the food dealers an equal opportunity of been selected a random sampling technique was used to select 25 food dealers from the markets respectively to make a sample size of 50 food dealers. Both questionnaires and interviews were used to elicit the required data from the selected food dealers. Descriptive statistics and cost and return analysis were used to achieve the objectives of this study. The study clearly shows that majority of the food dealers are females representing 64% of the sampled food dealers and majority of the food dealers had basic education. The major constraining experiences due to the insurgence were the decrease in the number of food dealers in Abia State and in the North and the continuous increase in the cost and selling price of the food items. The states of the North Central Zone are the most visited as shown by 55.9% of the food dealers response, while the North East Zone got the lowest number of visit of 8.9% as shown by the food dealers' response. The insurgence had a 19.5% estimated reduction on the net profit of the food dealers. Buying through an agent and the encouragement of local production of the food products mostly purchased in the North are the measures to curb the effect of the insurgency on the performance of the food dealers. The government should thoroughly consider the plight of these food dealers who put their life in danger in order to make food available in the state. The security of these traders should be paramount; they should consider organizing a system of purchasing the food in bulk with the aid of security agent and through trade agents. A plan to improve the agricultural system in the state in order to boost local production of some essential food commodities will reduce the risk of the insurgency on the food dealers.

***Key words*:** *insurgence, food, performance*

INTRODUCTION

Availability of food as well as one's access to the right quality and quantity of food required is often impaired by the rising level of insurgence globally. The availability, accessibility and affordability of the required food products amount to the food security of the individuals [7]. The lives and well being of millions can come under serious threat when that privilege is impaired in the right quantity and quality of food for their nourishment. There are estimates that more than 65 per cent of the Nigerian population is food insecure [9]. Most food produce consumed in the Southern part of Nigeria are produced from the Northern part of the country due to the fertility of their soil, land mass, the improved agricultural policies of the Northern states and the adoptable nature of some of these crops to the Northern climate. About 90 per cent of food items consumed in Lagos and other South-west and South-Eastern states come from the North [3].

The food that comes from the Northern part of Nigeria includes some vegetables, beans, yam, groundnut, potatoes, carrot, onions, beef etc. [4]. These food items constitute major part of the diet consumed in the Southern part of Nigeria. The Southern part of Nigeria depends on the food supply from the Northern part of Nigeria to meet their daily food requirement. The Southern part of the country is notable for the production of cassava, yam, some vegetables and palm fruit. The people in the southern part of the country are noted to be predominantly traders and farmers but due to the weak agricultural policy implementation and corruption, the food production rate in the area is very low, resulting to the high dependence on food imports and food from the northern part of the country [8].

Though there are rare cases of insurgence in the South-East part of Nigeria which include communal clashes, kidnapping and youth restiveness. But in the Northern part of the country, the Boko Haram upsurge coupled with the increase cases of communal clashes, herdsmen violence and youth restiveness have made the part of the country a serious nightmare and horror for the southern traders who usually travel to the Northern part for their trade. According [3] from Benue to Taraba, Nasarawa and Plateau in the North Central region and Zamfara and Kaduna States in the North West, clashes between farmers and herdsmen have left in its trail heavy losses of lives and property. In the past two years, farmers in North Eastern parts of Nigeria, particularly Adamawa, Yobe and Borno states are no longer able to farm for security reasons especially for fear of attacks by the dread Boko Haram sect who continued to unleash untold havoc in the part country[2]. These cases of insurgence have harmfully affected farming activities and other related businesses and this has resulted in a drastic reduction in farm outputs [6]. Less number trucks convey food to the South these days, because of the insurgence and this is having its effects on prices of food. The effects of the insurgence in the North is being felt, not only by the consumers but the traders as well who depend on supplies from the North for their livelihood.

This situation has really sky rocket the price of food from the Northern part of the country. The transportation cost and other cost component of travelling to the North to purchase these food products have been on the increase translating to increase in the price of the available food products from that part of the country. The terrorist group called boko haram has resorted to serial killing and widespread attack on the farming communities and this has instilled fear in the minds of the southern food dealers as well as the consumers. The food dealers are primarily scared of their security and safety when they go for their trade in the northern part of the country while the consumers are scared of the terrorists poisoning the food products made available by the food dealers. With the difficult socio economic conditions faced by the food traders in Abia State in adjusting to the rigors of the relocation of the major markets in last three years by the government (10). These situations have made the food dealers unable to procure enough food to meet the ever increasing demand for food items in the state, most food dealers have resorted to a change in the line of business where they can convey their product and transact securely. Based on the above premise this study examined the effect of the insurgence in the northern part of Nigeria on the performance of the food dealers in Abia State that source their products from the north.

Specifically, this study:

(i)Analyzed the constraining experience due to insurgency by the food dealers in Abia State,

(ii)Examined the frequency of travelling to the North to purchase foods produce, and

(iii)Analyzed the cost effect of the insurgency on the performance of food dealers in Abia State.

MATERIALS AND METHODS

This study was carried out in Abia State, Nigeria. Abia state is a State created in 1991 was carved out from Imo State. The citizens are predominantly Igbo's. Abia state is located in the South Eastern region of Nigeria.

The state is approximately within latitudes 4°, 41^{I} and 6°, 14^{I} north of the equator and longitudes 7°, 10^{I} and 8^{Io} east of the Greenwich meridian. It has seventeen Local Government Areas that are divided along three agricultural zones namely Ohafia, Umuahia, and Aba [1]. This state share common boundaries to the North with Ebonyi State, to the south and South west with Rivers State and the east and south east with Crossriver and Akwa Ibom States respectively; to the West is Imo State and to the North West Amambra State. The towns of Aba and Umuahia were selected for the study because of the huge presence of food markets. The commercial town of Aba is the abode for major market which include the Ariaria Market, Ahiaohuru, Salad Market/Railway Station, tenant by Asa Road/Mini Market etc. The most popular market in the capital town of Umuahia is the Ubani Main market.

The population from which data pertinent to this study were collected are the food dealers in Abia state, Nigeria.

A multi stage random sampling technique was adopted to select the food dealers. Firstly, a purposive selection of two major markets in the towns of Aba and Umuahia which include Ariara Main Market and the Ubani Ultra Modern Market Umuahia respectively , secondly, a fact finding visit to the various market associations popularly known as "OMATA" to ascertain the number of major food dealers in the market plying the North for their goods. The leadership of the markets gave the figures to be 180 and 98 in Ariara Main Market and the Ubani Ultra Modern Market Umuahia respectively. In order to give each of the major food dealers an equal opportunity of been selected a random sampling technique was used to select 25 food dealers from the markets respectively to make a sample size of 50 food dealers. Both questionnaires and interviews were used to elicit the required data from the selected food dealers.

Descriptive statistics and cost and return analysis were used to achieve the objectives of this study.

The cost and returns model follows and specified thus:

NEI = TR - (TVC + TFC)

Where:

NEI = Net enterprise income for the investment options in Naira

TR = Total Return in naira

TVC = Total Variable Cost in Naira

TFC = Total fixed cost in Naira

Gross margin: GM = TR – TVC

TR = Total Revenue.

TVC = Total Variable Cost.

RESULTS AND DISCUSSIONS

The questionnaires were distributed to the selected food dealers and interview sections were held with the respondents in the two major markets in the state.

Table 1. Socio economic characteristics of the respondents

Variable	F	%
Gender		
Female	32	64
Male	18	36
Total	**50**	100
Age in years		
21-30	22	44
31-40	17	34
41-50	8	16
51-60	3	6
Total	**50**	100
marital status		
Single	13	26
Married	37	74
Total	**50**	100
education level		
Primary	14	28
Secondary	23	46
Bsc/HND	8	16
Msc	4	8
PhD	1	2
Total	**50**	100

Note: F and % represents frequency and percentage of response respectively

Source: Own Calculation

Multiple responses were allowed for some questions in the questionnaire.

The socio economic characteristics of the food dealers examined include their gender, age, marital status and educational level. Descriptive statistics were used in the analysis while the result is presented in Table 1.

It was observed that 36% of the food dealers were males while 64% were females. This clearly shows female dominance among the food dealers in the study area. We observed that 44 % were in the age bracket of 21 – 30 years while 34% were in the age bracket of 31 – 40 years representing majority of the respondents which implies that most of the food dealers are in their youthful age. In the distribution of the respondents according to their marital status which indicates that 74% of the respondents are married while 26% are single, this result implies that there is high sense of responsibility among majority of the food dealers. Most of the food dealers had secondary and primary education representing 46% and 28% respectively. This clearly shows that majority of the food dealers in the state have acquired basic education.

Table 2. Constraining experience of the food dealers due to insurgency

Constraints due to insurgency	F	%
Increase in the cost of transportation	43	15.75
Unavailability of the food product	34	12.45
Increase in the cost of purchase of the food products	49	17.95
Insurgence attack	47	17.22
Decrease in the number of produce dealers both in the north	50	18.32
Continuous increase in the selling price of products	50	18.32
Total	**273**	**100**

Note: F and % represents frequency and percentage of response respectively
Source: Own Calculation

The food dealers were allowed to give an array of constraints experienced due to the rising level of insurgency in the northern part of the country where they source the food commodity for sale. Continuous increase in the selling price of products and decrease in the number of food produce dealers were identified by all the respondents as the constraining experience representing 18.3% of the total responses respectively. Increase in the cost of purchase of the food products from the North and the insurgent attacks as constraints accounted for about 17% of the total responses. The constraining experience of unavailability of the food products was indicated by about 12% of the total responses while increase in the cost of transportation was indicated by 15.8% of the total response as a constraining experience by the food dealers due to the insurgency in the Northern part of the country.

Table 3 presents the distribution of the food dealers to their frequency of visit to the northern states to purchase food items. From the North East geo-political zone of the country which is the major hub of the insurgence. This zone harbours states like Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe which before the insurgency were relatively peaceful and were noted for their agricultural prowess.

Adamawa State was identified by the food dealers as the major source for food items such as groundnut and yam. Only 10% of the respondents do visit the state every month to make purchase, 6% of the food dealers visit the state every quarter for their purchase while 2% of the food dealers visit the state annually for the purchase of the identified food products from the state which are in high demand in the southern part of Nigeria where the production is low.

Bauchi State was identified by the food dealers as the major source for food items such as beef and groundnut. Only 6% of the respondents do visit the state every month to make purchase, 4% of the food dealers visit the state every quarter for their purchase while 2% of the food dealers visit the state annually for the purchase of the identified food product from the state.

Borno State was identified by the food dealers as the major source for food items such as beef, sorghum, cowpeas and Maize. Due to the high presence of insurgence in this state only 2% of the food dealers visit the state for their purchase monthly. This state has been

noted to have the highest record of insurgent attacks and this have limited the number of trade in the state.

Table 3. Distribution of the food dealers according to their visits to the Northern states

	WEEKLY		TWO WEEKS		MONTHLY		QUARTERLY		BI ANNUALLY		ANNUALLY	
	F	%	F	%	F	%	F	%	F	%	F	%
NORTHEAST												
ADAMAWA	0	0	0	0	5	10	3	6	2	4	1	2
BAUCH	0	0	0	0	3	6	2	4	5	10	1	2
BORNO	0	0	0	0	0	0	1	2	0	0	0	0
GOMBE	0	0	1	2	2	4	0	0	0	0	0	0
TARABA	0	0	2	4	2	4	0	0	0	0	0	0
YOBE	0	0	0	0	0	0	2	4	1	2	5	10
NORTHWEST												
JIGAWA	0	0	5	10	10	20	8	16	5	10	7	14
KADUNA	0	0	3	6	8	16	9	18	6	12	4	8
KANO	0	0	9	18	9	18	10	20	2	4	8	16
KATSINA	0	0	4	8	8	16	2	4	4	8	3	6
KEBBI	0	0	0	0	1	2	3	6	3	6	3	6
SOKOTO	0	0	1	2	3	6	3	6	5	10	6	12
ZAMFARA	0	0		0	0	0	0	0	0	0	0	0
NORTH CENTRAL												
BENUE	4	8	2	4	19	38	9	18	6	12	10	20
KOGI	0	0	9	18	11	22	7	14	3	6	6	12
KWARA	0	0	8	16	8	16	9	18	4	8	7	14
NASSARAWA	0	0	2	4	6	12	11	22	6	12	4	8
NIGER	0	0	4	8	9	18	10	20	9	18	8	16
PLATEAU	7	14	5	10	8	16	10	20	8	16	9	18

Note: F and % represents frequency and percentage of response respectively
Source: Own Calculation

Gombe State was identified by the food dealers as the major source for food items like beef, millet and sorghum. The state was visited by 2% and 4% of the food dealers on every fourth night and monthly respectively despite the need for these important food items which must have fallen short of supply due to rising level of insurgency.

Taraba State was identified by the food dealers as the major source for food items such as beef, millet and sorghum. The sate was visited by 4% of the food dealers on every fourth night and monthly respectively while Yobe state which produces beans, beef and groundnut was visited by 10% of the food dealer annually.

North West geopolitical zone harbours Jigawa, Kadunna, Kano, Kastina, Kebbi, Sokoto and Zamfara states which are prominent commercial hub for the trade of products such as agricultural produce. There have been several cases of insurgence in these states and this has limited the trade and agricultural production of the states in this zone.

Jigawa State was identified by the food dealers as the major source for water melon, beef, potatoes, cowpea and groundnut. Only 10% of the respondents do visit the state every month to make purchase, 20% of the food dealers visit the state every quarter for their purchase while 14% of the food dealers visit the state annually for the purchase of the identified food product from the state which is in high demand in the southern part of Nigeria.

Kadunna State was identified by the food dealers as the major source for food items such as beef, ginger, pepper, onions, sugar cane and yam. Despite the scare of insurgent attacks 6% of the food dealers visit the state for their purchases every two weeks, on a monthly basis 16% of the food dealers visit Kadunna State for their purchases, 18% visit the state on quarterly basis, 12 % visit the state bi annually while 16% visit the state for

their purchases annually. Kano State is the producer of beef, millet, sorghum and maize. On a monthly and every two weeks 18% of the food dealers respectively visit the state in search of these scarce food crops with the rising rate of insurgence.

Kastina State produces beef, beans, groundnut, guinea corn, wheat and beans. On a monthly basis18% of the food dealers visit the Kastina State to purchase these agricultural produce to serve the demand of their customers in Abia State.

Kebbi State produces beef, guinea corn, maize and potatoes. The food dealers that visit Kebbi State were 6% on a quarterly, bi annually and annually respectively to purchase the produce for sale in Abia State. Sokoto State produces beef, beans, millet, wheat and potatoes. The food dealers that visit Sokoto State were 6% on a quarterly, bi annually and annually respectively to purchase the produce for sale in Abia State.

North Central geopolitical zone harbours Benue, Kogi, Kwara, Nasarawa, Niger, and Plateau states. Benue State was identified by the food dealers as the major source for yam, guinea corn and soya bean.

Benue State remains a favourable destination for the food dealers as the state has not been really hit by the Boko Haram insurgence except frequent communal clashes in the state. On a monthly basis 38% of the food dealers visit the state to purchase these food crops. Kogi State is a major centre for the purchase of food crops like Maize and guinea corn. On a monthly basis 22% of the food dealers visit the state to purchase these food crops.

Kwara State is a major centre for the purchase of food crops like Maiz millet, sorghum and groundnut and guinea corn. On a quarterly basis 22% of the food dealers visit the state to purchase these food crops. Nasarawa and Niger States produces yam, groundnut, sorghum and millet. These states were visited by 22% and 20% of the food dealers on a monthly basis for Nasarawa and Niger states respectively. Plateau state is the home for vegetables and the state is widely visited by the food dealers to bring these highly perishable food crops despite the increasing level of communal clashes and insurgence. On a weekly basis 14% of the food dealers visit Plateau State while 16% visit the state on a monthly basis.

Table 4. Distribution of the food dealers according to geopolitical zones visited for purchase of food crops

Geo political zones	**States**	**F**	**%**
	Adamawa	31	2.77
	Bauchi	31	2.77
North East	Borno	3	0.27
	Gombe	9	0.8
	Taraba	12	1.07
	Yobe	14	1.25
Total		**100**	**8.93**
	Jigawa	91	8.13
	Kaduna	82	7.32
North West	Kano	98	8.75
	Katsina	57	5.09
	Kebbi	24	2.14
	Sokoto	42	3.75
	Zamfara	0	0
Total		**394**	**35.2**
	Benue	130	11.6
North Central	Kogi	96	8.57
	Kwara	94	8.39
	Nassarawa	79	7.05
	Niger	104	9.29
	Plateau	123	11
Total		**626**	**55.9**
Grand Total		**1120**	**100**

Note: F and % represents frequency and percentage of response respectively. Multiple responses
Source: Own Calculation

Table 4 clearly shows the frequency of visits to the north by the food dealers. The North Central zone of the country was mostly visited by the food dealers representing 55.9% of the total visits to the north to source for food. Plateau and Benue states got the highest trade visits of 11% respectively, due to the high level of agricultural production of the states. This implies that despite the challenge of insurgency in the zone, the food dealers find it more secure to trade in the North Central Zone of the country. The North West geopolitical zone got 35.2% of the total visits to the north by the food dealers. Though there are cases of insurgence in this zone but the food dealers find it necessary to assume the risk in pursuit of the wealth of agricultural produce from this zone. But in the North East geopolitical zone of the state the food dealers

had the less number of visits to this zone representing 8.9% of the total visits.

Table 5. Cost effect of insurgence on the performance of the food dealers in Abia State

Item	Amount(N per month)
Total revenue	45,372,860
Expenditure	
Inputs	982,417
Wages (labour)	4,412,085
Transportation	1,298,050
Fuel/energy	1,470,695
Other variable cost	688,208
Total variable cost	8,851,455
Rent	8,371,250
Levies	674,250
Equipment	922,750
Other fixed costs	1,074,250
Total fixed cost	11,042,500
Total cost	19,893,955
Gross profit	36,521,405
Net profit	25,478,905
Estimated loss due to insurgency	20,600,100
Gross profit after estimated loss due to insurgency	15,921,305
Net profit after estimated loss due to insurgency	4,878,805

Note: F and % represents frequency and percentage of response respectively. Multiple responses
Source: Own Calculation

As shown in Table 5, the cost effect of insurgency on the sampled food dealers indicated that the total revenue of the food dealers in the State was ₦ 45,372,860 with the total variable cost (TVC) of ₦8,851,455 and a total fixed cost (TFC) of ₦11,042,500. With an aggregate loss (due to insurgence effect) of ₦20,600,100, the profit of the food dealers in the state plummeted to ₦4,878,805. This magnitude of aggregate loss accounted for reduction in the net profit of the farmers in the region by 19.15%.

As shown in table 6 the food dealers identified some remedy to cushion the effect of the insurgence on their trade. About 40.8% of the food dealers was of the opinion that purchasing the food items through an agent who goes to the north to buy on behalf of the food dealers who have hired him and paid him.

Table 6. Distribution of the respondents according to the identified solutions

Identified solutions	**F**	**%**
buying through an agent	38	40.86
reduction in the number of visit for purchases	26	27.96
going to the north with security	2	2.15
encouraging local production of the food produce	15	16.13
importation of food products	12	12.90
Total	**93**	**100**

Note: F and % represents frequency and percentage of response respectively. Multiple responses
Source: Own Calculation

This situation reduces the risk associated with food dealers going to the north on their own. The food dealers have resorted to proper planning of their visits to the north as indicated 27.9% of the response by the food dealers. This reduces their number of visits to the north as they may buy the products in bulk. Encouragement of local production of some of the food products was indicted by 16.13% of the total response by the food dealers. They do these by contracting the local farmers to produce these crops in large quantity as they buy up the produce. Importation of food as a remedy to mitigate the effect of insurgence on the food dealers was indicated by 12.90% of the food dealers' response. This is detrimental to the economic growth of the nation as the government tend to formulate policies to reduce food imports.

CONCLUSIONS

Food as a necessity for the survival and nourishment of every individual is an important issue to be studied. Attaining food sufficiency is the major concern of policy makers. To bridge the gap in the food supply trade becomes inevitable. But the upsurge of the insurgency that has affected the farming communities in the northern part of Nigeria has also affected the food supply to the southern part of Nigeria. This study has assessed the performance of the food dealers in Abia State who travel to the North in quest of food to meet the food need of about 2,883,999 people of Abia State [1]. The study clearly shows that majority of the food dealers are females representing 64% of the sampled

food dealers and majority of the food dealers had basic education. The major constraining experience due to the insurgence were the decrease in the number of food dealers in Abia State and in the North and the continuous increase in the cost and selling price of the food items. The states of the North Central Zone are the most visited as shown by 55.9% of the food dealers response. While the North East Zone got the lowest number of visit of 8.9% as shown by the food dealers response. The insurgence had a 19.5% estimated reduction on the net profit of the food dealers. Buying through an agent and the encouragement of local production of the food products mostly purchased in the North are the measures to curb the effect of the insurgency on the performance of the food dealers.

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COMPARATIVE ANALYSIS OF INFORMAL SAVINGS FORMS OF MALE-HEADED AND FEMALE-HEADED FARM HOUSEHOLDS IN AGUATA LOCAL GOVERNMENT AREA OF ANAMBRA STATE, NIGERIA

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Abstract

This study comparatively analyzed informal savings forms of male-headed and female-headed farm households in Aguata Local Government Area of Anambra State, Nigeria. 90 male and 90 female headed farm households were selected using multi-stage random sampling technique. Data was collected using structured questionnaire and analyzed using descriptive statistics, probit and Ordinary Least Square (OLS) regression models. Results showed that mean household size of both male and female headed farm households was 8 persons and that the male and female headed farm households saved a mean amount of ₦ 96,138.00 and ₦ 74,005.00 respectively in informal forms per annum. It was also observed that 90.00% and 83.33% of male and female headed farm households saved in form of cash at hand. The probit regression results revealed that household size, education level, saving distance and age were significant determinants of male headed farm households' decision to save in informal forms, while, household size, income, saving purpose and interest on savings were significant determinants of female headed farm households' decision to save in informal forms. The OLS regression results revealed that income, household size, education and age were significant determinants of amount saved in informal forms by male headed farm households, while income, age, saving distance and farm size were significant determinants of amount saved in informal forms by female headed farm households. It was recommended that government should educate farm households on the inherent benefits of maintaining low household sizes. Policies that reduce household size will improve savings of the farm households.

Key words**:** *farm households, household heads, informal savings forms*

INTRODUCTION

Farm households (male and female headed) in Nigeria either depends solely on farming activities for survival and generation of income or depend on other non-farming activities to supplement their farm income [30]. Most farm households have limited resources and do not have ready access to financial services including saving facilities of banks and other formal financial institutions due to absence of formal financial institutions in rural areas and low literacy level of the farmers. [10] rightly noted that the formal financial institutions in Nigeria provides services including savings facilities to about 35.0% of the economically active population while the remaining 65.0% are excluded from access to formal financial services [10].

Nigeria is endowed with many indigenous savings forms which through their informal and flexible mode of operation provide a savings forum for most farm households. The different informal saving mechanisms available to farm households in Nigeria include: stashing cash at home, keeping money with neighbours, friends or family members, saving money in rotating savings and credit association (ROSCAS), accumulating savings and credit association (ASCARS), credit and thrift cooperative societies and in-kind savings such as savings in the form of gold, silver and raw-materials [15]. In general, informal savings involve small savings and deposit and short-term transactions operated without physical collateral and takes place close to the

residence of its clients. Informal savings is considered more suitable to the needs of the rural farm households and characterized by small-scale transactions and risk. Major attributes of informal savings organization include easy accessibility, mobilization of small savings, flexibility and adaptability, social cohesion and security for members [24]. This encourages rural farm households to save in informal forms.

Savings is a means of accumulating assets that perform specific function for the saver [17]. It simply means putting something aside for future use or what will be considered as deferred expenditure [5]. Savings provide several benefits for male and female headed farm households. The sustenance of farm household savings increases the possibility of future investment and risk management both at the micro and macro- levels in the economy [33]. Directly, savings could be used for investment. Indirectly, savings indicates repayment ability, increases credit rating and can serve as collateral in a credit market [9]. Male and female headed farm households savings strategies deserve special attention because; savings is a crucial element of farmer's survival and key to economic growth. According to [27] successful rural finance stimulates all rural development.

In general, household savings can be used for a variety of purposes, such as purchasing or renovating a home, buying of goods and services, investing in agriculture, investing in financial and non-financial assets and repaying debt. However, farm household savings are constrained by scarcity of resources, low income, differential power relations and cultural values and standards. Understanding how farm households save their money and the factors that influence the amount saved is important for the conduct of monetary policy. The study intends to: (i) describe socio-economic characteristics of male and female headed farm households in the study area; (ii) identify various informal saving forms adopted by male and female headed farm households in the study area; (iii) determine factors that influence decision to save in informal forms by male and female headed farm households; (iv) determine factors that influence amount saved in informal forms by male and female headed farm households in the study area; (v) identify problems constraining male and female headed farm households from saving in informal forms.

MATERIALS AND METHODS

Study Area

The study was conducted in Aguata Local Government Area (LGA) of Anambra State. The study area lies between latitudes 6^0 13′ and 7^0 9′ N of the Equator and longitudes 7^0 49′ and 7^0 57′ E of the Greenwich Meridian. It is bounded on the north by Ideato North LGA of Imo State, on the South by Oko in Orumba north local government area cast by Ichida in Aniocha local government area on the west by Umunze in Orumba south local government area of Anambra State. Aguata LGA has a total population of 239,049 persons, made up of 141,329 males and 149,720 females [23].

The study area has 14 communities which include Ekwulobia, Uga, Igbo-Ukwu, Ezinifite, Umuchu, Isuofia, Achina, Akpo, Amesi, Ikenga, Umona, Ora-eri, Aguluezechukwu and Nkpologwu. The local government area has a vast number of informal financial organizations which are formed by communities or villages or groups, some of these includes; Ekwulobia progressive association (EPA), Ezenike Revolving Savings Associations (ERSA), Ikenga Fixed Fund and Savings Association (IFFSA) and Ofu-Obi Daily Savings Association (ODSA). These institutions are characterized by savings contribution with membership of about 50-80 percent of the household's heads in the study area.

Sampling Technique and Data Collection

Multi stage random sampling technique was used in this study for the purpose of selecting sampling location and samples. In the first stage five autonomous communities (Amesi, Isuofia, Ekwulobia, Ezinifite and Umona) were randomly selected from the study area. In the second stage, two villages were randomly selected from each of the communities; this gave a total of ten villages.

At the village level, a list of male and female headed households was formulated with the help of natives. This list served as the sampling frame, from which 9 male and 9 female headed farm households were randomly selected thus, giving a sampling size of 180 farm households, made up of 90 male-headed and 90 female-headed farm households. A farm household was defined for this study in line with [6] as an economic unit consisting of either a single person or a group of persons who live together and depend on common income and within the limits of that income, exercise choices in meeting specific objectives and where at least one member describes their major occupation as farming.

Structured questionnaire was used to collect data from the household heads. Data collected from the household heads included, age, marital status, education level, household size, farm size, amount saved in various informal credit units, frequency of savings, types of informal saving forms and outlets, reasons for saving in informal credit units and constraints to household savings activities.

Method of Data Analysis

Descriptive statistics such as means, frequencies, tables and percentages were used to analyse the socio-economic characteristics of the male and female headed farm households (objective i), identify various informal saving forms adopted by male and female headed farm households (objective ii) and identify problems constraining male and female headed farm households from saving in informal forms (objective v). Probit model was used to determine the factors that influence decision to save in the informal forms by the male and female headed farm household (objective iii), while ordinary least square (OLS) multiple regression model was employed to analyse the factors that influence amount saved by male and female headed farm households (objective iv).

Model Specification

The probit model is appropriate when response to dependent variable (Y) takes one of only two possible values representing presence or absence; the model was adopted as used by [14]:

$Pi\ [y=1] = [Fzi]$ … (1)

Where

$Zi = \beta 0 + \beta_1 X_1 + e$

$Y_i = \beta_1 + \beta_2 X_{2i} + ... + \beta_k X_{ki} + \mu$ … (2)

Yi* is unobserved but Yi = 0 if $y_i^* < 0$,1 if $Y_i^* \geq 0$

$P\ (Yi = 1) = P\ (Yi^* \geq 0)$

$P\ (\mu\ i \geq -\beta_1 + \beta_2 X_{2i} ... -B_k\ X_{kL}$ … (3)

Where i = 1, 2 ……180 male and female headed farm households

Where Y_i = decision to save in the informal forms by male and female headed households (dichotomous variable, 1 if yes; 0 if otherwise)

β_1 = Unknown coefficients value of factors

X_1 = Household size (number);

X_2 = Age of household head (years);

X_3 = Education level of household head (number of years spent in school);

X_4 = Income (Naira);

X_5 = Distance from saving centre (kilometre);

X_6 = Purpose of saving (if for investment = 1, if consumption = 0);

X_7 = Interest on savings (%);

X_8 = Farm size (Hectare);

μ = Error term.

The OLS model used is implicitly stated as:

$Y = F\ (X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e_i)$

Y = Amount saved (Naira)

X_1 = Income (Naira)

X_2 = Household size (number)

X_3 = Education level (number of years spent in school)

X_4= Age of household head (years)

X_5 = Distance from saving center (kilometer)

X_6 = Interest on savings (%)

X_7 = Farm size (Hectare)

X_8 = Purpose of saving (if for investment = 1, if consumption = 0)

e_i = Error term.

RESULTS AND DISCUSSIONS

Socio Economic Characteristics of Farm Household Heads

The distribution of male and female heads of farm households according to socio-economic profile is presented in Table 1. With respect to age, 36.67% and 56.67% of the male and female farm household heads were within the

ages of 41 and 50 years while 30.0% and 16.67% of male and female heads of households were within the ages of 31 and 40 years respectively. Mean age of the male and female heads of farm household was 47 and 42 years respectively. This indicates that the male and female heads of farm households were still active and productive. In terms of marital status it is observed that 83.33% and 70.00% of male and female heads of farm households respectively were married. Most of the female heads of the farm households were wives of male migrants. This implies that the married respondents were more involved in farming because of the need to supplement the family's means of livelihood [2]. The married class tends to save more because of the need to prepare for the possibility of financial crisis [5]. 60.00% and 33.33% of the male and female heads of farm households respectively had secondary school education, 23.33% and 36.67% of the respective group of household heads had primary school education, while 10.00% and 16.67% of the male and female farm household heads had tertiary education. In summary, 93.33% and 86.33% of male and female headed farm households respectively had formal education ranging from primary school education to tertiary school education. Acquisition of higher formal education by heads of farm households would enable them to better utilize effectively and efficiently whatever resources are available in the area including savings facilities. Higher education would enhance improved technology adoption and increased farm income, hence increased savings [25]. With respect to household size Table 1 shows that 53.34% and 43.33% of the male and female headed farm households had household size of between 5 and 8 persons while 33.33% and 40.00% of them had household size of between 9 and 12 persons. The mean household size of both groups was 8 persons. Large household size increases the propensity of farm household heads to consume rather than to save [12]. The mean farm size of male and female headed farm households was 1.53 hectares and 1.02 hectares respectively. This is a clear indication that the farm households in the study area operated mostly on marginal small farm lands. This result is in agreement with the observation of [31] that most farmers in rural areas of south-eastern generally have small land holdings.

Table 1. Distribution of Male and Female Headed Farm Households According to Socio-Economic Characteristics in Aguata LGA of Anambra State, Nigeria

	Male headed		Female headed	
Age (years)	**Frequency**	**Percentage**	**Frequency**	**Percentage**
31-40	27	30.00	15	16.67
41-50	33	36.67	51	56.67
50-61	21	23.33	12	13.33
Above 60	9	10.00	12	13.33
Mean	47.06		41.98	
Marital status				
Single	6	6.67	12	13.33
Married	75	83.33	63	70.00
Widowed	9	10.00	15	16.67
Educational status				
No formal education	6	6.67	12	13.33
Primary education	21	23.33	33	36.67
Secondary education	54	60.00	30	33.33
Tertiary education	9	10.00	15	16.67
Household size				
1-4	12	13.33	15	16.67
5-8	48	53.34	39	43.33
9-12	30	33.33	36	40.00
Mean	8.38		8.42	
Farm size				
<1	24	26.67	42	46.67
1-2.0	48	53.33	39	43.33
2.1-3.0	18	20.00	9	10.0
Mean	1.53		1.02	
Total	90	100.00	90	100.00

Source: Field survey, 2014.

Frequency of Savings by the Male and Female Headed Farm Households

Table 2 shows that 16.67% and 40.0% of the male and female headed farm households save on weekly basis respectively. 20.00% and 13.33% of male and female headed farm households respectively save sporadically. This means that these people save as at when they have an excess income. They do not have any specific pattern or interval for which they save their income. These categories of respondents included those whose incomes were irregular such as farmers and traders. According to them, they save when there is a good harvest or when sales are good. As much as 33.3% and 26.67% of both groups of respondents save monthly. This group is likely to consist of farm households who earn income on monthly basis and also of some individuals who make it a deliberate habit to save within specific intervals. It is important to note that 10.00% and 13.33% of male and

female headed farm households are prolific savers who save more than once in a week. Only 6.67% of the male headed farm households save on an annual basis.

Table 2. Distribution of Male and Female Headed Farm Households According to Frequency of Savings in Informal Financial Sectors in Aguata Local Government Area of Anambra State, Nigeria

	Male headed		Female headed	
Frequency of saving	Frequency	Percentage	Frequency	Percentage
Sporadically	18	20.00	12	13.33
Weekly	15	16.67	36	40.00
Monthly	30	33.33	24	26.67
Quarterly	12	13.33	3	6.67
Annually	6	6.67	0	0.00
Prolific	9	10.00	12	13.33
Total	90	100.00	90	100.00

Source: Field survey, 2014.

Amount of Cash Savings

The distribution of the respondents according to amount of annual cash saved in informal savings forms is shown in Table 3. Table 3 shows that male-headed and female headed farm households saved a mean amount of ₦ 96,138.00 and ₦ 74,005.00 per annum respectively. It could also be observed that 36.67% and 10.00% of male and female headed farm households respectively saved between ₦ 101.000-150,000 per annum while 20.00% and 40.0% of male and female headed farm households respectively saved between ₦ 1-50,000 per annum. This implies that the female headed farm households in the study area were small savers probably because they are low income earners. [13] opined that savings at the household level are important for the welfare of family members as a means to increase investment and income and address other financial needs.

Table 3. Distribution of Male and Female Headed Farm Households According to Annual Amount of Cash saved in informal Saving Forms in Aguata LGA of Anambra State, Nigeria

	Male headed		Female headed	
Cash savings (₦)	Frequency	Percentage	Frequency	Percentage
1-50,000	18	20.00	36	40.00
51,000-100,000	24	26.67	27	30.00
101,000-150,000	33	36.67	9	10.00
151,000-200,000	12	13.33	12	13.33
201,000-250,000	3	3.33	6	6.67
Total	90	100.00	90	100.00
Mean	96,138.00		74,005.0	

Source: Field survey, 2014.

Reason for Savings

As indicated in Table 4 the male headed farm households ranked investment (36.67%) and meeting emergencies (30.00%) as the first two and foremost reasons why they save. As much as 43.33% of the female headed households ranked consumption (to meet household needs) as the main reason why they save. Meeting emergencies was the second foremost reason (33.33%) why the female headed farm households save. The findings correspond with the assertion by [29] that the most important reason why households save is for investment and to prepare for the possibility of financial crisis, accidents, illness, pregnancy, job loss, divorce and many other crises, which all have financial consequences. It is also worthy to note that 23.33% and 10.0% of male and female headed farm households also save for the money to increase in value. A finding that is in line with [4] who opined that increasing ones' income substantially in amount is one of the reasons why people may want to save. Only 13.33% and 6.67% of the male and female headed households respectively indicated to also save in-order to repay previous borrowed funds.

Table 4. Distribution of Male and Female Headed Farm Households according to purpose for saving in Informal Savings Forms in Aguata LGA of Anambra State, Nigeria

	Male headed		Female headed	
Saving Purpose	Frequency*	Percentage	Frequency*	Percentage
Emergency	27	30.00	30	33.33
Consumption	18	20.00	39	43.33
Investment	33	36.67	27	30.00
Rate of return	21	23.33	9	10.00
Debt repayment	12	13.33	6	6.67

Source: Field Survey, 2014; * Multiple responses recorded

Informal Savings Outlets Undertaken by Male and Female Headed farm Households

The various outlets of savings adopted by the male and female headed farm households is presented in Table 5. The findings of the research revealed that the most popular informal outlets of savings adopted by 63.33% of the male headed and 56.67% of the female headed farm households in the study area are the cooperative thrift and credit society and mutual self-help groups respectively. 60.00% of the male headed and 50.0% female headed farm households saved

in rotating savings and credit association (Isusu). 53.33% of the female headed farm households who belonged to cooperative societies claimed that the societies (cooperative thrift and society) served as alternative forms of financial transactions in form of savings. Also, 43.33% and 36.67% of male and female headed farm households saved their money in Akawo (mobile banking), while 46.67% and 30.00% of them had their savings with fixed savings and credit association. 70.00% of the male headed and 36.67% of the female headed farm households claimed to also save in their homes. It is evident from Table 5 that most of the farm households saved their money in more than one informal savings outlet, which may be due to the relative ease in obtaining credit devoid of administrative delay, non-existence of security or collateral and flexibility built into repayment as reported by [26].

Table 5. Distribution of Respondents according to kinds of savings outlets or association adopted by Male and Female Headed Farm Households in Aguata Local Government Area of Anambra State, Nigeria

	Male headed		Female Headed	
Savings Outlets	**Frequency***	**Percentage**	**Frequency**	**Percentage**
Rotating savings and credit association (Isusu)	54	60.00	45	50.00
Self-help group	33	36.67	51	56.67
Mobile bankers (Akawo)	39	43.33	33	36.67
Fixed savings and credit association	42	46.67	27	30.00
Cooperative thrift and credit society	57	63.33	48	53.33
Home	63	70.00	33	36.67
Others (family, relation and friends)	6	6.67	9	10.00

Source: Field Survey, 2014; * Multiple responses recorded.

Informal forms of savings undertaken by male and female headed households

The various forms of savings adopted by the male and female headed farm households are presented in Table 6. Savings may be made by farm households in physical or financial form. Some households save in form of liquid asset or cash in hand; gold, silver, and other precious metals; stored crop produce; livestock like sheep, goats, pigs, cows and poultry and in form of assets like land, building, motor cycle, bicycle, scooter, radio, television, chair and other household assets. Table 6 shows that majority (90.00% and 83.33%) of male and female headed farm households respectively save in form of cash at hand. Also, 50.0% of male headed farm households save in form of assets like land, cycle, scooter, radio and chair among others, while 50.0% of the female headed farm households save in form of livestock like goats, pigs and poultry. The study further shows that 30.00% and 43.33% of male and female headed farm households respectively save in form of stored crop produce. 13.33% and 66.67% of the respective groups save in jewelleries while 23.33% and 56.67% save in form of wrapper. From the findings, it is evident that majority of the respondents in the study area saved in monetary form. This may be because of the relative ease of meeting immediate financial need of the family using savings made in cash. This is contrary to [18] that majority of the rural farmers saves in non-monetary forms.

Table 6. Distribution of Male and Female Headed Farm Households according to kinds of Savings Forms adopted in Aguata LGA of Anambra State, Nigeria.

	Male headed		Female	Headed
Savings forms	**Frequency***	**Percentage**	**Frequency***	**Percentage**
Liquid Assets (Cash at Hand)	81	90.00	75	83.33
Saving in barn	33	36.67	12	13.33
Stored crop produce	27	30.00	39	43.33
Livestock like goats, pigs and poultry	27	30.00	45	50.00
Assets like land, cycle, scooter, radio and chair	45	50.00	18	20.00
Jewelries	12	13.33	60	66.67
Wrapper	21	23.33	51	56.67

Source: Field Survey, 2014; * Multiple responses recorded.

Factors Influencing Decision to Save in Informal Savings Associations

Factors Influencing Decision to Save in Informal Savings Associations by Male Headed Farm Households

The probit regression model of factors that influenced decision to save in informal savings association by the male headed farm households is presented in Table 7. Overall, the model predicted 84.93 percent of the sample correctly and posted a log likelihood value of -62.108 and goodness of fit chi-square value of 61.04 which is statistically significant at 1.0% level. In the model, four explanatory variables were statistically significant at given levels and these are household size, age, education and distance to

savings centre. A positive sign on the variable's coefficient indicates a higher probability to save in informal savings associations, among male headed households and vice versa when a negative sign is obtained.

Table 7. Probit Regression estimates of Factors that influenced Decision to Save in Informal Savings Sector by Male Headed Households in Aguata Local Government Area of Anambra State, Nigeria

Variables	Estimated Coefficients	Standard Error	Z-Statistic	P-Value
Constant	-0.415	0.859	-0.481	0.629
Household size	0.143*	0.085	1.754	0.081
Age	0.006*	0.003	-0.284	0.097
Education	-0.139**	0.068	-2.043	0.041
Income	0.012	0.008	1.480	0.140
Distance to saving center	-0.969***	0.177	-5.496	0.000
Savings purpose	-0.023	0.081	-0.282	0.777
Interest on savings	-0.074	0.058	1.085	0.205
Farm size	-886.017	823.081	1.662	0.103
Pseudo R^2		0.832	-1.278	
Log likelihood		-62.108		
Chi2		61.04***		
Cases predicted		84.93		
Correctly (%)				

Source: Field survey, 2014; *Significant at 10% level; ** Significant at 5% level; ******* Significant at 1% level

Specifically, the coefficient (0.143) of household size was significant at 5.0% probability level and was positively signed. This implies that expanding household size increases the probability that a male headed household saves in informal savings associations. Increasing household size imposes additional responsibility on the household head. As such, savings are required to finance these activities which serve as a form of insurance or risk spreading to be tapped in economic hard times [13].

The negative coefficient (-0.139) of education implies that the decision to save in informal saving associations by male headed farm households decreases with increase in education of household heads. The literate heads of households may look down on local institutions as savings outlet but prefer orthodox banks as savings outlet. This finding is in line with [12] who obtained similar result in Abia State.

As expected, the coefficient (-0.969) of saving distance had an inverse relationship with decision to save in informal savings forms. Given the predominance of informal savings in the rural areas which are meant to accumulate a target amount for mostly consumption purposes, as observed by [7], proximity to the savings location is a widely preferred option for ease of access to the saved fund when the need arises.

The coefficient (0.006) of Age was positive and statistically significant at 10.0% risk level, implying that decision to save among male headed household in informal saving sector increases with increasing age. This consolidates the findings of [8] who found that savings capacity is enhanced as age tends to rise.

Factors influencing Decision to Save in Informal Savings Sector by Female Headed Farm Households

The probit regression model of factors that influenced decision to save in informal savings sector by the female headed farm households is presented in Table 8. The model predicted 53.20% of the sample correctly and posted a log likelihood value of -18.712 and a goodness of fit chi-square value of 14.83 which is statistically significant at 1.0% alpha level.

The coefficient (1.614) of household size was significant at 5.0% probability level and was positively signed. This implies that increase in household size increases the probability that a female headed farm household saves in informal financial sector. This is not in line with *a priori* expectation. However, increasing household size imposes additional responsibility on the household head. As such, savings are required to finance these activities which serve as a form of insurance or risk spreading to be tapped in economic hard times [13].

Table 8 also shows that the coefficient (2.320) of income had a significant positive effect at 1.0% alpha level on decision to save in informal savings sectors by female headed farm households. This implies that as the income of female headed farm households increases, the tendency to save in informal financial sector also increases. This is in

agreement with Keynesian postulates that relate income positively to savings and the Friedman permanent income hypothesis. The result is in line with [20] who obtained similar result in Kenya.

The coefficient (-0.435900) of saving purpose has a negative sign and was statistically significant at 10.0% alpha level. This result indicates that decision to save in informal saving sector by female headed farm households is stirred up for the purposes of consumption. This is in tandem with [11] who found out that households mostly save to smoothen their consumption.

The coefficient (-0.3228378) of interest on savings had a negative sign implying that increase in interest rate charged on savings declines the chances of female headed households to save. This can be interpreted as strong evidence that interest rates on savings produce substitution effect on income levels of farm households and then, impose binding liquidity constraints which reduce their propensity to save. This confirms the findings of [22] that had a similar result in their study on differences in households' savings behaviour in industrial and developing countries.

Table 8. Probit regression estimates of factors that influenced decision to save in Informal Savings Sector by Male Headed Households in Aguata Local Government Area of Anambra State, Nigeria.

Variables	Coefficients	Standard Error	T value	P>/z/
Constant	17.583	7.915	2.22**	0.026
Household size	1.614	0.798	2.04**	0.042
Age	0.183	0.323	0.57	0.570
Education status	0.006	0.024	0.23	0.816
Income	2.320	1.086	2.14**	0.032
Distance from saving centre	-0.253	0.276	-0.83	0.408
Saving purpose	-0.436	0.253	-1.74*	0.082
Interest on savings	-0.323	0.203	-1.60*	0.109
Farm size	-0.143	0.163	-0.88	0.380
Pseudo R^2	0.484			
Log likelihood	-18.712			
Chi^2	14.83			
Cases predicted	0.532			
Correctly (%)				

Source: Field Survey, 2014.

**,* = variables significant at 5.0% and 10.0% alpha level

Determinants of Amount Saved by Male and Female Headed Farm Households

Determinants of Amount Saved by Male headed Farm Households

The multiple regression estimates of factors that influenced the amount saved in informal financial organization by the male headed farm households is shown in Table 9. The Exponential function was chosen as the lead equation because it exhibited better diagnostic test statistics than other functions (Linear, double logarithmic and semi logarithmic). The R^2 of the lead equation indicates that 88.28 percent of variability of informal savings amount among the male headed farm households is attributed to the specified explanatory variables in the model. The F-statistic value of 701.70 is statistically significant at 1.0% probability level, suggesting that the data fit the model and that the independent variables were important explanatory factors of the variations in the amount saved by male headed farm households.

The empirical results show that the coefficient (0.5361972) of income had a significant positive effect at 1.0% significant level on the amount saved in informal sector by male headed households. This is in agreement with Keynesian postulates that relate income positively to savings and the Friedman permanent income hypothesis. This implies that as male headed farm households' income increase, the tendency to save in informal saving outlets also increases. The hypothesis asserted that households will spend their permanent income while the transitory income is channelled into savings with marginal propensity to save approaching unity. Similar results have also been obtained by [1] in Morocco; [3] in Nigeria; [16] in China and [20] in Kenya.

The coefficient (-0.1452402) of household size was negative and statistically significant at 1.0% level of significance. This implies that, the higher the household size, the less the amount saved in informal financial sector by male headed farm households. This is in line with *a priori* expectation. It is expected that households with large size will likely channel more of their income to food consumption expenditure rather than to savings. On the other hand, individuals with a smaller family size will have higher tendency to save as reported by [28, 32, 34].

Education had a significant positive effect (0.660254) on the amount saved by male headed farm households in the study area at 1.0% risk level. This implies that savings is predominant among the male farm household heads who had higher levels of formal education. Higher education level would enhance improved access to financial facilities and technology adoption hence increased farm income and greater ability to save [33]. However, the result is contrary to findings obtained by [34] in Pakistan.

The coefficient (0.0978664) of Age was positive and statistically significant at 1.0% alpha level, implying that the amount saved by male headed farm households increases with increasing age. This consolidates the findings of [8] and [33] that savings capacity is enhanced as age tends to rise.

Table 9. Multiple Regression Estimates of Factors that Influenced the Amount Saved in Informal Financial Sector by Male Headed Households in Aguata Local Government Area of Anambra State, Nigeria

		Functional	Forms	
Variables	**Linear**	**Exponential+**	**Semi-Log**	**Double-log**
Constant	-38133.25	7.942327***	46285.22	6.885725***
	(-1.02)	(13.22)	(0.40)	(4.59)
Income	21758.97**	0.5361972***	35268.19*	0.8744072
	(5.88)	(5.89)	(5.21)	(8.58)
Household size	2586.816	-0.1452402***	23020.01*	0.1895723
	(1.25)	(-2.88)	(1.84)	(0.73)
Education	3964.413	0.660254***	18329*	0.1291195
	(0.67)	(5.33)	(1.74)	(0.61)
Age	-143.6693	0.0978664***	-2088.397	0.7758773**
	(-0.21)	(7.01)	(-0.10)	(2.23)
Proximity to saving centre	-1294.469	-0.0229304	-8046.671*	-0.1393655
	(-1.46)	(1.04)	(-1.77)	(-1.39)
Interest on savings	16363.13*	1995.186	19124.71	0.1380492
	(1.50)	(0.96)	(0.74)	(0.57)
Farm size	0.000862	3.02e-07	389.9551	0.0232259
	(0.04)	(0.53)	(0.07)	(0.33)
Purpose of saving	0.130672	0.0127311	0.3352934	0.0370261
	(0.45)	(1.37)	(0.62)	(0.81)
R^2	0.2788	0.8828	0.5544	0.5306
Adjusted R^2	0.2198	0.8816	0.5083	0.4814
F-value	4.72***	701.70***	12.03***	10.80***

Source: Field survey, 2014.

***, **, *: variables statistically significant at 1.0%, 5.0% and 10.0% alpha levels respectively.

Figures in parenthesis are t-ratio, + = lead Equation

Determinants of Amount Saved by Female Headed Farm Households

The multiple regression estimates of factors that influenced the amount saved in informal financial organization by the female headed farm households is shown in Table 10. All the functional forms were significant at given levels implying that any of the functional forms can be used for predictive purposes. However, the savings function was best estimated using the linear functional form, which explained 87.32% of the total variation in the amount of savings of the female headed household farmers in the study area. Also, the linear functional form was chosen as the lead equation based on econometric and statistical reasons such as the number of regression coefficients that are significant, the magnitude of the F-ratio as well as their conformity to priori expectation. The F-ratio (157.86) was significant at 1.0% which attests to the overall significance of the regression result.

The empirical results show that the coefficient (37786.05) of income was statistically significant at 99% confidence level. The positive sign of the coefficient is in line with the traditional Keynesian theory and [11] who opined that the appearance of dissaving in developing countries can be explained by the underestimation of household incomes.

Age had a positive coefficient (384.0856) significant at 10.0% alpha level, implying that savings of the female-headed farm households in informal financial sector increase with increasing age. This consolidates the findings of [8] who found that savings capacity is enhanced as age tends to rise. Old people tend to be more frugal and thrifty.

As expected, saving distance had an inverse relationship (-6227.075) with saving capacity of the households. Given the predominance of informal savings in the rural areas which are meant to accumulate a target amount for mostly consumption purposes, as observed by [7], proximity to the saving location is a widely preferred option for ease of access to the saved fund when the need arises.

With a negative sign identity (-5153.099) for farm size, it indicates that decreasing farm size enhances the savings capacity of female headed households. This is plausible since expanding farm size requires more investment funds which reduces the amount saved. The result however, is not in line with *a priori* expectation. [19] opined that savings is closely related to investment and that

increased savings is a necessary but not a sufficient condition for investment.

Table 10. Multiple Regression Estimates of Factors that Influenced the Amount Saved in Informal Financial Sector by Female Headed Households in Aguata Local Government Area of Anambra State, Nigeria

		Functional	Forms	
Variables	Linear	Exponential+	Semi-Log	Double-log
Constant	-34071.07**	9.509219***	-1335745***	-1.148513*
	(-2.4615)	(35.9137)	(-11.9294)	(-1.5069)
Income	0.9414	0.8472	0.9520*	0.9732
	(0.8881)	(1.1932)	(1.6701)	(1.0934)
Household size	37786.05***	0.1239809***	-20222.41**	0.018234
	(6.9168)	(3.1334)	(-2.0169)	(0.2671)
Education	3642.991	0.1041091**	9618.688	0.0788798
	(0.6338)	(2.1288)	(0.8643)	(1.0412)
Age	384.0856**	0.0052527*	33309.18	0.3175912
	(2.4172)	(1.7280)	(1.2764)	(1.7880)
Proximity to saving center	-5153.099**	0.0964482**	-9185.519	0.0490681
	(-2.4814)	(2.4278)	(-0.8827)	(0.6927)
Interest on savings	-6227.075**	-0.0687977	-236560.2	0.1268303
	(-2.4358)	(-0.6257)	(-1.3781)	(0.9040)
Farm size	-1600.179	-0.000271	-9710.153	-0.0502673
	(-0.3136)	(-0.0027)	(-1.0870)	(-0.8267)
Purpose of saving				
R^2	0.8732	0.7472	0.8520	0.8414
Adjusted R^2	0.8598	0.7316	0.8280	0.8355
F-value	157.86	54.44	39.67	72.71

Source: Field survey, 2014.
***, **, * Indicate variables that are statistically significant at 1.0%, 5.0% and 10.0% alpha levels respectively.
Figures in parenthesis are t-ratio; + = lead Equation

Problems of Informal Savings by male and female headed farm households

The constraints identified by both the male and female headed farm households that inhibit their attempt to save in informal financial sectors are shown in Table 11. The farm households identified several constraints that limit their ability to save part of what they earn for use in the future. The main constraint to both groups inability to save in informal savings form is inadequate income which was attested by 73.3% and 90.0% of male and female headed farm households respectively. According to them, their incomes are not able to meet their needs let alone savings. They conceded that though they always try and wish to save, they are unable to do so due to their limited incomes.

Another hindrance to savings among the male and female headed farm households has to do with the fear that their monies will not be safe if they save it in informal savings form. 63.33% and 46.67% of the male headed and female headed farm households respectively mentioned the fact that fear of people absconding with their savings or thieves entering their homes and making away with their savings as reason for saving limited amount in informal forms. Pressure from the extended family as well as members of the society at large were also identified by 86.67% and 70.0% of the male and female headed farm households respectively as constraining their ability to save money. According to these people, constant illness depletes any money that they may have and may want to put aside for future use.
Other constraints such as remoteness of informal savings association were also found to hinder 26.67% of the male headed and 36.67% of female headed farm households saving abilities. A significant number (63.33% and 43.33%) of the male and female headed farm household respectively also identified their own inability to manage their financial resources very well as a constraint to their savings abilities.

Table 11. Constraints of Savings in Informal Saving Sector by Male Headed and Female Headed Households in Aguata Government Area of Anambra State, Nigeria

	Male Headed		Female Headed	
Constraints	Frequency*	Percentage	Frequency*	Percentage
Inadequate income	66	73.33	81	90.00
Sickness	42	64.67	60	66.67
Fear of safety of savings	57	63.33	42	46.67
Family and societal demand	78	86.67	63	70.00
Misuse of money	57	63.33	39	43.33
Remoteness of informal savings outlets	24	26.67	33	36.67

Source: Field Survey, 2014; *Multiple responses recorded

CONCLUSIONS

Based on findings obtained by the study, it is adduced that male headed farm households operated larger farms and saved more amount in informal forms than the female headed farm households. Although, both groups preferred to save in form of cash, a greater

percentage of the male headed farm households preferred to save in their homes, while, the female headed farm households preferred to save in self-help groups. The study showed that household size, education level, saving distance and age were significant determinants of male headed farm households' decision to save in informal forms, while, household size, income, saving purpose and interest on savings were significant determinants of female headed farm households' decision to save in informal forms. The study also revealed that income, household size, education and age were significant determinants of amount saved in informal forms by male headed farm households, while income, age, saving distance and farm size were significant determinants of amount saved in informal forms by female headed farm households. The following recommendations are therefore pertinent:

In the face of current harsh economic realities, government should educate farm households on the inherent benefits of maintaining low household sizes. Policies that reduce household size will improve savings of farm households in the area.

Increase in food share of total expenditure and household size would reduce savings rate, thus, there is need for the government to review its policies aimed at reducing consumer price index.

Both male and female headed farm household should diversify into non-farming activities to increase savings.

Policies should be made on the need to facilitate rural farm household investment climate in order to boost the level of productivity and consequently, the level of income which translates to a higher level of savings rate and investment.

Personal efforts of the male and female headed farm households to better their lives should be commended in the face of harsh economic realities, especially to the female headed households because of low possession of productive asset (land) by these women.

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DEVELOPMENT OF WATER AND SEWAGE INFRASTRUCTURE ON RURAL AREAS IN POLAND

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Abstract

The aim of this paper was to analyse development of a water and sewage infrastructure on rural areas in Poland. The study encompassed years 1989-2013 from which two periods have been distincted namely before (1989-2004) and after (2004-2013) the Poland accession to the European Union (EU). A significant increase in the length of waterworks (from 53.6 M to 223.4 M km) and sewage system (from 2.9 M to over 75 M km). Despite significantly faster extension of sewer system in examined period, a disadvantageous disproportion between its waterworks length has been indicated. The development of analyzed infrastructure has been accompanied by an improvement in terms of its quality and efficiency. Among others over 400 new waste-water treatment plants capable of removing biogenic contaminants. The population share served by waste-water treatment plants and waterworks has increased significantly (from 3.1 to 35.3%) and (from 61.4 to 76.6%). As a result an increase in terms of consumed water and sewage disposal has been claimed. Summing up it has been acknowledged that the development in water and sewage infrastructure on the rural areas in Poland lead to an increase in an investment attractiveness of those areas and the quality of its inhabitants lives.

Key words**:** *Poland, rural areas, sewage system, waterworks*

INTRODUCTION

From early 1990s population of rural areas has experienced a systematical growth. This phenomenon is mainly caused by a birth rate and a migration from urban to rural areas [10]. As a result the rural population share over the last dozen or so years has raised to 39.6% (from 38%). Despite a significant population living in rural areas over the years an evident underinvestment in terms of adequate technical infrastructure has been observed. Consequently the attractiveness of rural areas in respect of investments and housing was relatively low. It is important to note that one of the basic elements of a land management and planning, which is determinative when it comes to the: possibilities of economic initiative development; modernization of agricultural production; settlement development and environmental protection the adequate level of technical and water and sewage infrastructure is of vital importance [1].Therefore the development of water and sewage network in rural areas makes up to the most important factors of improving peoples living conditions. Hence the beginning of political transformation which took place at the turn of the 1980/90s the investments in mentioned areas are being realized. Additionally important factors which put pressure on rapid making good on deficiencies in said infrastructure are legal requirements for environmental protection imposed on Poland by the EU [10].
In this work an analysis of development in the range of water and sewage infrastructure on rural areas in Poland has been done. Research encompassed years 1989-2013 which have been divided into two periods, namely before (1989-2004) and after (2004-2013) accession to the EU.

MATERIALS AND METHODS

Data for this study have been obtained from: Local Data Bank of Central Statistical Office in Poland, Statistical Yearbooks of

Environmental Protection and Community Facilities. The assessment of water and sewage management development was based on the analysis of waterworks and sewers lengths changes and number and kind of wastewater treatment plants. The dynamics and pace of waterworks and sewers network changes have been assessed based on chain index of dynamics. By denoting the investigated phenomenon as y_i the mean chain index of dynamics given by equation:

$$\bar{i} = \sqrt[n-1]{\frac{y_1}{y_0} \cdot \frac{y_2}{y_1} \cdot \frac{y_3}{y_2} \cdot \ldots \cdot \frac{y_n}{y_{n-1}}} \qquad (1)$$

By applying the mean chain index of dynamics the average pace ($\overline{T}$) of waterworks and sewers length in analyzed time period has been calculated.

$$\overline{T} = (\bar{i} - 1) \cdot 100\ [\%] \qquad (2)$$

Presented analysis included also the number of individual wastewater treatments; septic tanks and population being served by both elements of communal infrastructure over the years 1989-2013.

RESULTS AND DISCUSSIONS

Over the period 1989-2013 a rapid development of water and sewage infrastructure on rural areas has been observed. The total length of sewers has increased from 2.9 M to over 75 M kilometers whereas waterworks length from 52.6 M to 233.4 M kilometers (Fig.1). Despite significantly greater percentage increase in the length of sewers than waterworks there still remains a huge disproportion between those two elements of infrastructure. However this difference has been extensively leveled as is indicated by the ratio of sewers to waterworks length in the year 1989 amounting to 1:18 and at the end of examined period only to 1:3. There are many causes underlying behind this state of affairs but to most important one may count among: lower costs of waterworks infrastructure and social considerations.

In the hierarchy of rural population needs for many years the development of water supplying infrastructure was higher than carrying impurities [9]. Significant changes occurred after an increase in population ecological awareness and the need to comply with EU environmental protection regulations [6]. Since the beginning of the 1990s the average annual pace of sewers length changes is double that of waterworks. In the whole analyzed period the mean annual length increase amounted do 14% whereas highest values reached over 20% over the years 1995-2003. The similar course of development has been also observed in case of waterworks and their mean annual increase over the whole period amounted to about 6%.

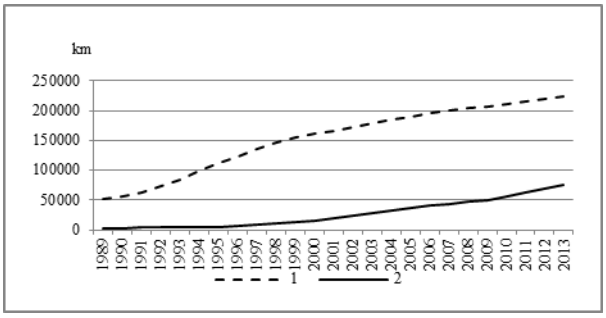

Fig. 1. Length of waterworks and sewers on rural areas in Poland.
Conventions: 1 – water supply network; 2 – sewage network

The development of analyzed infrastructure caused an increase of population percentage served by it. As a result the number of people using sewer systems has increased several-fold. But in the case of waterworks this value has only increased by XX (Table 1).

Table 1. Population share served by waterworks and sewer systems in Poland

	Population using					
	Water supply system			Wastewater treatment		
	1995	2004	2013	1995	2004	2013
Poland	81.2*	85.5	88	41.6	59.0	70.7
Poland - rural areas	61.4*	71.3	76.6	3.1	18.5	35.3

*estimated on the number of water supply connections

Dynamic development of water and sewage infrastructure combined with an increase in rural population has led to a persistent positive trend in terms of consumed water and produced sewage. In the same period from the country perspective the overall tendency was

other way around [4,5]. Its cause is the drop in terms of water demand in cities and by water intensive industrial plants.

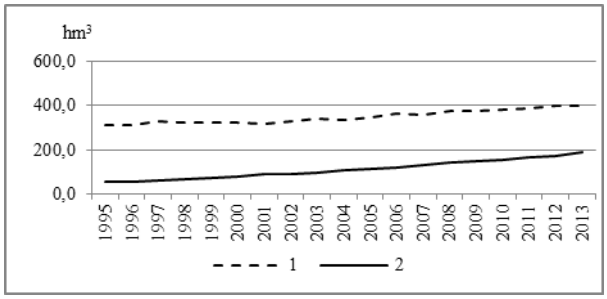

Fig. 2. Water consumption and wastewater discharge in polish household on rural areas
Conventions: 1 – Consumption of water; 2 – Discharged wastewater

The water and sewage infrastructure has also experienced an improvement in terms of quality. In this case a good example is an increase in number and king of wastewater treatment plants. A total number of all wastewater treatment plants have increased by factor of five and a most significant change has been observed in area of biological purification plants capable of removing biogenic contaminants. Mentioned biological plants are of particular importance because they ensure the highest level of hazardous (biogenic contaminants) removal from wastewater.

Table 2. Number of sewage treatment plants by kind and share in sewage treatment

Sewage treatment plants	Number of sewage treatment plants			Share of purified water by kind of plant [%]		
	1995	2004	2013	1995	2004	2013
Mechanical	23	82	39	4.8	2.1	0.6
Chemical	4	-	-	1,0	-	-
Biological	402	1,537	2,014	87.8	58.0	48.8
With increased biogenne removal	22	327	438	6.5	39.9	50.6

The main obstacle restricting the development of sewage system on rural areas which are characterized by dispersed housing is lack of economic justification for such an investment. With a similar frequency appear technical constraints resulting from site specific relief [8]. In such cases one possible solution is to invest in individual wastewater treatment plants. Over the recent years a declining trend is observed in terms of number of septic tanks while opposite in case of individual wastewater treatment plants on rural areas in Poland.

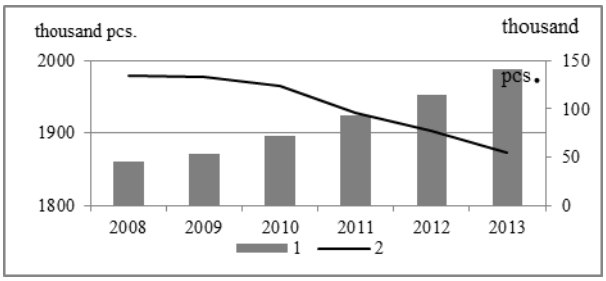

Fig. 3. Number of septic tanks and individual wastewater treatment plants on rural areas in Poland
Conventions: 1 - Independent wastewater treatment facilities; 2 – septic tanks

As has been already mentioned the imposed by EU regulations were the factors which stimulated the intensive development of water and sewage infrastructure. At the same time thanks to the integration with EU in Poland appeared new possibilities to secure financing for the development of this sort of communal infrastructure. Before EU accession rural areas were able to use two so called Pre-Accession Funds: Instrument for Structural Policies for Pre-accession (ISPA) and Support for Pre-accession Measures for Agriculture and Rural Development (SAPARD).

With the accession to the EU new ways of financing water and sewage infrastructure have emerged. Currently one of the tasks of European support funds is to reduce the disproportions in level of communal infrastructure development in rural Ares. This aim is being realized by refinancing local government investments in area of: water supply, sewage discharge and solid waste management [8].

By means of mentioned funds a rapid and complex expansion of individual facilities and elements of water and sewage infrastructure was possible. It is important to underline that the costs of building and modernization of mentioned infrastructure are so high that no individual rural community would be able to realize them by own financial means.

It is worth noting that stated significant development has not appeared in equal measures over the country. A strong

differentiation is visible between number of people served by waterworks and sewers in western and eastern central Poland [3]. The leveling of existing disproportions is essential to ensure sustainable development of the whole country. Because as has been mentioned the water and sewage infrastructure is a key to fast social and economic development.

CONCLUSIONS

The analysis of selected elements of water and sewage infrastructure in Poland indicated meaningful development of their individual parts. Also a disproportion between waterworks and sewers has been pointed out. Despite faster development rates of sewers this aspect of communal infrastructure is still far away behind waterworks. By analyzing individual elements of water and sewage infrastructure before and after accession to the EU it has been observed that the highest dynamic was in pre-accession period. An important role of EU funds without which such a significant progress would not be possible has been stressed out. The development of this kind of communal infrastructure led to an improvement in working conditions of rural population. It has also stipulated the economic development of those areas by raising their investment attractiveness. Thereby importantly limiting the atrophic pressure by reducing the amount of not treated sewage.

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CONSIDERATIONS ON THE DEVELOPMENT OF MEDICAL TOURISM AT WORLD LEVEL AND IN ROMANIA

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Abstract

The paper aimed to present a few considerations on the development of medical tourism at international level and in Romania, based on the existing literature abroad and in the country. The medical tourism is dynamics branch of tourism creating patients flows and incomes for the receiving countries, which are providers of healthcare services at international standards and certification. Most of the "suppliers" of medical services are in Asia, but also in the Latin America, Europe and the USA. The medical services of interest for medical tourists are: cosmetic surgery, dentistry, cardio surgery, orthopaedic surgery, bariatric surgery, fertility, organ, cell and tissue transplantation, eye surgery, wellness, analysis, tests, scans etc. The medical tourist flow is created by the wish of the patients to be consulted and treated in another place or country because in their own country are not satisfied by the offer of medical services, the quality of services, the price/procedure, for making savings. In Romania, about 70 % of the foreign tourists are represented the Romanians living abroad who return in the country for dental implants, cosmetic surgery, in vitro fertilization, heart diseases, orthopaedical problems, rheumatism treatments, physiotherapy in spas, because the average expenditure per procedure is about Euro 3,200, much cheaper than in other countries. The source of medical tourists for Romania are Germany, United Kingdom, Italy, France, Israel, USA. As medical tourism is a nich for Romania, a new strategy is required to improve the infrastructure, to assure the high tech endowment in hospitals and clinics, a high professional training and salary for the medical staff and a more efficient marketing to promote Romania's resources and quality and price of medical services.

Key words**:** *development, medical tourism, international market, Romania's market*

INTRODUCTION

The definition of a medical traveler, given by *Patients Beyond Borders* is: "anyone who travels across international borders for the purpose of receiving medical care". [19]
In other words, "medical tourism is defined as a travel abroad in order to seek medical treatment, with or without a holiday or the consumption of tourism services". [5, 10, 22]
Medical tourism is continuously developing, becoming a distinguished branch of tourism industry as a result of the people's permanent need of health care, the uneven growth of private sector in health care services, the deeper involvement of high technologies in medical services, the tourism globalization and the existence of the unlimited opportunities to access health resources [5].
Medical tourists are characterized by the following features which divide them a various categories of patients:(i)people who are ill and their disease is treatable, and because of that they look for a diagnosis to confirm their illness;(ii) people who look for a cosmetic treatment or a surgery;(iii)people willing to leave their home and travel in order to be treated;(iv) people motivated to travel because they found lower tariffs per medical service in another place or a higher quality of a healthcare service or a better access to healthcare services, or a shorter waiting period or who are not able to get a medical service at home or in their country of origin; (v)people looking for the best medical procedures, the highest technologies, the best doctors;(vi)people looking for the rehabilitation after a treatment or surgery or to get an additional medical service. [6]
Medical tourism has known a continuous development in the recent years at world level becoming a real tourism industry, creating patient flows to the countries offering healthcare services at international standards

and at costs for all the types of medical tourists.

Traveling for medical services is a challenge and also an opportunity to get a new life experience aiming to maintain health and visit other places or countries.

In this context, the purpose of this paper was to present some considerations about the development of medical tourism both at world level but also in Romania, which has a high potential, for the moment not enough used in this area.

MATERIALS AND METHODS

This study is based on literature and aimed to point out the development of medical tourism at international level and in Romania, characterizing the main aspects such as: definition of medical tourism, the main factors determining patients to apply abroad for healthcare services, the top country destinations, financial aspect of medical tourism, the healthcare services of high interest for patients travelling abroad to test and treat. In this study are also presented the author's opinions on the development of medical tourism.

The statistical data provided by various sources have been processed using the specific methodology.

RESULTS AND DISCUSSIONS

Medical tourism development at international level

The main reasons of medical tourism development at international level.

There are many reasons determining people to look for tests, diagnosis or treatment, surgery etc in other places than the one of origin. In this respect, there are many opinions and some of them are selected below.

The growth of treatment cost, the limited financial resources and the need to save money have determined most of patients to look for cheaper medical services in other countries, mainly in the emerging economies [11].

The aging of the world population and the lack of possibility to cover all the inquiries of medical services in the country of origin have oriented people to travel abroad in the counties where they could find satisfaction [16]

Sometimes, the long time of waits to be consulted and treated in the country have determined the patients to find solutions abroad paying the procedures [11]

A survey report made by McKinsey and Company mentioned that 40% of medical tourists travel abroad looking for advanced technology, 32 % patients seek for better medical services, 15 % are interested in fast healthcare services and 9 % travelers seek lower medical costs. [15]

The increasing financial efforts made in the healthcare system by Governments, the high investments in healthcare and tourism infrastructure, the excellent medical services and international reputation, accreditation and quality assurance in some countries in general, but especially in the Asian countries and the Latin American countries have created poles of medical tourism in the world like: India, Singapore, Malaysia, Taiwan, Thailand, South Korea, but also Costa Rica and Mexico, as well as USA and Israel. [17, 15]

Responding to the global need of hospitals accreditation, meaning that each international hospital must meet the same set of rigorous standards set forth in the USA in 1999, at present the Joint Commission International accredited more than 600 hospitals and clinical departments around the world and their growth rate is about 20% per year. [20]

The top 10 countries in the world regarding the number of JCI acredited hospitals in 2012 were: Turkey (42), Saudi Arabia (39), United Arab Emirates (38), Brazil (31), Ireland (15), Thailand (17), India (16), Italy (15), Singapore (14) and China (14). [21]

In Europe, the most important medical destinations are Hungary, Poland, Romania, Bulgaria, Czech Rep, and Romania, countries from the Central and Eastern part of the continent, where high facilities are provided at lower costs than in the Western Countries. Also Belgium, Spain, Belgium and Turkey are among the most important medical services providers. [7, 22]

The long experience, high performance and best practices in healthcare and medical procedures, high competence and experienced medical staff, international accreditation of some international hospitals and ambulatory medical services, recognition of high quality, prompt and efficient medical services have also contributed to a high international flow of patients. [19]

The internet access to various web sites providing useful information about healthcare services in various countries and also the possibility to mix the advantages of medical tourism and tourism attractions offered by the destination country have sustained the wish of many patients to travel abroad. [16]

A study regarding the use of internet by breast augmentation patients concluded that 68% of the respondents utilized internet information, 53 % patients have chosen the procedures by internet, 36 % choose the surgeon, 25% respondents choose the hospital. [13]

Medical services of high interest for patients: Cosmetic surgery (breast, face, liposuction), Dentistry (cosmetic and reconstruction), Cardiology/cardiac surgery (by-pass, valve replacement), Orthopaedic surgery (hip replacement, resurfacing, knee replacement, joint surgery), Bariatric surgery (gastric by-pass, gastric banding), Fertility/reproductive system (IVF, gender reassignment), Organ, cell and tissue transplantation (organ transplantation; stem cell), Eye surgery, Wellness services, analysis, tests, scans, etc. [14]

Medical tourism in figures

It is difficult to find information about the statistics of international and national medical tourism, global healthcare, and the international patient experience. Sometimes the figures presented by various sources do not fit. However, any information source is useful to have a comprehensive idea about the evolution of medical tourism industry.

-***The number of international patients*** accounts for about 6 million people travelling in various countries for healthcare services, but adding those patients who travel a distance within a country, the total number of patients around the globe will be about 11 million per year. The forecast provides a continuous growth for the next years. [25]

The OECD estimated that in 2014, there were 50 million medical tourists worldwide, which prove the continuous extend of medical tourism industry. [15]

In the USA, the number of American medical tourists increased from 500 thousand in 2007 to 800 thousand in 2012 and 1,25 million in 2014. [15]

In 2012, the number of medical tourists by the main countries of destination was: 1,200 thousand in Thailand, 1,000 thousand in Mexico, 1,200 thousand in the USA, 610 thousand in Singapore, 160 thousand in India, 180 thousand in Brazil, 110 thousand in Turkey and 90 thousand in Taiwan. The figures increased every year in various destination countries.(Table 1).

Table 1. Number of medical tourists by destination country, 2012-2014 (thousand)

	THAILAND	MEXICO	USA	SINGAPORE	INDIA	COSTA RICA	PANAMA	BRAZIL	TURKEY	TAIWAN	MALAYSIA
2012	1,200	1,000	1,200	610	166	-	-	180	110	90	-
2013	2,500	1,200	1,225	850	280	-	-	200	185	-	770
2014	2,500	1,500	1,250	855	400	40	40	220	300	-	800

Sources: [15, 20]

-***The receipts coming from international healthcare services*** are estimated at about USD 50 billion and even USD 65 billion in 2014, and the average annual growth rate is about 20 %.[15]

-***The average expenditure for medical healthcare services*** is about USD 3,500-5,000 per visit, including the cost of medical services, transport, accommodation etc.

-***The average growth rate of the international medical tourism market*** is estimated at 15-25%, but higher in Asia, more than 26 %. The market is continuously increasing.

-The tariffs for some medical services practiced in a few top countries are presented in Table 1. It could be easily notice that in the USA and UK the tariffs are higher in general compared to the ones applied in Singapore, Thailand, India, Malaysia, Mexico, Poland and Hungary (Table 2).

Table 2.Tariffs of Medical services in some countries in 2011 (USD/procedure)

PROCEDURE	USA	UK	SINGAPORE	THAILAND	INDIA	MALAYSIA	MEXICO	POLAND	HUNGARY
HEART BYPASS (CABG)	113,000	13,921	20,000	13,000	10,000	9,000	3,250	7,140	-
HEART VALVE REPLACEMENT	150,000	-	13,000	11,000	9,500	9,000	18,000	0,520	-
ANGIOPLASTY	47,000	8,000	13,000	10,000	11,000	11,000	15,000	7,300	-
KNEE REPLACEMENT	48,000	10,162	13,000	10,000	8,500	8,000	14,650	6,375	-
RHINOPLASTY	4,500	3,500	4,375	2,500	2,000	2,083	3,200	1,700	3,500
MASTECTOMY	17,000	-	12,400	9,000	7,500	-	7,500	-	-
BREAST IMPLANTS	5,200	6,075	8,000	2,600	2,200	3,308	2,500	5,243	3,871
CROWN	385	330	400	243	180	250	300	246	322
TOOTH WHITENING	289	500	-	100	100	400	350	174	350
DENTAL IMPLANTS	1,188	1,600	1,500	1,429	1,100	2,636	950	953	650

Note: Travel and accommodation cost excluded.
Source: [14]

A research study revealed that it is cheaper to apply for medical services in India compared to UK. In India, a patient could save £ 4,718 for a coronary artery bypass, £ 4,898 for a total hip replacement, £ 732 for a total knee replacement, £ 276 for a femoral hernia repair and £ 378 for an inguinal hernia repair.(Table 3).

-The savings level in various countries where the US patients used to travel for treatments and medical procedures are: India: 65-90%, Malaysia: 65-80%, Thailand: 50-75%, Turkey: 50-65%,
Costa Rica: 45-65%, Mexico: 40-65%, Taiwan: 40-55%, South Korea: 30-45%, Singapore: 25-40% and Brazil: 20-30%.[15]
Regarding the savings in various countries for dental and cosmetic surgery compared to the cost of these medical services in the USA, another information source mentioned: 40-70% less in Panama, 40-50% less in Hungary, 25-35% less in Mexico, 30-40% less in Costa Rica, 40-50 %less in Brazil, 20 % less in India, 30% less in Thailand, 35% less in Singapore, 25 % less in Malaysia. [15]

-The country ranking based on medical tourism index. In order to establish a correct hierarchy of the countries where patients travel for medical services, the International Healthcare Research Center (IHRC) has set up a Medical Tourism Index (MTI) which quantifies the attractiveness of a country for medical tourism based on its local environment, healthcare and tourism potential and infrastructure, and availability and quality of medical facilities and services.

1. The top 25 performers with the highest MTI scores are presented in Tabel 4. As one can notice, 7 destination countries are from Asia: Singapore, Philippines, China, Japan, South Korea, India, and Thailand. [9]

-In Europe there are some countries facing with medical tourists because of their high healthcare services, high tech endowment in hospitals and clinics, high competence medical staff. Italy, Germany, France, Spain, Poland and Russia are among the top 25 countries in the world based on the medical tourism index.(Table 4). Also, other countries like Czech Rep., Hungary, Ireland, Turkey, Romania and Bulgaria are considered among the attractive countries for their medical services.

A recent study made in 2013 in Lithuania put into evidence the number of practicing physicians, hospital beds and healthcare price level in a few European countries, reflecting the potential healthcare capacity.(Tabel 5)

The tariffs per medical service differ according to the procedure and country as presented in Table 6 for dentistry, plastic surgery and vision surgery.

Table 3.Comparative advantages to apply for medical services in India compared to UK

COST FOR ONLY PATIENT TRAVELLING PROCEDURE	COST UK (£)A	COST PROCEDURE INDIA (£)B	COST OF FLIGHTS (£)	TOTAL COST INDIA (£)	COST SAVED PER OPERATION (£)	WAITING LISTS	TOTAL SAVED (£)
CORONARY ARTERY BYPASS GRAFT (CABG)	8,631	3,413	500	3,913	4,718	97	457,646
CORONARY ANGIOPLASTY	2,269	2,363	500	2,863	-594	25,241	NOT WORTH IT
TOTAL HIP REPLACEMENT	8,811	3,413	500	3,913	4,898	28,800	141,062,400
TOTAL KNEE REPLACEMENT	6,377	5,145	500	5,645	732	53,911	39,462,852
FEMORAL HERNIA REPAIR	1,595	819	500	1,319	276	1,686	465,336
INGUINAL HERNIA REPAIR	1,595	717	500	1,217	378	65,064	24,594,192
TOTAL				206,042,426			

Source: Hospital Episode Statistics, Main procedures and operations 2007-2008 [14]

Table 4. The country ranking at world level based on this Medical Tourism Index (MTI)in 2014

CRT NO	COUNTRY	MTI (%)	CRT NO	COUNTRY	MTI (%)
1	CANADA	76.9	14	JAMAICA	67.7
2	UNITED KINGDOM	74.9	15	INDIA	67.5
3	ISRAEL	74.2	16	COLOMBIA	67.4
4	SINGAPORE	74.0	17	DUBAI	66.1
5	COSTA RICA	72.8	18	DOMINICAN REP.	66
6	ITALY	72.0	19	POLAND	65.5
7	GERMANY	70.7	20	THAILAND	65.5
8	PHILIPPINES	70.7	21	ARGENTINA	64.4
9	JAPAN	70.4	22	CHINA	63.1
10	FRANCE	70.2	23	SOUTH AFRICA	62.1
11	SOUTH KOREA	70.0	24	MEXICO	61.0
12	SPAIN	69.3	25	RUSSIA	50.3
13	BRAZIL	67.9			

Source: [9]

Medical tourism development in Romania

Among the main factors contributing to the development of medical tourism in Romania could be mentioned:

-the existing healthcare and medical potential of Romania representing 30 % of Europe potential;

-the existence of the infrastructure regarding well known state hospitals with high competence and long experience medical staff in various medical fields and the spas, even thou some of them are not so well maintained;

-the appearance of high class healthcare services in private hospitals, clinics, well endowed with high technology for offering corresponding high quality medical services;

-the tariffs of medical services in Romania are by 40-50 % lower compared to the tariffs practiced in Germany, Italy and France; for instance a coronary artery bypass surgery accounts for about Euro 4,000-5,000 compared to about Euro 9,500 in UK; another example, a dental implant in Romania costs about Euro 500 compared to Euro 1,000 in the Western countries;

-the European Directive No.24/2011 which allows the cross-border healthcare and according to which, at the beginning the

medical services were for free, but din October 25, 2013, this provision was modified, so that at present each patient with medical insurance is obliged to reimburse a part of the treatment cost if the national legislation provides this, meaning about 40 % and the remaining of 60 % is discharged by the country of origin. [4, 23]

Table 5.The healthcare capacity in a few European countries

COUNTRY	NO. OF PRACTISING PHYZICIANS	NO. OF HOSPITAL BEDS	HEALTHCARE PRICE LEVEL
LITHUANIA	372.0	675.1	1.00
ESTONIA	323.5	533.4	1.28
POLAND	217.9	658.5	1.10
CZECH REP.	358.0	701.0	1.12
HUNGARY	286.9	718.2	1.05
UNITED KINGDOM	271.2	295.5	2.24
THE NETHERLANDS	292.3	465.7	1.92
GERMANY	373.1	842.8	2.06
SWEDEN	380.2	272.6	2.41
TOTAL 10 COUNTRIES	2,875.1	5,162.8	-

Source: [1]

The tariffs per medical service differ according to the procedure and country as presented in Table 6 for dentistry, plastic surgery and vision surgery.

Table 6.Tariffs per medical service in a few European countries in 2013 (USD/procedure)

MEDICAL SERVICE	SCANDINAVIAN COUNTRIES	THE NETHERLANDS	UNITED KINGDOM/ IRELAND
DENTISTRY	816	488	723
PLASTIC SURGERY	3,842	3,087	3,891
VISION SURGERY	3,000	2,100	2,460

Source: [1]

According to a study made on 1,000 patients from United Kingdom, *Treatment Abroad - Intuition Communication Ltd 2012*, it was noticed that on the top position is the doctor professional experience (89 %), the quality and fame of a hospital (85%) and tariff level per medical service is on the 3rd position (81%). [7]

The main medical services of high interest for patients in Romania are: Surgery 42 % esthetical surgery, but also other surgery types like general and gastric bypass, Dentistry 32 % (restorative, cosmetic), Obesity 9 %, Reproduction (fertility tests and treatments 4 %, births, in vitro fertilization), Orthopaedy 4 %, other medical fields 9 %: Cardiology (transplants, angioplasty, bypass), Skin diseases, Nutrition, Rheumatism treatment, physiotherapy spa (Mangalia, Eforie, Otopeni, Baile Herculane, Baile Felix).

Dentistry, luxury surgery, plastic surgery and reparatory surgery, abdominal surgery are of high attraction in Romania because of the lower price per intervention compared to the Western European countries. Dentistry is the top medical field, because in Romania there are high quality services and an excellent price/quality ratio and high competence of the medical staff. Unfortunately, spa physio-therapy is still limited due to the uncorresponding infrastructure, but this is also a niche for Romania's medical and wellness tourism. [7]

The number of medical tourists visiting Romania was 60,000 in 2013, and their number is expected to increase. [4]

However, at national level there no a statistics regarding medical tourism. [24]

The structure of foreign patients who apply for healthcare services in Romania is

represented in the most cases by the Romanians living abroad. The foreign patients are mainly from Germany, United Kingdom, Italy, France, Israel, USA. For instance, for dental problems, the main patients come from UK, Italy, France, USA, Austria, Hungary, because the tariffs are 70 % lower than in those countries; the most accessed services are: dental implants, ceramics cover, teeth whitening etc. The structure of patients: 60 % Romanians, 25 % Romanians from abroad and 15 % foreigners. An important role in the promotion of dentistry tourism in Romania have the non profit organizations and the implementation of various projects destined to develop the educational system in order to assure high competence medical staff in the field of dentistry. [7]

The number of Romanian patients travelling abroad to make analysis, tests, surgery, scans etc was 20,000 in 2012 and 25,000 in 2013 and it is expected to increase in the coming years. These patients are represented by people interested to get the second opinion on their diagnostic and treatment or for a surgery because they consider that the medical system abroad is better endowed and has higher competence medical staff.

The most preferred destination countries by the Romanian medical tourists are Hungary, Turkey, Austria, Germany and Israel and the average expenditure made abroad per medical service is about Euro 5,000. About 25 % of the Romanian medical tourists are attracted by the healthcare service provided by Turkey, because of the complete offer provided by the Turkish hospitals including: collection of the patient from the airport, transport, translator, high quality healthcare, accommodation for the accompanying person, tickets to museums and tourism attractions etc. [4]

The expenditures made by a Foreign patient in Romania for a medical procedure is in average Euro 3,500, including the air ticket, accommodation, and healthcare service. This is a small price compared to the medical services provided by other European countries. For the price attractiveness and a high quality of medical services, Romania is expected to exceed Euro 400 million income in the year 2015. [8]

From other information source, it is expected as the number of healthcare tourists mainly Germans, Italians, Israelians and British patients to be double by the end of the year 2015 and the income coming from the their payments to account for about Euro 500 Million. [3]

At the International Forum on "Medical Tourism - A pillar for Romania's sustainable development", it was affirmed that there is no evidence on medical tourism in Romania, but the Romanian Association of Medical Tourism in Romania recorded 6,500 patients in 2014. It was also mentioned that Romania has a high potential for healthcare tourism and for this reason a higher number of patients is expected to come resulting an income growth for the private hospitals and clinics. Only in 2014, those 6,500 patients spent about Euro 20 million in Romania. [12]

The amount of money for the treatments abroad by the Romanian patients made by CNAS- The National House of Medical Insurance, NHMI, increased from Lei 0.1 million in 2007 to Lei 300 million in 2014. Only in the period 2007-2014, the NHMI paid Lei 564.4 million.(Table 7)

Therefore, if in the period 2007-2014 Romania was due to pay Euro 212 million, including the medical services assured by the European card of social health insurance, the provisory certificate replacing that card, and the European forms needed to pen the residence and treatment rights. [4]

Romania's debts for the Romanians' treatments by country are presented in Table 8.

Romania's potential of medical and wellness services in spas. Romania has a high potential to offer medical services and wellness services in spas.

Table 7.The payment made by NHMI for the Romanian patients treated abroad in the period 2007-2014 (Lei Million)

	2007	2008	2009	2010	2011	2012	2013	2014
PAYMENT FOR TREATMENTS ABROAD	0.1	14.8	19	8.9	12.7	57.6	151.3	300

Source: [4]

Table 8. Romania's debts to various countries for the Romanians' treatments

GERMANY		ITALY		AUSTRIA		FRANCE		SPAIN		HUNGARY		BELGIUM	
EURO MILLION	%	EURO MILLION	%	EURO MILLION	%	EURO MILLION	%	EURO MILLION	%	EURO MILLION	%	EURO MILLION	%
73	36.5	40	20	30	15	20	10	16	8	12	6	8	4

Source: [4] Own calculation.

In 2013, the accommodation capacity was represented by 499 spas, representing 8.30% of the total number of accommodation units (6,009 units), with 39,953 places (beds) in spas, representing 13.06 % of the total number of 305,707 beds at country level. Also, in 2013, the number of beds-days, totalized 10,370,447 in spas, representing 13.46 % of the 77,028,488 beds-days at country level (Table 9).

Table 9.Romania's accommodation capacity in spas in 2013

TOTAL UNITS WITH TOURIST ACCOMMOD.	SPAS		TOTAL BEDS (PLACES)	SPAS		TOTAL BEDS-DAYS	SPAS	
NO.	NO.	%	NO	NO	%	NO	NO	%
6,009	499	8.30	305,953	39,953	13.06	77,028,488	10,370,447	13.46

Source: [18] Own calculation.

The number of tourists accommodated in Romania's spas increased by 19.40 % in the period 2010-2014, from 568 thousand in 2010 to 678 thousand in 2014.

Table 10. The number of tourist accommodated in spas, 2010-2014

SPECIFICATION	2010	2014	2014/2010%
NO. OF TOURISTS ACCOMMODATED IN SPAS	568,257	678,536	19.40
SHARE OF THE NUMBER OF TOURISTS ACCOMMODATED IN SPAS IN TOTAL NUMBER OF ACCOMMODATED TOURISTS IN ROMANIA (%)	10.3	8.5	-

Source: [18] Own calculation.

But, the share of the number of tourists accommodated in spas in the total number of tourists accommodated in Romania declined from 10.3 % in 2010 to 8.5% in 2014.(Table 10)

The number of tourist overnight stays in the Romanian spas increased from 3,910,309 in 2010 to 4,138,034 in 2013, that is by 5.82 %.(Table 11).

Strategical directions for the medical tourism development in Romania

Taking into account the deficiencies existing in the medical services in Romania such as:

-the lack of statistical records with complete and correct data bases at national level,

-the lack of a corresponding infrastructure regarding in the field of spas, state hospitals and clinics, -the lack of related services like visiting tour to tourism attractions: historical and cultural places, landscapes, Romanian traditions,

-the lack of viable alternatives in case of complications after treatment,

-the weak promotion of Romania's potential regarding the medical and wellness services,

the well endowed hospitals and clinics, the well known doctors and other medical staff,
-the lack of a corresponding salary for the medical staff, the migration of doctors, assistants etc in the Western countries and the lack of medical personnel, it is obviously required to develop a strategy for the development of medical tourism in Romania in the future.

Table 11.The number of overnight stays of the tourists in Romania's spas, 2010-2013

YEAR	TOTAL OVERNIGHT STAYS AT COUNTRY LEVEL	OVERNIGHT STAYS IN SPAS	SHARE OF OVERNIGHT STAYS IN SPAS IN TOTAL OVERNIGHT STAYS (%)
2010	16,051,135	3,910,309	24.4
2011	17,979,439	4,342,157	24.2
2012	19,116,122	4,268,473	24.3
2013	19,362,671	4,138,034	21.4

Source: [18] Own calculation.

Table 12.The number of overnight stays in spas by foreign and Romanian tourists, 2010-2013

OVERNIGHT STAYS IN ROMANIA'S SPAS				YEAR
FOREIGN TOURISTS		ROMANIAN TOURISTS		
NO. OVERNIGHT STAYS	%	NO. OVERNIGHT STAYS	%	
89,637	2.29	3,820,672	97.71	2010
103,503	2.38	4,238,654	97.62	2011
111,534	2.61	4,156,939	97.39	2012
129,070	3.12	4,008,964	96.88	2013

Source: [18] Own calculation.

Since 2007 when Romania became an EU member, it lost 25,000 doctors and 15,000 medical assistants who went to Germany, France, Spain and Italy, because the average salary of an experienced doctor in Romania is USD 20,000 per year compared to USD 82,000 in Germany and USD 120,000 in UK.
At present, Romania has the lowest doctors density: 22.7 doctors per 10,000 inhabitants, less than 35 doctors the EU average and also less than in Croatia (26) and Hungary (30.3), Austria (48.5). [3]
The strategy for the development of the medical tourism in Romania in the future should contain specific objectives and measures to assure their achievement.
The main strategical directions to whom the authorities with responsibilities in the field of medical tourism must to pay attention are:
(i)the improvement and modernization of infrastructure in the medical system, by investments in new and high technologies,
(ii) a better marketing meaning: the identification of foreign markets which could supply medical tourists, the promotion of Romania's health care resources and services, the establishment of Romanian brands in medical tourism, setting up complete touristic packages including both healthcare services, tours to touristic attractions, air tickets, tickets to museums etc;
(iii) the increase the quality of medical services and assure the best ration between service quality and price;
(iv)to increase the medical staff knowledge and skills, to assure high competence doctors and assistants;
(v)to increase the salary of medical staff based on their professional contribution to the medical problem solving and to reduce and avoid medical staff migration to other countries where they could find better paid jobs.
The main medical services of high attraction which should be developed in the future for the foreign patients are: Dentistry, Esthetyc Surgery, Fertilization, Anti-aging treatments, Bariatric surgery and post recovery, Cardiovascular surgery, Eye surgery, wellness and spa medicine. [2]
The role of medical associations in the development of medical tourism. A high importance in the development of medical tourism have had and have the various medical associations, including hospitals, clinics with the highest technologies and the best medical staff, and also dealing with projects and a sustainable marketing. A

significant example is the Romanian Association of Medical Tourism, including 136 private hospitals and clinics and 206 tourism agencies, hotels, air companies, insurance companies. This Association received over Euro 26 million last year from the patients treated in its hospitals and clinics. The average expenditure of a foreign patient in Romania accounted for Euro 3,200. The most required medical services have been Dentistry (70% of foreign patients), Esthetyc surgery (15%), Vision surgery (5%), Orthopedy, Skin diseases and Bariatric surgery (10%). The country of origin for these patients were Italy, France, Spain, Germany, Switzerland, United Kingdom, but also the Arabian countries, Russia and USA. [8]

CONCLUSIONS

Medical tourism is continuously developing and has created poles of medical services, patient flows and income flows at international level and in some countries from Asia, Latin America and Europe.

For Romania, medical tourism is a challenge, an opportunity and a niche which could bring more tourists in the country to have contact and appreciate the achievements in the field of medicine, but also the beautiful landscapes, cultural and historical treasures, traditions and people hospitality.

The medical tourist flows could also increase the incomes improving the payment balance and supplying financial resources to the private units to continue their development.

The medical tourism should be better promoted keeping pace with the new trends and actual requirements and standards of the European and national market.

Romania's medical tourism must offer high quality services, fitting the international standards and certifications, assuring a corresponding management of the medical units and the patient security and safety as well as an efficient marketing.

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ANALYSIS OF THE EVOLUTION AND DISTRIBUTION OF MAIZE CULTIVATED AREA AND PRODUCTION IN ROMANIA

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Abstract

The paper goal was to analyze the dynamics and distribution of maize cultivated area and production in Romania and in its regions of development, using empirical data provided by the National Institute of Statistics for the period 2007-2013. The statistical parameters: mean, deviation standard and coefficient of variation were determined in order to characterize each indicator. With 2.5 million ha cultivated with maize Romania came on the top position in the EU-28.For maize production, it is on the 2nd position after France. Romania's production increased more 2.7 times in the analyzed period, and the contribution of the development regions to it was the following one in 2013: 22.29 % South Muntenia, 18.18 % South East, 18.19 % North East, 13.06 % South West Oltenia, 12.47 % West, 9.68 % North West, 5.69 % Central part and 0.44 % Bucharest-Ilfov. The means, standard deviations and the variation coefficients proved that both the cultivated area and maize production registered a high variation from a region to another. The discrepancies among the regions concerning soil and climate conditions, farm size, technical endowment, applied technologies, maize varieties, farm management resulted in a high variability of production performance. For Romania, maize is a strategic crop which could cover both the internal market, and become a good product for export on the foreign market. As a result, the Romanian farmers should be aware that the yield growth must be their main objective which should be reached using high potential hybrids resistant to drought and diseases, and extending irrigation systems.

Key words**:** *cultivated area, dynamics, distribution, maize, production, Romania*

INTRODUCTION

Maize and wheat are among the most important cereals in the world. In 2013, the world maize production accounted for 1,058,948 thousand Metric Tons, to which the top five producers contributed by 74.5 % as follows: USA 32.1 %, China 24.4 %, Brazil 8.3 %, the EU-28 6.4 % and Argentina 3.3 % [8].

In 2013, maize was cultivated on 181.55 million ha at world level, which produced 991.45 million Metric Tons grains.

The most important countries cultivating maize on the largest surfaces are China (36.32 million ha), USA (35.39 million ha), Brazil (15.80 million ha), India (9.43 million ha) and Mexico (7.05 million ha). [9] (Table 1).

The EU-28 comes on the 4th position in the world. It cultivated 9,660 million ha with maize in 2013, and having an average production of 6.69 Metric Tons/ha, it produced 64.62 million Metric Tons grains.

Romania is among the most important producers of maize grains in the EU and also among the top 10 producers at world level. In 2014, it was situated on the 1st position in the EU-28 for the cultivated area with maize for grains and on the 2nd position after France, regarding the maize production. In Romania, maize is cultivated on 47.1 % of the agricultural land cultivated with cereals. [4, 8]

Eurostat confirmed the paradox between the top position of Romania for the cultivated area with maize and the smallest level of yield.

In 2013, the EU-28 average was 6,690 kg/ha, while Romania carried out only 4,408 kg/ha by 35 % less.

Other countries registered a higher performance: Germany 8,214 kg/ha, France 8,139 kg/ha, Austria 8,118 kg/ha, Czech Rep., 6,726 kg/ha, Croatia 6,600 kg/ha, and Bulgaria 5,476 kg/ha. [3]

Table 1. The top five maize producers in the world, 2013

COUNTRY	MAIZE CULTIVATED AREA MILLION HA		MAIZE YIELD METRIC TONS/HA		MAIZE PRODUCTION MILLION METRIC TONS	
	VALUE	SHARE IN THE WORLD (%)	VALUE	SHARE IN THE WORLD (%)	VALUE	SHARE IN THE WORLD (%)
WORLD	181.55	100.00	5.46	100.00	991.45	100.00
1.USA	35.39	19.49	9.93	181.86	351.27	35.42
2.CHINA	36.32	20.00	6.02	110.25	218.49	22.03
3.BRAZIL	15.80	8.70	5.60	92.67	80.00	8.06
4.INDIA	9,43	5.19	2.57	47.06	24.66	2.48
5.MEXICO	7.05	3.88	3.24	59.34	22.88	2.30

Source: World Agricultural Production, Circular Series, Sept 2015[9] Own calculations.

In this context, the purpose of the paper was to analyze the dynamics of the surface cultivated with maize for grains and production in the period 2007-2013 in Romania, both at national level and in the territory by regions of development and to identify the variation from a year to another and among different areas.

MATERIALS AND METHODS

In order to achieve the objective of the research, the empirical data were collected from the data basis of the National Institute of Statistics for the period 2007-2013.
The main indicators were the maize cultivated surface at the national level and in the territory by region of development, the share of the regions in the cultivated area, the statistical parameters for the cultivated area and maize production: mean, standard deviation and the variation coefficient, the share of maize production in the cereals production, Romania's position in the EU-28 for the cultivated area and maize production, the contribution of various development regions to maize production, the weight of development regions in the maize production, the maize production/consumption ratio per inhabitant.
The results were presented in Tables, illustrated in graphics and interpreted as presented below.

RESULTS AND DISCUSSIONS

The maize cultivated area was 2,524,706 ha in 2007, and then it recorded a decline to 2,098,394 ha in 2010, but after that it increased again to 2,730,157 ha in 2012, and in 2013 it decreased again to 2,518,268 ha. In 2013, of the total agricultural land cultivated with cereals in Romania, accounting for 5,475 thousand ha, maize was cultivated on 2,528 thousand ha, representing 46.17 % (Fig.1.).

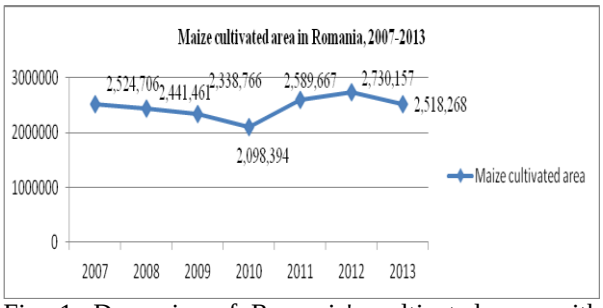

Fig. 1. Dynamics of Romania's cultivated area with maize, 2007-2013 (ha). Source: [6] Own design.

The most important regions producing maize grains. In Romania in all the development regions it is possible to produce maize, but there are zones more suitable for this crop, it is about the South Muntenia, South Eastern and North Eastern Romania, but also the South West Oltenia, West and North West. (Fig.2, Table 2).

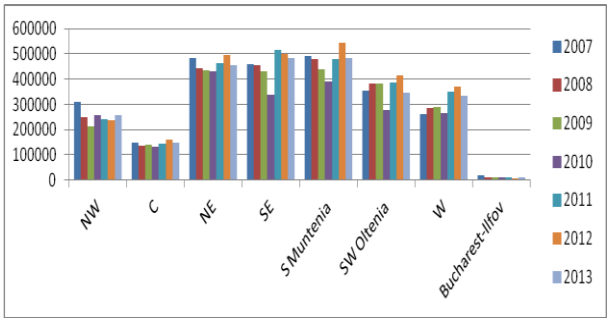

Fig. 2. Romania's maize cultivated area by development region, 2007-2013. [7] Own design.

The share of development regions in the cultivated area. In 2013, the relative distribution of the cultivated area with maize by region was the following one: 19.24 % South Muntenia, 19.12 % South East, 17.99 % North East, 13.77 % South West Oltenia, 13.33 % West, 10.18 % North West, 5.95 % Central part and 0.42 % Bucharest-Ilfov(Table 3).

Table 2. The share of each development region in the cultivated area with maize, Romania, 2007-2013 (%)

	2007	2008	2009	2010	2011	2012	2013
NW	12.20	10.23	9.17	12.22	9.25	8.69	10.18
C	5.84	5.55	5.89	6.27	5.59	5.86	5.95
NE	19.09	18.13	18.56	20.43	17.91	18.11	17.99
SE	18.22	18.65	18.36	16.00	19.91	18.31	19.12
S MUNTENIA	19.42	19.61	18.84	18.67	18.53	19.94	19.24
SW OLTENIA	14.07	15.66	16.35	13.17	14.93	15.18	13.77
W	10.37	11.70	12.35	12.64	13.54	13.64	13.33
BUCHAREST ILFOV	0.79	0.47	0.48	0.60	0.34	0.27	0.42

Source: Own calculations.

The statistical parameters of the maize cultivated area. The average cultivated area per year in the analyzed period varied between the minimum value 262,299.25 ha in the year 2010 and the maximum value 341,262.62 ha in 2012. The variation coefficient was very high every year, reflecting that there are discrepancies in time. The highest variation coefficient, V%=55.52 % in 2012 and the lowest coefficient of variation was 51.87 % in 2010.(Table 4).

Table 3. Statistical parameters of maize cultivated area by years, 2007-2013

	MEAN	STANDARD DEVIATION	VARIATION COEFFICIENT (%)
2007	315,588.25	168,765.1	53.47
2008	305,182.62	167,349.96	54.83
2009	292,470.75	159,496.49	54.53
2010	262,299.25	136,078.75	51.87
2011	323,708.37	178,858.61	55.25
2012	341,262.62	189,476.99	55.52
2013	314,783.50	169,250.33	53.76

Source: Own calculations.

By region, the mean of the cultivated area varied between the maximum level 472,819.85 ha in the South Muntenia and the minimum level 11,621.85 ha in Bucharest-Ilfov area. The coefficient of variation reflects in this case much better the disparities exiting among regions. Thus, Bucharest-Ilfov recorded the highest variation coefficient, 34.79 %, South Muntenia registered 9.94 ||% and the Central part 6.76 5 and North Eat area 5.37 % reflecting a low variation. The regions with moderate variation were North West 11.40 %, South East 13.12 %, South West Oltenia 12.17 % and West 14.22 %.(Table 5).

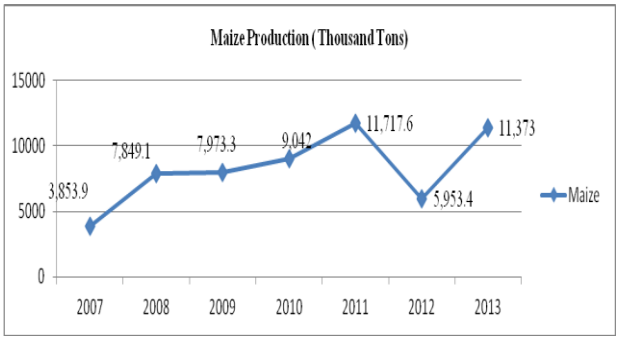

Fig. 3. Dynamics of Romania's maize production, 2007-2013 (ha). Source: Source: Romania's Statistical Yearbook, 2014 [7]. Own design.

The maize production increased 2.95 times in the analyzed period from 3,853.9 thousand tons in 2007 to 11,373 thousand tons in 2013. The general trend is an increasing one, however in 2012, the production declined due to the drought (Fig. 3).

Table 4. Statistical parameters of maize cultivated are by development region, 2007-2013

	MEAN	STANDARD DEVIATION	VARIATION COEFFICIENT (%)
NW	251,824.71	28,732.38	11.40
C	143,890.28	9,738.08	6.76
NE	457,073.14	24,579.03	5.37
SE	454,057.28	59,589.16	13.12
S MUNTENIA	472,819.85	47,000.18	9.94
SW OLTENIA	363,328.71	44,247.88	12.17
W	308,443.43	43,888.56	14.22
BUCHAREST ILFOV	11,621.85	4,044.07	34.79

Source: Own calculations.

The statistical parameters of the maize production. The production mean varied between 481,739.79 tons, the lowest level, in the year 2007 and the highest level in 2011. The variation coefficient was very high every year, reflecting that there are discrepancies during the analyzed period. The highest variation coefficient, V%= 57.41% in 2013 and the lowest coefficient of variation was 50.84% in 2010.(Table 6).

Table 5. Statistical parameters of maize production by years, 2007-2013

	MEAN	STANDARD DEVIATION	VARIATION COEFFICIENT (%)
2007	481,739.79	262,195.42	54.42
2008	981,135.37	503,157.52	51.28
2009	996,657.25	551,735.07	55.35
2010	1,130,254	574,671.91	50.84
2011	1,464,698.87	837,777.65	57.19
2012	744,169	425,364.88	57.15
2013	1,413,136.87	811,365.18	57.41

Source: Own calculations.

The share of maize production in cereals production increased from 49.31 % in 2007 to 54.11 % in 2013, with a peak of 56.22 % in 2011 and the lowest value 46.42 % in 2012. Compared to other cereals, maize has the highest share in the cereals production. (Table 7).

Romania's position in the EU-28 regarding maize production and cultivated area. Romania is among the top producers of maize in the EU-28. Romania, France, Germany, Bulgaria, Croatia, Czech Rep. and Austria.

In 2013, Romania cultivated 2,580 thousand ha with maize, representing 26.70 % of the EU-28 cultivated area with this crop, a reason to be placed on the top. For maize production achieved in 2013, which accounted for 11,373 thousand tons, representing 17.60 % of the EU-28 maize production, Romania came on the 2nd position after France (Table 8).

In 2014, Romania carried out 11,734 thousand tons maize grains, the highest production, meaning 4,600 kg/ha maize grains yield. [6]

The contribution of various development regions to maize production. The regions with the highest maize production are South Muntenia, South East and North East, followed in the decreasing order, by West and North West part of Romania (Table 9, Fig.4).

The share of development regions in the maize production. In 2013, the relative distribution of the maize production by region was the following one: 22.29 % South Muntenia, 18.18 % South East, 18.19 % North East, 13.06 % South West Oltenia, 12.47 % West, 9.68 % North West, 5.69 % Central part and 0.44 % Bucharest-Ilfov (Table 10).

The ratio maize production/consumption per inhabitant. Taking into account the demographical evolution and maize production, the maize production/inhabitant increase 2.81 times in the analyzed period from 179 kg/capita in the year 2007 to 504 kg/capita in 2013.

And considering average annual consumption

of maize in terms of maize grains equivalent, the production/consumption ratio is higher than 1. (Table 11)

Taking into account 2007 as a reference term, the self sufficiency registered an increasing trend from 96 % in 2008 to 112 % in 2013. [1]

The maize yield. Maize production was determined by the cultivated area and the maize yield, which in its turn depended on the soil type, technologies applied, weather conditions and many other factors.

Farm size is an important factor closed related to the applied technologies (technical endowment, maize varieties, fertilization level, irrigation etc) and all this resulting in the production performance, productivity and efficiency.

Romania's maize yield is the smallest in the EU-28, because maize is cultivated in about 2.5 agricultural holdings of various dimensions, only 0.38 % of the total number of farms have over 100 ha.

The yield varied between 1.526 kg/ha in 2007 to 4,490 kg/ha in 2013, reflecting a 2.94 times higher performance. [2, 5]

Table 6. The weight of maize production in the cereals production, Romania, 2007-2013 (%)

	2007	2008	2009	2010	2011	2012	2013
CEREALS PRODUCTION (THOUSAND TONS)	7,814.8	16,826.4	14,873	16,712.9	20,842.2	12,824.1	21,016
SHARE OF MAIZE PROD.(%)	49.31	49.64	53.60	54.10	56.22	46.42	54.11

Source: Romania's Statistical Yearbook, 2014. [7]Own calculations.

Table 7. Romania's position in the EU-28, regarding the maize cultivated area, production and yield, 2007-2013

	MAIZE CULTIVATED AREA (THOUSAND HA)		MAIZE GRAINS PRODUCTION (THOUSAND TONS)		MAIZE GRAINS YIELDS (KG/HA)	
EU-28	9,660,000	100.00	64,620	100.00	6,690	100.00
ROMANIA	2,580	26.70	11,373	17.60	4,408	65.88
FRANCE	1,849.6	19.14	15,053	23.29	8,139	121.66
GERMANY	495.8	5.13	4,072.4	6.30	8,214	122.78
BULGARIA	420.0	4.34	2,300.0	3.55	5,476	81.85
CROATIA	290.0	3.00	1,914	2.96	6,600	98.65
AUSTRIA	201.9	2.09	1,639	2.53	6,726	100.53
CZECH REP.	11.9	1.15	752.6	1.16	8,118	121.34
TOTAL	-	61.55	-	57.39	-	-

Source: Eurostat, 2014. [3] Own calculations.

Table 8. Romania's maize production by development region, 2007-2013 (Tons)

	2007	2008	2009	2010	2011	2012	2013
NW	858,027	1,009,247	1,009,247	735,923	1,096,326	1,060,818	648,234
C	434,821	521,490	521,490	527,681	582,564	675,837	406,965
NE	680,504	1,627,542	1,627,542	1,475,914	1,664,395	1,966,518	977,220
SE	396,874	1,097,187	1,097,187	1,053,286	1,456,742	2,454,524	839,806
S MUNTENIA	463,617	1,448,641	1,448,641	1,684,462	1,794,856	2,381,534	1,388,692
SW OLTENIA	315,235	1,086,449	1,453,235	1,189,394	1,569,294	604,181	1,475,745
W	690,963	1,024,627	1,009,614	1,208,001	1,570,345	1,075,699	1,409,572
BUCHAREST ILFOV	13,877	33,900	33,143	49,754	38,721	12,555	48,989

Source: Romania's Statistical Yearbook, 2014, [7]

Dividing the cultivated area in the year 2007, 2,524,706 ha by the number of agricultural holdings cultivating maize, 2,390,933, it resulted an average farm size of 1.05 ha, which very small specific to subsistence farms.

In the year 2010, the cultivated area was 2,098,394 ha and divided by the number of farms, accounting for 1,899,054, it is obvious that the farms size increased a little to 1.10 ha/holding.

The situation regarding the share of the farms by surface interval was the following one in the year 2007: under 0.1 ha 0.39 %, 0.1-0.3 ha 6.37 %, 0.3-0.5 6.66 %, 0.5-1 ha 17.19 %, 1-2 ha 24.59 %, 2-5 ha 31.87 %, 5-10 ha 9.85 %, 10-20 ha 2.21 %, 20-30 ha 0.30 %, 30-50 ha 0.20 %, 50-100 ha 0.14 % and over 100 ha 0.23 %.

In the year 2010, the farm weight by size interval was: under 0.1 ha 1.06 %, 0.1-0.3 ha 10.48 %, 0.3-0.5 ha 9.60 %, 0.5-1 ha 18.43 %, 1-2 ha 24.18 %, 2-5 ha 26.85 %, 5-10 ha 6.59 %, 10-20 ha 1.48 %, 20-30 ha 0.27 %, 30-50 ha 0.28 %, 50-100 ha 0.24 % and over 100 ha 0.38 %.(Romania's Statistical Yearbook, 2014).

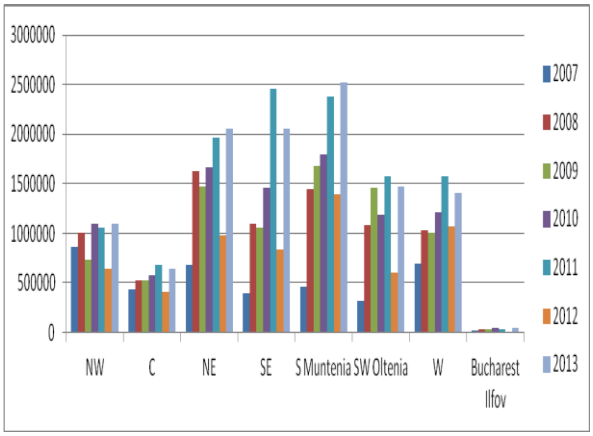

Fig. 4. Romania's maize production by development region, 2007-2013. Own design

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Table 9. The share of each development region in the cultivated area with maize, Romania, 2007-2013 (%)

	2007	2008	2009	2010	2011	2012	2013
NW	22.26	12.85	9.20	12.12	9.05	10.88	9.68
C	11.28	6.64	6.51	6.44	5.76	6.83	5.69
NE	17.65	20.73	18.50	18.40	16.78	16.41	18.19
SE	10.39	13.97	13.46	15.11	20.94	14.11	18.18
S MUNTENIA	12.04	18.46	21.10	19.85	20.32	23.33	22.29
SW OLTENIA	8.18	13.85	18.21	13.16	13.40	10.15	13.06
W	17.93	13.06	12.61	13.36	13.41	18.07	12.47
BUCHAREST ILFOV	0.36	0.44	0.41	0.56	0.34	0.22	0.44

Source: Own calculations.

Table 10. Maize Production/Consumption ratio per inhabitant

	2007	2008	2009	2010	2011	2012	2013	2013/2007
MAIZE PRODUCTION KG/CAPITA	170	347	353	401	521	265	504	281.56
MAIZE CONSUMPTION IN GRAINS EQUIVALENT KG/CAPITA	36.5	34.9	34.8	36.7	37.7	38.3	42.3	115.89
MAIZE PRODUCTION/ CONSUMPTION RATIO	4.65	9.94	10.14	10.92	13.81	6.91	11.91	256.13

Source: National Institute of Statistics, 2015[6]. Own calculations.

CONCLUSIONS

This study emphasized that Romania had a relatively constant surface cultivated with maize, about 2.5 million ha, representing about 47 % of the cultivated area with cereals. Due to this reason, Romania is in the top cultivators of maize in the EU-28.

The maize production registered an increasing trend from 3,853.9 thousand tons in 2007 to 11,373 thousand tons in 2013. The growth was due to the producers' continuous efforts directed to increase the maize yield.

The distribution of the cultivated area and production of maize in the territory varies from a year to another and from a region of development to another. In the decreasing order, the share of the development regions in the maize production in 2013 was the following one: 22.29 % South Muntenia, 18.18 % South East, 18.19 % North East, 13.06 % South West Oltenia, 12.47 % West, 9.68 % North West, 5.69 % Central part and 0.44 % Bucharest-Ilfov.

The means, standard deviations and the variation coefficients proved that both the cultivated area and maize production registered a high variation from a region to another. The explanations consist of the discrepancies exiting among regions regarding the soil and climate conditions, farm size, technical endowment, applied technologies, maize varieties, farm management.

The farm size is a critical one, in average about 1.10 ha/agricultural holding.

Just a number of 23,302 farms cultivating maize have over 20 ha and all together represent 1.17 % of the whole number of farms dealing with this crop.

Therefore, the farm size is very important to be improved, and this is possible only by joining land, endowment and labour, the main production factors which could be more efficiently used by producer's associations.

The high maize production situated Romania on the 2nd position in the EU-28, after France. Despite of the production performance on such a large surface cultivated with maize, Romania has still a low maize yield compared to France and other countries, in fact, it has the smallest performance level from this point of view.

As a conclusion, the surplus resulting from the difference between production and consumption is an encouragement for the Romania to produce more and to export in the international market. Therefore, the Romanian farmers should pay attention especially to the yield growth, using high potential hybrids resistant to drought and diseases, and extending irrigation systems to assure protection against the global warmth.

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RESEARCH ON THE DISTRIBUTION AND CONCENTRATION OF THE FARMS CULTIVATING MAIZE FOR GRAINS IN ROMANIA USING THE GINI COEFFICIENT

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Abstract

The purpose of the paper was to estimate the Gini coefficient in order to characterize the concentration and distribution of the farm dealing with maize cropping in Romania. In this purpose, a suitable mathematical model was used for different intervals of owned land, as follows: $G= D_X/2\,\bar{x} = (\sum_{i=1}^{n}\sum_{j=1}^{n} | xi - xj |) / 2\,\bar{x}\,n^2$*. The Gini coefficient had the values: 0.595 in 2007 and 0.640 in 2012, reflecting that the farms have an unequal repartition, being more concentrated to the farms with a smaller size. However, in the analyzed period, 2007-2012, it increased the percentage of the smallest farms with under 0.1 and 1 ha, it was reduced the share of the farms with 1-2 ha, and also of the ones with 2-5 ha. Also the weight of the farms with 5-10 ha declined. And, the share of the farms with over 20 ha increased from 0.42 % in 2007 to 1.24 %. The percentages changes because the number of farms growing maize decreased by about 28.42 %. The causes could be the following ones: the orientation of the farmers to the crops with a higher revenue than maize, because of the high production, the maize price was enough small, and the impossibility to work the land by a part the oldest population or deaths among old people owning land. As a conclusion, it was noticed a slight a positive aspect that the share of the farms larger than 20 ha increased to 1.24 %. The improvement of farm structure in Romania is still a long process and the best solution to shorten it is as farmers to join in associative forms.*

Key words**:** *farms concentration and distribution, maize for grains, Romania, the Gini coefficient*

INTRODUCTION

Romania is on the top position in the EU-28 for the cultivated area with maize for grains and on the 2ns position for grains production. However, the maize yield is the smallest in the EU, about 4,600 kg/ha and this is because of the small sized farms whose average accounts for about 1.1 ha. The sprayed cultivated area in very small plots is a consequence of the application of the Land Law No.18/1991 and led to the impossibility to apply modern technology and assure high production performance per surface unit. This is why, at present the farm structure reflects that most of the farms are very small, and just 1 % farms have over 20 ha.

The Gini Coefficient is a measure of inequality and could be used to evaluate the degree of concentration and distribution of agricultural holdings. This coefficient was established and described by Corrado Gini, an Italian statistician in his paper " Variabilita e mutabilita", published in the year 1912. [8].

This coefficient can be used to measure any form of uneven distribution. Usually the Gini coefficient can be utilized to show the population distribution by income size class [11], the distribution of the countries by GDP growth [1], the income disparities in the world, to provide an index of development [6, 7], the market share of an enterprise based on its turnover in the marketing studies [4] and in health equity in households surveys [13]. But it also can be used in any other fields of activity. [5]

Mathematically, the Gini coefficient is defined based on the Lorenz Curve, designed in a diagram, where the proportion of the population income (y axis) is combined with the cumulative earnings of the bottom x % of the population. In this case, the Gini coefficient is given by the ratio: G= A/ (A + B), where A= the area which lies between the

line of equality and the Lorenz Curve (A) over the total area under the line of equality (A and B). [2]. But, the Gini coefficient is also mathematically determined using the formula which reflects the half of the relative mean absolute difference, which is a mathematical equivalence [14].

In this context, in this paper, the Gini coefficient was used in Romania's agriculture to quantify the concentration and distribution of the farms cultivating maize for grains, by size interval in terms of owned area (ha).

Romania has the largest surface cultivated with the maize crop for grains in the EU-28, and for this reason, it comes on the 1st position, and also on the 2nd position regarding the total grains production.

Based on the empirical data provided by the National Institute of Statistics for the years 2007 and 2012 concerning the farm structure by land interval, the goal was to establish if the farm structure changed from Romania's adhesion to the EU in the year 2007 till 2012.

As it is known, in Romania there are about 2,5 million small farms, whose land is sprayed in small plots, which produce maize and this dispersion of land has a deep impact on the yield.

MATERIALS AND METHODS

The empirical data regarding the distribution of the farms dealing with maize cropping were collected from the National Institute of Statistics, 2015, providing the number of farms by size interval in terms of cultivated area size (ha) for the years 2007 and 2012.

The Gini Coefficient was calculated using the formula :

$G= D_X/2\ \bar{x}= (\sum_{i=1}^{n} \sum_{j=1}^{n} | xi - xj |) / 2\ \bar{x}\ n^2$

as mentioned by Molnar, M.(2010) [11], and Iosifescu et al., (1985) [10] who used the formula:

$G= Dm/ 2\ \bar{x} = (4\ (| x - Me | | yx - yMe |) / n^2)/2\ \bar{x}$

This formula is suitable to be used when the variables are distributed by inequal intervals or classes.

The Gini coefficient values were interpreted as follows: G=0, it is about a perfect equality among the distributed variables, G=1, it is about a perfect inequality regarding the distribution of the variables, as most of them are grouped in a place.

The Gini Index was also determined as percentage, being equal to the Gini coefficient multiplied by 100. [3].

In order to be an unbiased estimate of the true value of the variables, it was multiplied by n/n-1. [9].

The results were tabled and correspondingly interpreted.

RESULTS AND DISCUSSIONS

The Gini coefficient calculation for the farm structure cultivating maize for grains in the year 2007. is presented in Table 1.

The Gini coefficient was higher than 0, G>0, reflecting a higher inequality of the farm size within this distribution in the year 2007.

The farm structure by land interval in 2007 is presented in Fig.1.

One can notice that most of the farms have a small size, mainly under 5 ha. About 30.62 % farms have between under 0.1 and 1 ha, 31.87 % between 2 and 5 ha and 24.59 % have 1-2 ha.

About 9.84 % farms have between 5 and 10 ha, 2.21 % have between 10 and 20 ha, and only 0.42 % have over 20 ha.

The Gini coefficient calculation for the farm structure cultivating maize for grains in the year 2012 is presented in Table 2.

The Gini coefficient was G= 0.640, by 7.56 % higher than in the year 2007, reflecting that in 2012 the distribution of farms is more unequal than in 2007.

The farm structure by land interval in 2012 is presented in Fig.2. One can notice that most of the farms have still a small size, mainly under 5 ha. About 39.66 % farms have between under 0.1 and 1 ha, 24.12 % between 1-2 ha, 26.84 % between 2 and 5 ha. About 6.59 % farms have between 5 and 10 ha, 1.49

% have between 10 and 20 ha, and only 1.24 % have over 20 ha.

Table 1.The Gini coefficient calculation for farm dispersion in 2007, Romania

LAND SURFACE INTERVAL (HA)	X_I	Y_X	|X- 52,705|	$\|Y_X - 5\|$	|X- 52,705| $\|Y_X - 5\|$
UNDER 0.1- 1	732,319	1	679,614	4	2,718,456
1-2	588,066	2	535,361	3	1,606,083
2-5	762,192	3	709,487	2	1,481,974
5-10	235,467	4	182,762	1	182,762
10-20	52,705	5	0	0	0
20-30	6,958	6	45,747	1	45,747
30-50	4,781	7	47,924	2	95,848
50-100	3,152	8	49,553	3	148,659
OVER 100	5,293	9	47,412	4	189,648
$\sum xi$	2,390,933	-	-	-	6,406,177
$\bar{x}$	265,659.22				
DX	316,354.41				
$2\bar{x}$	265,659.22				
G	0.595				

Source: National Institute of Statistics. Own calculations.

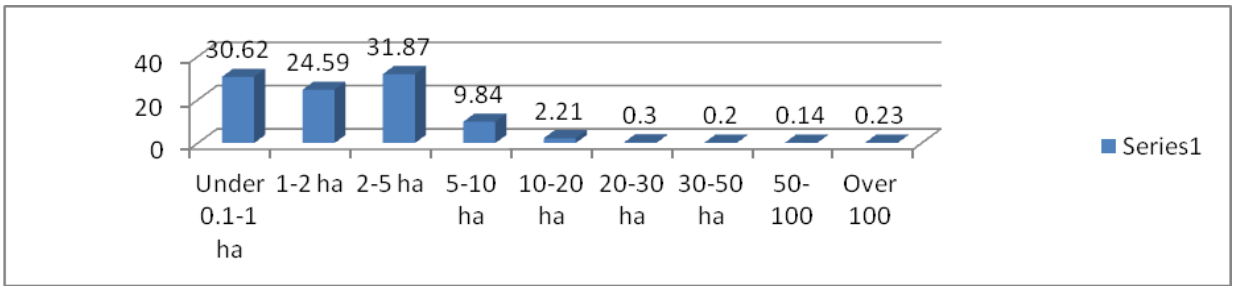

Fig. 1.The structure of the farms growing maize by land interval (%), Romania, 2007.
Source: National Institute of Statistics. Own calculations.

Table 2.The Gini coefficient calculation for farm dispersion in 2012, Romania

LAND SURFACE INTERVAL (HA)	X_I	Y_X	|X- 28,138|	$\|Y_X - 5\|$	|X- 28,138| $\|Y_X - 5\|$
UNDER 0.1- 1	753,346	1	725,208	4	2,900,832
1-2	459,232	2	431,094	3	1,293,282
2-5	509,754	3	481,616	2	963,232
5-10	125,282	4	97,144	1	97,144
10-20	28,138	5	0	0	0
20-30	6,262	6	21876	1	21,876
30-50	5,237	7	22,901	2	45,802
50-100	4,527	8	23,611	3	70,833
OVER 100	7,276	9	20,862	4	83,448
$\sum xi$	1,899,054	-	-	-	5,476,449
$\bar{x}$	211,006				
DX	270,441.92				
$2\bar{x}$	422,012				
G	0.640				

Source: National Institute of Statistics. Own calculations.

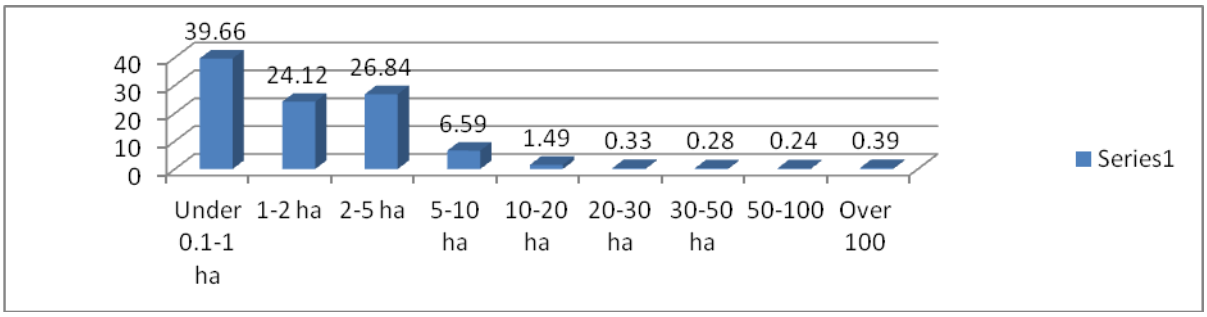

Fig. 2. The structure of the farms growing maize by land interval (%), Romania, 2012.
Source: National Institute of Statistics. Own calculations.

CONCLUSIONS

In the period 2007-2012, it increased the percentage of the smallest farms with under 0.1 and 1 ha, it was reduced the share of the farms with 1-2 ha, and also of the ones with 2-5 ha. Also the weight of the farms with 5-10 ha declined. And, the share of the farms with over 20 ha increased from 0.42 % in 2007 to 1.24 %. The percentages changes because the number of farms growing maize decreased by about 28.42 %. The causes could be the following ones: the orientation of the farmers to the crops with a higher revenue than maize, because of the high production, the maize price was enough small, and the impossibility to work the land by a part the oldest population or deaths among old people owning land.

The Gini coefficient and Gini index reflect that the distribution of farms is more accentuated, the inequality persists and even is stronger.

However, a positive aspect is the fact that the share of the farms larger than 20 ha increased to 1.24 %.

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INGESTION OF LEAD DUE TO THE CONSUMPTION OF DRINKING WATER FROM PRIVATE WELLS IN FOUR RURAL AREAS FROM BAIA MARE – ROMANIA METROPOLITAN AREA

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Abstract

The ingestion of high levels of heavy metals through drinking water intake can lead to chronic diseases such as renal failure, liver cirrhosis and chronic anemia. The present study evaluates the lead content in thirteen private wells from four rural areas located in Baia Mare (NW Romania) metropolitan area. Based on the lead concentration, the daily intake rate of Pb was calculated for the female, male and children who use these water sources as drinking water supplies. The daily ingestion rate of lead due to water consumption was considerably higher for the inhabitants from Tăuţii de Sus (0.05 – 0.21 µg/day/person) than for the inhabitants from the other villages (<0.08 µg/day/person).

Key words**:** *daily ingestion rate, drinking water, exposure, lead*

INTRODUCTION

Due to the well-known toxicity and low biodegradation, as well as the threat to the environment and public health, lead is one of the heavy metals which has been widely studied in various environmental and biological compartments [1], [5], [13]. Ingestion of drinking water, vegetables and fruits contaminated with lead represent the main ways in which this element enters the human body. Once entered into the body, it is a cumulative toxicant that is deposited especially in bone and fat tissues and can affect multiple body systems, including the neurological, haematological, gastrointestinal, cardiovascular and renal systems, by causing different diseases, especially cardiovascular, kidney, nervous system, blood or bone diseases [14].

Children, especially under 6 years, represent the most vulnerable category and even relatively low levels of exposure can cause serious and sometimes irreversible neurological damage.

The main anthropic sources of lead are the mining and smelting activities. The present study was conducted in Baia Mare area, one of the important mining areas from Romania. The mineral assemblages from Baia Mare area include native elements (Au, Ag, Cu, As, S), sulphide minerals (pyrite, chalcopyrite, arsenopyrite, sphalerite, galena, stibnite) sulphosalts (tetrahedrite, jamesonite, semseyite, pyrargyrite) and tungstates (wolframite, scheelite), together with quartz, clay minerals, adularia, carbonates, rhodonite and barite as gangue minerals [9]. The mining of gold-silver, lead-zinc and copper ore deposits has been the main economic activity for many centuries, but its decline after 1990 created serious economic, social and environmental problems. The soil in Baia Mare mining area is contaminated especially with lead, copper, zinc and cadmium, as a consequence of the emission and dispersion of pollutants during the mining and post-mining activities, as well as the ore processing industry or tailings storage [2], [4], [6], [8], [11]. There are few recent data [3], [10] regarding the presence of heavy metals in drinking water from the wells in the area of Baia Mare. The main objectives of the present study were: (1) to investigate the presence of lead in thirteen private wells located in Baia Mare area, and (2) to evaluate the possible health effects to the residents caused by lead

uptake via water ingestion, by calculating the daily intake rate.

MATERIALS AND METHODS

The drinking water samples were collected from thirteen private wells, located in four villages from Baia Mare metropolitan area (Tăuții de Sus, Satu Nou de Sus, Bozânta Mare and Bozânta Mică) (Fig.1). The samples were collected in July 2014.

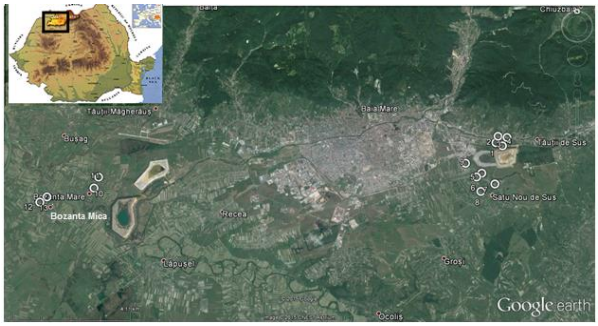

Fig. 1. The location of the sampling points.
Source: Google earth.

The water pH was measured *in situ* using a portable multiparameter (WTW Multi 350i).
The water samples collected for lead analysis were sampled in polyethylene bottles, filtered (0.45 µm) and acidified to a pH ≈ 2 (with HNO_3 65%). They were stored at dark and at cold (4ºC) and analysed within 48 hours from sampling. The lead content was analysed in the laboratory by Atomic Absorption Spectrometry (AAS, ZEENIT 700 Analytik Jena).
The potential chronic risks associated with the exposure to lead by water consumption were evaluated by calculating the daily intake rate (DIR) (µg/day) [12] using the following formula:

$$DIR = \frac{C \times I_R}{BW}$$

where, C is the lead concentration in water sample (mg/l); I_R is the water ingestion rate (l/person/day); and BW is the average adult/child body weight (kg).
A questionnaire-based survey was performed during the water sampling. The questionnaire acquired the basic information regarding water ingestion rate, number of family members, their age, and average weight.

RESULTS AND DISCUSSIONS

The analysed water samples proved to be slightly acidic to neutral, having the pH between 6.1 and 6.9. As it is shown in Fig. 2, most of the samples had the pH close to 6.5, which is the limit (6.5 – 9.5) imposed by national legislation for drinking water. The two wells from Bozânta Mare village and one of the wells (13) from Bozânta Mică village proved to have the pH lower than the limit imposed by national legislation. Such low levels of pH can enhance the heavy metals solubility.

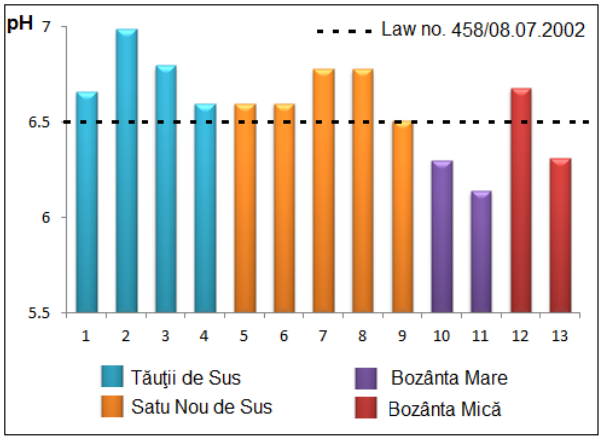

Fig. 2. pH value for the investigated wells.
Source: Own calculation.

The lead content of the analysed private wells ranged between 2.2 and 12.9 µg/l. With the exception of one well (no. 3 from Tăuţii de Sus village), the investigated wells had the lead content below the maximum permissible limit (10 µg/l) imposed by national legislation as safe limit for drinking water. The high level of lead from sample no. 3 is the consequence of the well location in the close vicinity of the "Aurul" tailing pond from Tăuţii de Sus. Because of the high mobility in soil, lead can infiltrate from the tailing pond into phreatic water leading to ground water contamination.
Similar results were obtained in the study made by Gurzău et al., 2012 [10], where extremely high levels of lead (up to 2800 µg/l) were detected in the close vicinity of the tailings ponds from Bozânta Mare and Bozânta Mică, while in the private wells from the two villages, lead was detected only in one sample (7.7 µg/l) being lower than 1 µg/l for

the rest of the analyzed wells [10].

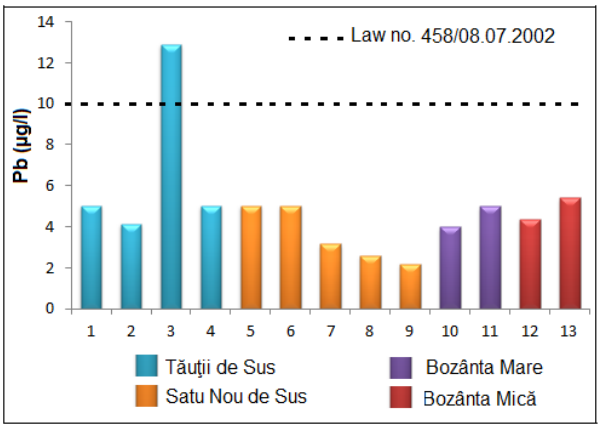

Fig. 3. Lead content in the analysed water samples, comparing to maximum level set by national legislation for drinking waters.
Source: Own calculation.

The daily intake rate (µg/day per kg body weight) was estimated based on the daily consumption rates of water from the investigated wells and the lead con2centrations in water samples.
A questionnaire-based survey was performed on 50 residents, out of which 42% were males (17% from 18 to 29 years old, 28% from 30 to 49 years old, and 55% from 50 to 73 years old), 46% were females (12% from 18 to 29 years old, 35% from 30 to 49 years old, and 53% from 50 to 78 years old), and 12% were children (between 3 and 13 years old). The average weight was 75 kg for males (ranging between 56 and 88 kg), 67 kg for females (ranging between 53 and 84 kg), and 34 kg for children (ranging between 12 and 45 kg). Based on the questionnaire information, the average intake of water from the monetarised wells was 0.8 l for adults, both female and male and 0.55 l for children.
The estimated daily intake rates (µg/day per kg body weight) of lead caused by water ingestion are presented in Fig. 4. The present study proved the high contribution of water ingestion to Pb intake, for the inhabitants from Tăuţii de Sus village.
The intake of Pb caused by the water ingestion from private water supplies in Tăuţii de Sus village ranged between 0.05 and 0.21 µg/day/kg body weight, comparing to the other investigated villages, where the lead intake 0.08 µg/day/kg body weight.

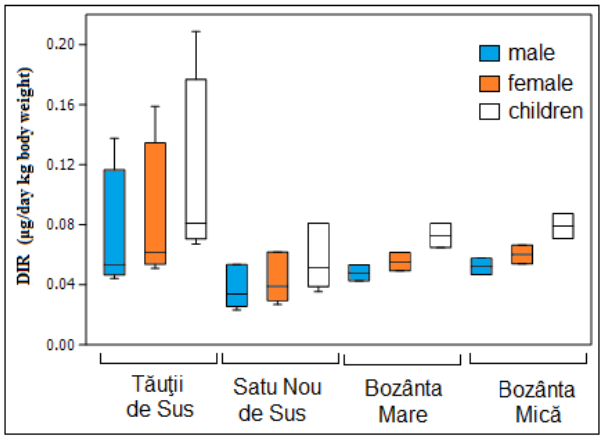

Fig. 4. The estimated daily intake rate (DIR) (µg/day per kg body weight) of lead via water ingestion
Source: Own calculation.

The tolerable daily intake for Pb is 3.57 µg/day/kg body weight, value which was recommended by FAO-WHO (2001) [7]. The lead intake caused by water ingestion from the private wells, represents a percentage of 3% (Tăuţii de Sus), 1.3% (Satu Nou de Sus), 1.2% (Bozânta Mare) and 2% (Bozânta Mică) from the tolerable daily intake for Pb.
The results showed that the DIR was higher for female than for male. The DIR was reported as µg of Pb daily ingested by a person per kg body weight, as a consequence due to the lower body weight of female the DIR was higher. For all the investigated villages, the DIR was higher for children than for adults, because in their case the ingested dose was reported to a lower body weight. The continuous usage of private wells from Tăuţii de Sus village, especially no. 3, as drinking water supplies represents a high risk for the inhabitants' health, especially for their children. Lead is a toxic metal, potential carcinogenic to humans; the toxic effects of Pb focus on the liver, kidneys, spleen and lung. As a consequence, in order to decrease the lead intake, the inhabitants from Tăuţii de Sus village should stop or reduce the use of private wells as drinking water supply. These water sources must be carefully monetarised because even at low levels, lead may cause a range of health effects including behavioural problems and learning disabilities.

CONCLUSIONS

The analysed water samples were slightly acidic to neutral, having the pH between 6.1 and 6.9. Three samples had a lower pH than the limit imposed by national legislation (6.5 – 9.5).

The lead level detected in the analysed samples ranged between 2.2 and 12.9 µg/l. In one of the wells from Tăuţii de Sus village, located in the close vicinity of the "Aurul" tailing pond, the lead content exceeded the maximum permissible limit imposed by national legislation.

The DIR of lead due to water ingestion was considerably higher for the inhabitants from Tăuţii de Sus than for the inhabitants from the other villages. For all the investigated villages, the DIR was higher for children than for adults.

Because of the high level of Pb, the consumption of drinking water from source no. 3 from Tăuţii de Sus village must be stopped or considerably restricted, because is a real threat for residents health.

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OPERATING BUDGETS AS THE MANAGEMENT CONTROL

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Abstract

Regional Water Company (it's called as PDAM) Tirta Tuah Benua East Kutai is a company owned regions that serves the area's water needs in the region Sengatta, East Kutai. PDAM has financial planning for the future that summarized in a budget. The purpose of this study is: 1) Analyzing the operating budget deviations against the realization operational at PDAM Tirta Tuah Benua East Kutai. (2) Analysis of operational deviations to improve management control in PDAM Tirta Tuah Continent East Kutai. Results of variance between budget and actual in 2011 namely: (1) Total revenue has unfavorable deviation; (2) favorable deviation occurs in total of business direct cost, total of business indirect cost, Total revenues and other expenses, and operating loss before income tax. Results of the variance is known that there are deviations between budget and realization in 2012, namely: (1) Total revenue has favorable deviations; (2) unfavorable deviation occurs in total of business direct cost, and profit or loss of business before income tax; 3) favorable deviation occur in indirect cost of business, the cost, the amount of revenue and other expenses. Deviation of the most dominant in the operational budget of 2011 contained in variable of the business direct costs, namely cost of operation of transmission and distribution that have unfavorable deviation. In 2012 the most dominant irregularities contained in the same variable, maintenance cost of Water Treatment which has unfavorable deviation.

Key words**:** *deviation, management control, operating budgets*

INTRODUCTION

Every company organization needs a control, financial planning , and company budget. Control [9] is the process of measuring and evaluating the actual performance of each part of the organization of a company, and then implement corrective actions if necessary. Management control [1] is the process by which managers influence other members of the organization's strategies.

The main functions of management control [2] is a planning and control. Planning and control are the two things are inseparable. Planning look to the future, which was to determine the measures to be taken to realize certain goals. Controlling look to back, namely assess that has produced and compared with the plans that have been prepared.

Management to obtain certainty, whether the organization had been carrying out what has been set out in the planning, it is necessary to control the management, as the process of motivating and encouraging managers to implement the organization's activities in order to achieve the goals set [1].

Important component in the enterprise planning related to finance and budgets. Budget [3] is Budget be defined as a financial plan that serves as basic for expenditure decision making and subsequent control expenditures. Management control [4] is: Profit planning and control may be broadly as defined as systematic and formalized approach for accomplishing the planning, coordinating and control responsibility of management. The budget can be a tool of management control of the company, comprise [5] to evaluate (assess) on the implementation of the work, by the way: (1) Comparing the realization of the budget plan. (2) Perform corrective action when deemed necessary (if there are adverse deviation).

Grouping budget [6] among them the operating budget. The operational budget [9] is a business plan that covers all the main activities of enterprise in obtaining revenue within a certain period, aims to draw up the budget income [7]. The operational budget

includes [8]: (a) budget revenues, (b) cost budget, and (c) profit budget.

The operational budget is one of the tools for the management of a company to planning financial measures and decisive to policy in the future in a certain period.

This is in line with the budget PDAM Tirta Tuah Benua East Kutai, which is one important aspect to plan decisions to be taken by the management, so that in the event of a mistake or inaccuracies in planning or executing the budget may result in a decrease in the company's performance. Inaccuracy or the difference between the budget and realization can also occur in PDAM Tirta Tuah Benua East Kutai. Regional Water Company (It's call as PDAM) Tirta Benua East Kutai is a business entity (organization) owned by local governments that provide services and to organize public interest in the field of drinking water.

Since the formation to PDAM of the East Kutai Regency in 2001 and then it's changed name to PDAM Tirta Benua East Kutai, PDAM performance did not improve the performance and service PDAM even worse.

Since 2010, East Kutai Regency Government has committed to improving water service to the community. PDAM has reached 14 service areas where 3 Installation of Water Services in the cities area and 11 Installation of Water Services there is in rural areas.

This service improvement is not followed by the improved financial performance, it is seen from the realization of the financial statements below budgeted figures in 2011 and 2012.

Based on description above, the formulation of the problem is: (1) Is there an deviations of operating budget in actual operation; (2) Does the analysis of operational deviations can improve management control.

MATERIALS AND METHODS

Research conducted at PDAM Tirta Tuah Benua East Kutai located in Swarga Bara-Sengatta, East Kalimantan, Indonesian. The research focused on Projections of the Budget of Income company PDAM Tirta Tuah Benua East Kutai period 2011-2012. The main component of operating budget PDAM Tirta Tuah Benua East Kutai consists of (a) Operating Revenues; (b) Direct Cost of Business; (c) Indirect Costs of Business; (d) Other Costs; (e) profit (Loss) Business Gross; (f) Profit (Loss) Business; (g) Profit (Loss) Before Income Taxes.

Operational Budget study conducted to determine the cause of the deviation that occurred in the budget. This study uses analysis tools as follows:

Analysis of Variance

Analysis of variance was analysis of variance (difference) budget. It's used to determine the actual results of budgeted plan, namely by comparing costs and revenues are allocated to the realization [6].

Deviations between budget and realization consists of deviation favorable and deviation unfavorable. Determination of the deviation favorable (favorable) and adverse the deviation (unfavorable), there is a very significant difference between revenue and costs [7]. That are:

(a) The revenue aspect, if the budget is smaller than the realization then the deviations that occur is favorable. If the budget is greater than the realization of then the deviation unfavorable.

(b) The cost aspect, if the budget is smaller than the realization of then the deviation is unfavorable. Meanwhile, if the budget is greater than this deviation profitable realization or favorable.

The cause of deviation.

Budget variance analysis can show where the difference between actual results with previously set budget. So that can know the cause of the deviations that occurred, but the analysis of variance would have no meaning unless the variances are reported separately based on the factors and organizational units responsible so that deviations can be corrected.

RESULTS AND DISCUSSIONS

Results

This study was conducted on the operational budget income PDAM Tirta Tuah Benua East Kutai in 2011 and 2012. Some of the

categories on the profit and loss in the analysis of variance, namely revenue, direct cost of business, indirect costs of business, revenue and other expenses, profit and loss of gross, profit and loss of business, and profit and loss before income taxes.

(1) Revenue, consisting of water revenues, and non-water sales revenue. Non water sales revenue consists of revenue the new connection, openings back, late payment penalties, enforcement services of water meters and water revenue.

(2) Direct Costs of Business, consisting of the operating costs of water source, water source maintenance costs, the cost of raw water, depreciation costs of water sources, operating costs of water treatment, water treatment maintenance costs, depreciation costs of water treatment, operating costs of transmission and distribution, maintenance costs transmission and distribution, depreciation costs of transmission and distribution.

(3) Indirect Costs, comprised of personnel costs, office costs, the cost of the subscription relationship, research and development costs, financial costs, maintenance costs, and cost of allowance and removal, receivables, miscellaneous general expenses, and depreciation and amortization.

(4) Revenue and Cost Others

The following table shows a summary of variances between budget and actual operational of PDAM Tirta Tuah Benua East Kutai for 2011 and 2012.

Results Variance Budget of Operations PDAM Tirta Tuah Benua East Kutai in 2011.

The following table shows a summary of variances between budget and actual operational of PDAM Tirta Tuah Benua East Kutai for 2011.

1. Operating Revenues:

Operating revenues produces unfavorable variance showed -80.15%. Analysis of variance were performed on:

(1) The results of the analysis of variance in revenues water caused by the budget of water usage, number of customers, average usage per customer connection (SL) per month, and the average price of water is under the specified budget;

(2) Non-water sales revenues consist of revenues the new connection, openings back, late payment penalties, enforcement services of water meters and water revenue. Non water sales revenues have unfavorable deviation caused by the late payment fines adjusted. surveillance services, enforcement services of water meters, repair services and other revenues were realized less than budgeted.

Table 1. Results Variance Budget of Operations PDAM Tirta Tuah Benua East Kutai in 2011.

Description	Year 2011	
	Variance (%)	U/F
Total Operating Revenue	-80.15%	unfavorable
Total Direct Cost of Businesses	-30.77%	favorable
Total Indirect Cost of Businesses	-13.77%	favorable
Total Revenue and Cost Others	-10.96%	favorable
Profit (Loss) Business Gross	-131.90%	unfavorable
Profit (Loss) Business	-401.64%	favorable
Profit (Loss) Before Income Taxes	-263.41%	favorable

2. Direct Costs of Business:

Total direct cost of business produces favorable -30.77% deviation. Analysis of variance were performed on:

(1) The operating costs of water sources do not produces a deviation, because there is nothing in the budget but directly realize unfavorable expenditure; (2) Cost of Maintenance of Water Resources, has a favorable aberration due to the cost of electricity, the cost of chemicals is realized less than budgeted; (3) Cost of raw water do not produces favorable aberration because its budget is the result at the end of this month without doing it realization; (4) Depreciation costs of water sources produces unfavorable deviation; (5) The operating costs of water treatment produces favorable aberration caused miscellaneous of amortization expense and depreciation expenses are under budget; (6)Cost of maintenance of the water treatment produces unfavorable deviation. This deviation is caused by the water maintenance costs realized under the budget; (7) Depreciation costs of water treatment produces unfavorable deviation; (8) The operations cost of transmission and

distribution produces unfavorable deviations because it has the greatest deviation from the value of other components; (9) The cost of maintenance of transmission and distribution produces deviation favorable; (10) Depreciation costs of transmission and distribution produces deviation caused depreciation costs are under budget.

3. Indirect Costs of Business:

Indirect costs of business have favorable -13.77% deviation. Analysis of variance were performed on:

(1) Cost of employees, office fee, customer fee produces deviations favorable; (2) Research and development costs do not produces deviations because budget has been implemented without realized; (3) The cost of maintenance, and the cost of the allowance for receivables have favorable deviation; (4) Miscellaneous general costs have unfavorable deviation; (5) Depreciation and amortization does not have a presentation deviation, because the direct costs in the budget realized without beforehand.

4. Revenue and Cost Others:

Total revenues and other expenses have favorable -10.96% deviation. Analysis of variance were performed on:

(1) Total revenue outside the business have unfavorable deviation. This occurs because receipt of interest on deposits and interest checking services that factor into the preparation of other income is smaller than that in the budget; (2) Jumlah biaya di luar bisnis memiliki penyimpangan yang menguntungkan.

5. Profit (Loss) Before Income Taxes:

Income (loss) before income tax resulting from the calculation of total income, total expenses and business income. Analysis of variance is favorable.

Results Variance Budget of Operations PDAM Tirta Tuah Benua East Kutai in 2012.

The following table shows a summary of variances between budget and actual operational of PDAM Tirta Tuah Benua East Kutai for 2012.

1. Operating Revenues.

Total revenue produces favorable deviation 29.67%. Analysis of variance were performed on:

(1) The results of variance in water revenue produces favorable deviations that. Budget predetermined number has a smaller value than its realization; (2) The sales income of non water has favorable deviation, caused by supervisory services, enforcement services of water meters, repair services realized lebh larger than budgeted.

Table 2. Results Variance Budget of Operations PDAM Tirta Tuah Benua East Kutai in 2012

Description	Year 2012	
	Variance (%)	U/F
Total Operating Revenue	29.67%	favorable
Total Direct Cost of Businesses	21.97%	unfavorable
Total Indirect Cost of Businesses	-3.49%	favorable
Total Revenue and Cost Others	-27.45%	favorable
Profit (Loss) Business Gross	11.20%	unfavorable
Profit (Loss) Business	2.18%	favorable
Profit (Loss) Before Income Taxes	18.47%	unfavorable

2. Direct Costs of Business:

Total direct cost of business produces unfavorable deviation 21.97%. Analysis of variance were performed on:

(1) Costs of operating sources produces unfavorable deviation. This happens because the cost of electricity, the cost of chemicals is realized is greater than the budget; (2) Cost of Maintenance of Water Resources has a favorable deviation. This increase is due to the work cable networks that are not budgeted; (3) Cost of raw water do not produces favorable deviation. because the budget is not realized; (4) depreciation costs of water sources produces unfavorable deviation; (5) The cost of the water treatment operations produces unfavorable deviation, because research and development costs in excess of its budget; (6) Cost of maintenance of water treatment produces the greatest deviation among other irregularities namely unfavorable. This variance is caused the maintenance of water treatment realized over the budget; (7) depreciation costs of water treatment produces unfavorable deviation; (8) The operations cost of transmission and distribution produces unfavorable deviation;

(9) The cost of maintenance of transmission and distribution produces unfavorable deviation; (10) depreciation costs of transmission and distribution produces unfavorable deviation.

3. Indirect Costs of Business:

Total indirect costs of business have favorable -13.77% deviation. Analysis of variance were performed on:

(1)Cost of employee produces favorable deviation; (2) Cost of office produces favorable deviation; (3) Cost of customer relationship produces favorable deviation; (4) Costs of research and development produces unfavorable deviation: (5) The financial costs have favorable deviation; (6) Cost pemliharaan produces favorable deviation; (7) Cost of allowance receivables have favorable deviation. This happens because of the interest and principal that is not in the budget; (8)Other general costs have favorable deviation. This is due to miscellaneous general expenses were realized under budget; (9)Depreciation and amortization had a favorable deviation.

4. Revenue and Cost Others:

Total revenues and other expenses have favorable -27.45% deviation. Analysis of variance were performed on:

(1) Total revenue outside the business have unfavorable deviation. Deviations occurred in others income occurred because the interest rate on deposits and giro services can be factors others income component is smaller than the budget. Other revenues under the budget also caused by the sale of meter former and retribution fees decreased hygiene; (2) Total expenses outside the business have favorable deviation.

5. Profit (Loss) Before Income Taxes:

Income (loss) before income tax resulting from the calculation of total income, total expenses and profit (Loss) business. Deviations are favorable 18.47%.

2. Discussions

1) Results of Variance.

Based on the results of the variance in the operating budget and realization in PDAM Tirta Tuah Benua East Kutai in 2011 and 2012 can be seen in several managerial aspects, namely:

a. Operational budget by 2011.

After carried the variance is known that in 2011 occurred the many costs that exceed the budget, namely the cost of operating the water source, water source depreciation costs, maintenance costs of water treatment, water treatment depreciation costs, cost operations of transmission and distribution, depreciation costs of transmission and distribution, other general expenses, depreciation and amortization. These costs realized greater than budget. It becomes the task of the Human Resources (HR) and production because the cost exceeds the budget. On the part needs to be traced back the factors that cause costs exceed the budget, so as to the deviation of budget for next year does not recur difference and minimized.

Besides the cost incurred exceeds the budget, revenue the sales of water and revenue the sales of non-water has realized revenue under the budget so the difference is unfavorable. This is caused not achieving the target number of connections customer previously planned. Besides revenue outside the business are also under budget. Causes of realization are under budget is a task related parts in it, one of which is a part of marketing. The section should further improve its performance so that the number of a connection new customer and water usage is increasing. The increasing number of these resulted in water revenues increased.

b. Operational budget for 2012.

Results of variance was also carried on the budget in 2012. Once processed almost all of the cost exceeds the budget. These costs include the cost of operating the water source, water source depreciation costs, operating costs of water treatment, water treatment maintenance costs, depreciation costs of water treatment, Costs distribution of transmission and operation, maintenance costs of transmission and distribution, transmission and distribution of depreciation costs, costs of research and development. Besides the many unbudgeted expenses also resulted in increasingly large amount of costs to be incurred. Total cost greater than the budget would result in reduced profit margin in the previous year.

Great cost incurred are the responsibility of the parts related to the cost of the part. On that section should be examined again needs costs, because if expenditure is too large can result in disadvantages the company. Therefore, the related parts must make efficient the cost needed.

2) The cause of Deviations.

All the variables above, the deviation of the most dominant in the operational budget of 2011 contained in the variable of direct costs of business, namely Costs distribution of operation and transmission that have unfavorable deviation 971.01%. Whereas in 2012 the most dominant deviation contained in the same variable, but with different costs, namely costs Maintenance Wastewater who has unfavorable deviation 145.08%. Deviations were dominated was presented as the main culprit in every operating budget period. For that it is the duty of management control to address the causes of deviation of the most dominant in each period operating budget PDAM Tirta Tuah Benua East Kutai.

CONCLUSIONS

Based on the results and the discussion concluded, that:

(1) The results of the variance is known that there are deviations between budget and actual of PDAM Tirta Tuah Benua East Kutai in 2011 namely total revenues has unfavorable deviation. In the total direct cost of business deviations favorable with percentages. Indirect costs of business has deviations favorable. Similarly, the amount of revenue and other expenses has deviations favorable, while profit (loss) of business before income tax generated in the analysis of variance has favorable deviation.

(2) The results of variance is known that deviations between budget and actual of PDAM Tirta Tuah Benua East Kutai in 2012 namely total revenue has favorable deviation. In the total direct cost of business has deviations unfavorable. Indirect costs of business has deviations favorable. Similarly, the amount of revenue and other expenses has deviations favorable. Profit (loss) before income tax operating has deviation unfavorable variance.

(3) Deviations of the most dominant in the operational budget of 2011 contained in the variable of direct costs of business, namely costs distribution of operation and transmission that have unfavorable deviation. In 2012 the most dominant deviation contained in the same variable, but with different costs, namely costs Maintenance Wastewater who has unfavorable deviation. Deviations were dominated was the main culprit in every operating budget period. For that it is the duty of management control to address the causes of deviation of the most dominant in each period operating budget PDAM Tirta Tuah Benua East Kutai.

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MAJOR DEVELOPMENTS OF ROMANIA'S AGRICULTURAL SECTOR WITHIN EU27 – COMPARISONS POST-ACCESSION

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Abstract

The paper aims to present the evolution of main sectoral indicators of Romania's agriculture in the context of European Union enlarged to 27 countries. There have been analysed the sizes and trends of the basic agricultural resources including land, livestock and labour force, as well as the synthetic indicators related to the output. The research was based on the statistical data provided by Eurostat. The results emphasize that Romania ranks among the forefront states regarding the utilized agricultural area, as well as having the largest number of employees in the primary sector. The share of Romania's primary sector in the gross value added, although four time greater than the EU average, had a downward trend, recording a minimum of 6.4% in 2013. Romania's agricultural trade balance gathered a deficit of -8 billion Euros in the post-accession period; however, a net export performance was merely achieved in 2013. In conclusion, Romania's agricultural labour productivity was placed in a modest position by the gaps comparing to the majority of member states, that drew attention to the necessary improvements of the performances and to narrowing the disparities.

Key words**:** *agriculture, EU27, output, Romania, sectoral indicators*

INTRODUCTION

In Romania, alike in all Member States, agricultural and food production are core social and economical elements of the rural European Union (EU).
Within this context, the research has been focused on assessments of the agricultural sector state prior to Common Agricultural Policy (CAP) embarked on a new reform stage post-2013.
The new political framework envisaged an effective and adapted reform able to meet the future challenges more efficiently, for a more competitive and sustainable agriculture [1].
The main objectives of development of rural areas, of:
- ensuring a decent standard of living for farmers,
- providing stable and safe food supply at reasonable prices for consumers;
continue to be followed while focussing on the sustainable management of resources.
The present article provides analysis on several indictors related to these objectives.

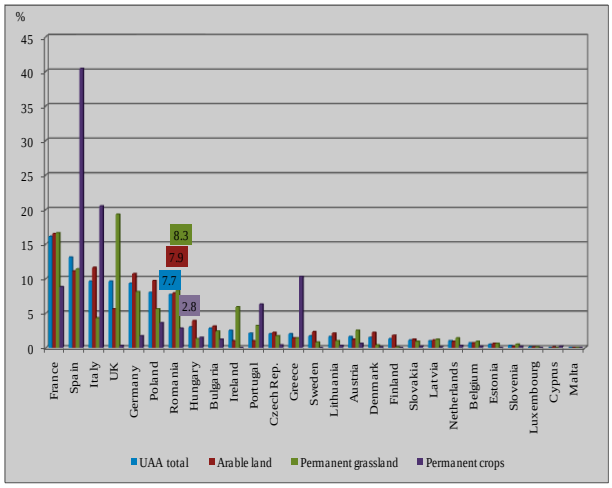
MATERIALS AND METHODS

The research was based on statistical and comparative analysis methods that used structural sectoral indicators related to the performance within EU of Romania's agriculture post-accession: production resources, i.e. utilized agricultural area (UAA), livestock units (LSU), labour input, and macroeconomic indicators, i.e. gross value added (GVA) in the primary sector, the agricultural output and agri-food foreign trade flows [5].
The statistical information has been used from the online database Eurostat, while for Romania's data on agricultural trade provided by the National Institute of Statistics.

RESULTS AND DISCUSSIONS

The contribution of the primary sector of the Romanian economy, including agriculture & forestry& fisheries, in gross value added (GVA), has had a downward trend, falling from 12% in early 2000 to 6.7% in 2010 [4] and 6.4% in 2013 when reached a minimum historical value.

The share of agricultural sector remains, however, almost 4 times higher than the European average EU-27of 1.7% [5].
Romania benefits from a noteworthy part of resources for agricultural activity, representing, as shares in EU-27, 32% of the agricultural holdings, 7.7% of the utilized agricultural area (UAA), 4% of the livestock units and 16.5% of the full-time equivalent labour input employed in agriculture, expressed by annual work units (AWU) [5].
It strikes also the least standard output per farm, of 3000 EUR/farm, while the EU27 average of 63000 EUR/farm, according to the 2010 Agricultural census [2].
Based on the census, certain disparities in the land structure of the EU has been indicated by half of holdings of small sizes, less than 2 ha, numbering 6 million farms, that worked 2.5% of the total UAA, while large farms, over 100 hectares in sizes, shared 2.7 % of all holdings, farmed half of the total EU land.
According to the average farm size, EU countries roughly comprise 3 categories, i.e. 8 countries with predominant small farms, with sizes ≤ 10 ha, including Romania.
10 countries with large farms sizes, over the EU average of 34.4 ha; and 9 countries with farm sizes between 11 and 32 ha per farm.
Almost 3.9 million of total EU's agricultural holdings, or one third share in EU27, belong to Romania, of which three quarters are of small sizes < 2 ha, while one in four in Italy, sharing 13.2 %, or Poland, 12.3 %.
Among the main countries with predominant small farms are included as well Italy, with 10.7 ha per farm, Poland, 9.6 ha per farm, and Hungary with 9.3 ha per farm, followed by Greece, with an average size of 5 ha per farm or Slovenia with 6.4 ha per farm.
Romania, with 2.7 million people, and Poland, with 1.8 million people, own the largest number of employees in the primary sector, accounting for almost half, of total EU employment in the primary sector in 2013 (49%); however was observed a decreasing trend during 2007-2012.
The highest shares of employment in the primary sector in the EU, have been registered in Romania, followed by Bulgaria, Poland, Greece and Portugal, respectively, from 30% in Romania to 10.5% in Portugal.
In contrast, the lowest rates ≤1.5% have been in Luxembourg, Belgium, United Kingdom and Germany.
By the land structure, Romania had a front position in EU's share of the UAA, with 8.3% of the permanent grassland, enhancing the country's potential for grazing (Fig. 1).
In the same time, Romania ranked the sixth in 2013, after France, Spain, Italy, Germany and Poland, sharing 7.9% in the arable area of EU27.



Source: [5].
Fig. 1. Structure of UAA in EU-27 by Member States (2013)

The assessments indicate for the time period 2001-2013 that Romania's agriculture shared 4% in the average GVA of EU27 agriculture, favoured by the increasing share in the EU-27 of the value of crop production, from 3.9%, in 2001, to 5.7%, produced in 2012, while the share of the animal production value decreased, from 2.7% to 2.3% [5].
Romania's contribution to the total agricultural output in the EU-27, in 2013, was of 3% in crop production, respectively, of 1% in animal production.
The GVA accounting for 7.9 million EUR in 2013, placed Romania, after France, Italy, Spain, Germany, Poland, UK and Netherlands, among the top ten member states.
However, the labour productivity of the sector rest reduced in 2013, of 5,000 EUR per AWU.

Table 1. Structural indicators of agriculture in EU-27, by Member States

	No. of farms	UAA	Livestock units	Labour force
	1000	mil. ha	1000 LSU	1000 AWU
EU-27, total	12,015	180.3	134,192	9,761
Belgium	43	1.3	3,799	62
Bulgaria	370	5.0	1,149	407
Czech Rep.	23	3.5	1,722	108
Denmark	42	2.7	4,919	52
Germany	299	16.7	17,793	546
Estonia	20	1.0	306	25
Ireland	140	4.5	5,787	165
Greece	723	3.7	2,407	430
Spain	990	23.6	14,831	889
France	516	29.0	22,674	780
Italy	1,621	17.3	9,912	954
Cyprus	39	0.1	201	19
Latvia	83	1.9	475	85
Lithuania	200	2.9	900	147
Luxembourg	2	0.1	168	4
Hungary	577	5.3	2,484	423
Malta	13	0.0	42	5
Netherlands	72	1.8	6,712	162
Austria	150	2.9	2,517	114
Poland	1,507	14.4	10,377	1897
Portugal	305	3.7	2,206	363
Romania	3,859	13.9	5,444	1610
Slovenia	75	0.5	518	77
Slovakia	24	1.9	668	56
Finland	64	2.3	1,121	60
Sweden	71	3.0	1,752	57
UK	187	17.3	13,308	266

Source: Processing on Eurostat, from Agric. Census 2010.

The main divergent gaps between Romania and the level of development of the agricultural sector in the greatest part of member states were underlined by the major input of Romania's agriculture in EU's economy and by its share in agricultural employment.

During the analysed time period, the trade flows have a tendency to increase, especially the export value. It is noted in the post-accession small contributions have recorded in total amounts of EU-27, both regarding the share of exports, of 0.8% and those of agri-food imports, of 1%.

In 2013, the market share of Romanian exports to the EU recorded 1.2%, the highest value of the post-accession period.

Concerning the agri-food trade, during the period 2001-2013, Romania's total agri-food trade cumulated 65 billion EUR, of which 23% deficit; exports increased 11 times, while imports grew 4 times.

Romania's agricultural trade balance have had significant deficits, of -1.1 billion EUR, on average, in the period 2001-2006, then widened to -1.4 billion EUR in 2007-2013 while developing with a balancing tendency [6]. Romanian agri-food trade registered a positive balance of 343 million Euro, in the year 2013, the, an unique performance achieved in the last quarter century.

CONCLUSIONS

The research identified that the gaps between Romanian agricultural sector and the EU Member States alert for medium and long term necessity of improvement the internal productivity and efficiency able to enhance the external competitiveness.

Diversification of rural economic activities request an injection of local investments and wider range of jobs created in the upstream and downstream of agriculture.

In addition to these efforts together with innovation and modernization of agriculture techniques, affordable for individual farms, converge to enhancing their capacity of absorbing the financial support provided within CAP framework and more focused on market and economic development.

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EFFICIENCY OF RESOURCES UTILIZATION IN THE SUSTAINABLE DEVELOPMENT OF RURAL ENTREPRENEURSHIP

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Abstract

The paper makes an analysis of the economic and social resources involved in the rural entrepreneurship development in Romania. The methodology used is based on the analysis and synthesis of information on the social and economic coordinates of the rural entrepreneurship development. The statistical data were completed with information from articles and studies published in specialty journals as well as in Government's documents. The results allow us to conclude that the natural resources, the social capital, the rural governance and the business development have a direct influence upon entrepreneurship development in the countryside.

Key words**:** *entrepreneurship , resources, rural development*

INTRODUCTION

The entrepreneurship concept represents an initiative, a work-related attitude of an individual or of a human community, which is going to be manifested in a certain place, at a certain moment and in certain conditions, in order to maximize the profit of their activities, on short term and to focus on investments, on long term. In the modern sense of the market economy, an entrepreneur is an economic operator who mainly adopts an active and innovatory behaviour and deliberately accepts financial risks in order to develop new projects. [5]

At present, the entrepreneurship promotion and development represents one of the main directions of Europe 2020. This strategy represents a solution to the recent slowdown of the economic growth in several Member States of the European Union (EU) and intends to create more jobs and to ensure better living conditions for the population in the years to come. [4]

For the rural area, the support and consolidation of entrepreneurship and innovation represent one of the most important methods of approaching the economic issues in the rural communities, materialized under the organizational-juridical form of the small and medium-sized enterprises (SMEs).

One of the principles that lie at the basis of the rural development policy is the principle referring to the multisectoral and integrated approach to the rural economy, in the sense of *diversification of economic activities*, of creating *additional income and employment sources*, as well as of preserving the rural heritage. [8]

In order to counteract the depopulation process of the agricultural areas and to strengthen the economic and social substance of the countryside, one of the rural development policy goals of the European Union, defined in the Council Regulation no. 1257 of May 17 1999, on the community support to rural development, targets to *the development of certain complementary and alternative job creating activities.* [3]

Thus, the development of SMEs in handicraft and in the sector of services (telecommunications, research, management, technical assistance, etc.) in the countryside provide new great opportunities for development.

The complementary activities that can be practiced in the rural areas are extremely numerous. When they get expanded by putting into value the local natural resources, the action is even better. In any case, these activities are practiced on a larger scale in the

developed agricultural areas, compared to those areas where agriculture is less developed. The industrial activities and services require specific infrastructure and skills, for which, in general, farmers are less trained and prepared. [1]
In this context, in which the developed states show an increasingly great interest in the positive role that the rural entrepreneurship can play in their economies, the present paper attempts an analysis of the economic and social resources involved in the rural entrepreneurship development in Romania.

MATERIALS AND METHODS

The research study starts from the premise that the natural and human resources specific to the Romanian rural space are not fully and adequately put into value, and the development of the small and medium-sized enterprises represents a significant source for obtaining incomes and for the promotion of entrepreneurial skills, innovation and job creation.
The methodological approach includes the identification of the "territorial socio-economic capital" of the rural settlements by association with the other resources that can support the concrete approaches for the implementation of the strategic objectives proposed for modeling the future of the rural community as integrating part of the sustainable development policy.
The utilized research methods are the stocktaking of the utilizable resources for the sustainable development of the rural entrepreneurship and the cause-and-effect explanation of the investigated phenomenon.
The analysis is based on data and information obtained through bibliographical and field documentation.
For the researcher of the contemporary rural phenomena, the investigation of the relations that exist between the environmental and social factors, at local level, makes it possible to delimit the necessary mechanisms for the sustainable development of the non-agricultural activities, which can contribute to the increase of the number of jobs and alternative incomes, as well as to the increase of rural area attractiveness.

RESULTS AND DISCUSSIONS

In Romania, the rural areas cover 87.1% of the territory and include 45.1% of the population. The active population accounts for 46.3% of the rural dwellers and can sustain rural economic growth if adequate incentives become available. [8]
The human capital characteristics and their evolutions in time have a decisive impact on the rural population's access and participation to the labour market (Table 1).

Table 1. Rural population characteristics

Year	Active population thousand persons		Employed population thousand persons		Unemployment thousand persons - by ILO* -	
	total	rural	total	rural	total	rural
2010	9,965	4,427	9,240	4,208	725	219
2011	9,868	4,305	9,138	4,066	730	239
2012	9,964	4,411	9,263	4,185	701	226
2013	9,977	4,425	9,247	4189	730	236
2014	9,277	4,165	8,614	3,945	629	220

* International Labour Office
Source: Romanian Statistical Yearbook, 2010-2014 data series, NIS

Even though the migration of the rural population to towns has been a consistent phenomenon, which will continue in the years to come, the rural population was and probably will remain significantly numerous in the next decades as well.
Taking into account the relief forms, the climate and the hydrographical network, we can consider that in Romania, land is favorable for farming. In the rural area, agriculture, forestry and fisheries are the main occupations for the greatest part of its inhabitants.
Across regions, significant disparities can be noticed with regard to the rural population's occupational structure (Fig. 1), which reflect the structure of regional rural economies as well as the population's dependence on the agricultural resources. [6]
The lack of non-agricultural occupational opportunities in the rural areas was perpetuated and it maintained the dependence of the rural population on agriculture and on small farm production. Out of this reason, the

concentration in agricultural land use runs slowly, with negative consequences upon the productivity of the primary sector of national economy. [10]

This situation explains the need for creating new jobs, alternative ones, in the rural area, especially for the orientation of the small farmers or of the family members to non-agricultural sectors.

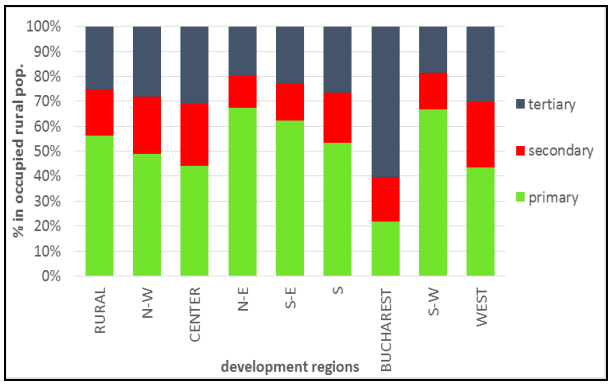

Fig. 1. Regional structure of rural employment by activity sectors, in 2011

The diversification of the non-agricultural utilization of the available natural and human capital in the rural area is sporadically present, mainly in the localities located in the proximity of towns. The enterprises are facing great difficulties in the access to finance from the banking sector, mainly due to the lack of necessary collaterals and to the entrepreneurs' weak managerial capacity.

The entrepreneurship is weakly developed, being characterized by the lack of basic managerial knowledge and skills, resulting in a low productivity level.

These problems are aggravated by many small entrepreneurs being reluctant in the relation to the banks and by the fact that most often the value of the collaterals they can offer is limited by the low value of properties in the countryside. [2]

The low rate of the entrepreneurial activity from the rural area has several causes. Here are some of them:

-Lack of the entrepreneurial education in the Romanian society before 1990;

-Unfavourable business environment in the transition period of the 1990s;

-Population's orientation towards stable jobs, in large firms, in the period of economic growth of the first years after 2000.

In this context, the rural entrepreneurship:

-Is mobilizing the resources to meet the unsatisfied demand of the market;

-Has the ability to create or build something out of nothing;

-Is the process by which value is created from the realization of a single package of resources in order to use an opportunity.

The diversification of the available non-agricultural resources by entrepreneurial combinations has taken different forms, from tourism, supply of conditions for sports and leisure or for training up to activities such as small trade, industrial applications (ceramics etc.), consultancy services, adding value to products (meat, milk, wood products). The recent approaches focus on new land utilizations that make it possible to lower the intensity of the agricultural production, such as organic production.

The investments for increasing farm competitiveness and also on the agro-processing units contribute to capital improvement and the re-orientation of the labour force from the rural area towards local non-agricultural activities in the field of production and services.

The promotion of non-agricultural activities in the rural area and the diversification of the activities by acquiring new entrepreneurial skills, new abilities and supply of new services for the rural population are the main factors that contribute to the economic growth and implicitly to the change of mentality and to the increase of the living standard in the rural area, as well as to the stability of the territorial, social and economic equilibrium.

According to the Horizon 2014-2020 Program launched by the EU, steps will be taken to strengthen the agriculture and rural development by an important financial support allocated to knowledge transfer, modernization of the small and semi-subsistence farms, young and women farmers training, increase of profitableness and competitiveness, and to assure the sustainable development of the rural areas. [9]

The promotion of entrepreneurial initiatives in the rural area starts from the need to diversify the rural economy. In general, no rural

development program can be designed without agriculture having an essential role; yet the rural economy is more developed and more dynamic if it has a more diverse structure and the non-agricultural economy has a higher share in the countryside. The non-agricultural activities regard the extractive and processing industry, food and light industry, wood and forest products harvesting and processing, cottage industry, agro-tourism activities and services.

CONCLUSIONS

At present, in Romania, the economic function of the rural space is considered as the basic, primary function, whose main pillar is agriculture.

The rural human resources live their own history, generated by the endogenous demographic processes of the rural area and by the vulnerability of local rural economies.

The rural employment rate declined because of the lack of job opportunities in both rural and urban areas.

The rural economy features significant differences depending on the country's regions and the specific demographic, social and economic characteristics. This differentiation is noticeable mainly with regard to the low level of incomes in rural Romania, as reflected by the low living standard and by the lack of alternative income sources.

This situation explains the need for the creation of alternative jobs, mainly through the orientation of the small farmer or the family members towards non-agricultural production activities and the development of services in the rural area.

The presence of non-agricultural activities, linked to the primary sector and mainly to the natural resources exploitation and their processing are quite insignificant in economic terms.

The small-scale business development is known as the most important source of jobs/ incomes in the rural area, both for the already developed economies and for the developing economies.

The analysis of the business environment in the rural area reveals its low capacity to meet the need for supplying jobs for the rural population. In most rural communities, the entrepreneurial initiatives are weakly represented. This situation severely constrains the development capacity of the rural areas according to the existing potential.

In an attractive socio-economic context, the creation and promotion of entrepreneurial initiatives addressed to the young people and women put into operation a viable mechanism for the rural community development.

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STUDY ON POTATO MARKET IN ROMANIA

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Abstract

This paper presents the evolution of potato market in Romania during 2010-2014 period of time. In order to realize a study to highlight essential aspects of this market, there were analysed certain indicators, as following: the area cultivated with potatoes; average production per hectare, potatoes consumption and so on. Statistical data used in this study were taken from the National Institute of Statistics. The research of potato market in Romania is mainly, a quantitative analysis, aiming at the fluctuations recorded from a period to another. The amendments in this market were determined by: the quality of seed potatoes used by farmers; domestic production realized in strong correlation with weather conditions and massive potatoes imports in this period. National potato market has a particular importance because Romanian people are great consumers. In accordance with official statistical data, Romania is on the 4th place regarding human potatoes consumption.

Key words**:** *average consumption per capita, market, potatoes, total potatoes production, Romania*

INTRODUCTION

The potato, due to the highly content of carbohydrates, vitamins, microelements and essential acids, is an almost complete element. It is considered a dietetic food of high digestibility.

For this reason, potato consumption is increased in strongly industrialized countries such as: the USA, France, Germany, United Kingdom of Great Britain and Northern Ireland, Japan and so on. [10]

Potatoes have a particular importance because they are being used for human consumption, animal feed and industry.

In Romania, potato market is the fourth one according to the value of vegetal farming after: corn market, vegetables and fruits one and grain one.

In Romania, due to favourable pedo-climatic factors and to the less intensive cultivation system, potatoes along with other vegetables, have the advantage of being tasty.

This aspect offers a great advantage to domestic producers, especially for those who aim to produce for export. [2]

Nowadays, major potatoes producers work almost 200 hectares, but the value of production is not bigger than 1.5 million Euros/year. [14] An essential factor that influences the level of production, as well as the profitability one is represented by the seed potato. For this reason, in order to obtain a profitable potato production, farmers must annual purchase certified seed potatoes. [10]

MATERIALS AND METHODS

In order to realize the present study, there were processed and used data given by the National Institute of Statistics. There were also consulted various speciality materials chartered by the official site of the National Potato Federation in Romania, as well as other references in domain. The analysis of potato market in Romania was based on a series of relevant indicators, such as: area cultivated with potatoes; potatoes production both at total level and by categories; average potatoes production per hectare; basic and purchasing price and so on.

RESULTS AND DISCUSSIONS

The area attracted into culture represents an important element, influencing the quantity of

potatoes obtained by producers in Romania. In table no.1 is being presented an evolution of the area cultivated with potatoes, nationwide and at Macro-Regional level. One may easily observe that from 2010 to 2014, the cultivated surface registered variations. In 2014, only 198,540 hectares were cultivated with potatoes, representing a decrease in comparison with 2010 (241,349 hectares). At Macro-Regional level, in 2014 the largest cultivated area was into the 1st Macro-Region (89,985 hectares). The areas cultivated with potatoes recorded decreases due to high expenditures of establishment of a hectare of potatoes (Lei 25,000-30,000) and adverse weather conditions. [8] Potato culture is a pretentious one and requires big efforts, especially for small producers. Big producers recorded more reduced expenditures, making investments in sorting and packaging stations. [7]According to official data, in Romania there is a reduced interest regarding the areas with seed lots. This situations has been driven by the lack of irrigation system. [8]

Table 1. The evolution of potatoes cultivated area, nationwide and at Macro-Regional level (ha)

Specification	2010	2011	2012	2013	2014	2014/2010 (%)
Romania	Potatoes– total					
	241,349	242,636	223,517	203,424	198,540	82.2
Macroregion one	103,778	111,160	98,891	88,265	89,985	86.7
Macroregion two	67,561	65,920	63,717	60,545	58,500	86.5
Macroregion three	21,313	20,925	19,998	20,411	18,123	85.0
Macroregion four	48,697	44,631	40,911	34,203	31,932	65.5
Romania	Early, early mid and summer potatoes					
	30,338	29,787	28,462	28,632	27,984	92.2
Macroregion one	3,226	2,950	2,975	3,750	3,457	107.1
Macroregion two	6,340	6,321	5,335	6,317	6,194	97.6
Macroregion three	10,414	10,653	10,673	11,396	9,994	95.9
Macroregion four	10,358	9,863	9,479	71,69	8,339	80.5
Romania	Autumn potatoes					
	211,011	212,849	195,055	174,792	170,556	80.8
Macroregion one	100,552	108,210	95,916	84,515	86,528	86.0
Macroregion two	61,221	59,599	58,382	54,228	52,306	85.4
Macroregion three	10,899	10,272	9,325	9,015	8,129	74.5
Macroregion four	38,339	34,768	31,432	27,034	23,593	61.3

Source: [9]; own calculations

Nationwide potatoes production is a key component for the market because the demand for this product is large, Romanian people being big consumers. The production depends mainly on potato seed quality and *Phytophthora infestans* attack.

In table no. 2 one may find the evolution of potatoes production, nationwide and at Macro-Regional level, during 2010-2014. The biggest potatoes production recorded in the analyzed period was in 2011 (4,076,570 tonnes). In 2014 there was recorded an increase of potatoes total production of 7.1% than in 2010. This was possible because of favourable weather conditions. [4] For "Early, early mid and summer potatoes" category, one may observe an increase at national level in 2014 (+4.6%) than in the reference year, 2010. The most significant increase for this category was recorded in the 1st Macro-Region in 2014 in comparison with 2010 (+32.8 %). Concerning the "Autumn potatoes" category, there was an increase from 2,871,583 tonnes (in 2010) to 3,088,000 tonnes (in 2014). As to the production, Romania is situated on the 4th place within the European Union. However, our country is positioned far away from Germany, Holland and Poland in quantitative terms. [14]

Table 2. The evolution of potatoes production nationwide and at Macro-Regional level (tonnes)

Specification	2010	2011	2012	2013	2014	2014/2010 (%)
Romania	Potatoes– total					
	3,283,866	4,076,570	2,465,150	3,289,722	3,519,329	107.1
Macroregion one	1,451,768	1,954,093	1,002,572	1,524,622	1,749,311	120.4
Macroregion two	860,559	1,145,204	702,703	947,558	1,009,641	117.3
Macroregion three	341,077	356,656	286,363	349,144	312,577	91.6
Macroregion four	630,462	620,617	473,512	468,398	447,800	71.0
Romania	Early, early mid and summer potatoes					
	412,283	437,779	356,760	410,546	431,329	104.6
Macroregion one	38,313	46,431	38,637	54,043	50,890	132.8
Macroregion two	68,541	85,447	51,344	72,114	76,095	111.0
Macroregion three	184,016	183,093	163,301	201,931	193,365	105.0
Macroregion four	121,413	122,808	103,478	82,458	110,979	91.4
Romania	Autumn potatoes					
	2,871,583	3,638,791	2,108,390	2,879,176	3,088,000	107.5
Macroregion one	1,413,455	1,907,662	963,935	1,470,579	1,698,421	120.1
Macroregion two	792,018	1,059,757	651,359	875,444	933,546	117.8
Macroregion three	157,061	173,563	123,062	147,213	119,212	75.9
Macroregion four	509,049	497,809	370,034	385,940	336,821	66.1

Source: [9]; own calculations

In table, it is presented the evolution of average production at national and Macro-Regional level. In 2014, one may observe an increase of average potatoes production per hectares with 31.2% than in 2010. Regarding the Macro-Regions situations, the 1st one recorded the biggest average production per hectare, in 2014 (19,363 Kg/ha) all over the analyzed period.

Table 3. The evolution of potatoes average production per hectare at national and Macro-Regional level (kg/ha)

Specification	2010	2011	2012	2013	2014	2014/2010 (%)
	Potatoes– total					
Romania	13,354	16,554	10,777	15,953	17,527	131.2
Macroregion one	13,893	17,502	10,056	17,185	19,363	139.3
Macroregion two	12,426	17,056	10,722	15,333	16,971	136.5
Macroregion three	15,051	16,049	13,306	16,570	16,706	110.9
Macroregion four	12,753	13,689	11,369	13,506	13,837	108.4
	Early, early mid and summer potatoes					
Romania	13,160	14,275	12,136	14,239	15,328	116.4
Macroregion one	11,559	15,384	12,654	14,207	14,588	126.2
Macroregion two	10,496	13,298	9,372	11,211	12,060	114.9
Macroregion three	16,829	16,368	14,492	17,663	19,303	114.7
Macroregion four	11,601	12,309	10,878	11,480	13,297	114.6
	Autumn potatoes					
Romania	13,382	16,873	10,579	16,234	17,888	133.6
Macroregion one	13,967	17,560	9,976	17,317	19,554	140.0
Macroregion two	12,626	17,455	10,845	15,813	17,553	139.0
Macroregion three	13,352	15,718	11,949	15,189	13,513	101.2
Macroregion four	13,064	14,081	11,516	14,043	14,028	107.3

Source: [9]; own calculations

On the opposite, the smallest average production per hectare was obtained in the 2nd Macro-Region in 2012 (10,056 Kg/ha). According to official statistics, in 2012 there was recorded the smallest average production in the last 20 years. [11]

In table 4 there is presented the evolution of potatoes basic price in Romania, from 2010 to 2013. The basic price registered fluctuation a period to another. The highest price was recorded in 2013 (Lei 1,750 /tonne), and the lowest one was in 2012 (Lei 1,250/tonne).
For farmers is also very important the potato production cost. In 2014, producer's price was Lei 0.4 per kg, being very similar to the cost one. Nowadays, due to it, some of the farmers in our country gave up to the seed import from other countries, using domestic one. This aspect has contributed to a decrease of seed acquisition costs and smaller farmers had the possibility to buy seed at a more reasonable price. [4]

Table 4. The evolution of potatoes basic price at national level, during 2010-2013

Specification	UM	2010	2011	2012	2013	2013/2010 (%)
Potatoes, including seed ones	Lei/tona	1,361	1,640	1,250	1,750	107.2

Source: [9]; own calculations

Potatoes average purchasing price is influenced by a series of factors as following: inner production, domestic consumption demand, external consumption demand and imported quantities. In table no. 5 is being presented the evolution of potatoes average purchasing price, nationwide and by development regions. It is noticed a fluctuation of potatoes price: from year to year; one region to another and one season to another.

Table 5.The evolution of potatoes average purchasing price, nationwide and by development regions (Lei/Kg)

Specification	2010	2011	2012	2013	2014
	Early, early mid and summer potatoes				
Romania	1.17	1.07	0.78	1.14	0.86
North-West Region	-	1.51	0.61	1.28	0.66
Center Region	-	-	-	-	1.05
North-East Region	1.18	1.16	0.74	1.45	1.14
South-West Oltenia Region	1.18		1.01	1.43	1.22
	Autumn potatoes				
Romania	1.01	1.31	0.62	0.9	0.74
North-West Region	-	1.36	0.48	0.54	0.54
Center Region	-	-	-	-	0.73
North-East Region	0.96	1.27	0.6	1.1	1.05
South-West Oltenia Region	1.16	1.53	1.17	1.62	1.43

Source: [9]; own calculations

In winter, potatoes price increases and it is influenced by the growth of export demand. A relevant example is represented by the situation recorded in December, 2012, when producer prices doubled compared with November. This issue was determined by a higher demand from countries such as Germany, Slovakia, Austria and Hungary.
They realized small potatoes productions because of floods in 2012 and in order to cover the necessary of consumption, they resorted to massive imports. [13] During the analyzed period, nationwide there was registered a decrease from 1.17 RON/kg (in 2010) to 0.86 RON/Kg (in 2014), for "Early, early mid and summer potatoes" category. For "autumn potatoes" category, one may observe a decrease of average purchasing price in 2014 (0.74 RON/Kg) than in 2010 (1.01 RON/Kg). At regional level the smallest price recorded in 2014 was in North-West Region (0.66 RON/kg) for "Early, early mid and summer potatoes" category. In table 6 is presented the evolution of annual average potatoes consumption and production per capita in Romania. During 2010-2013 period of time there was recorded constant potatoes consumption. This high level led to

Romania's placement among the largest potatoes consumers. [12] At the European Union's level, our country is placed on the 4th position in this ranking after: Portugal (126.9 kg/capita/year), Ireland (118.7 kg/capita/year) and Great Britain (112.4 kg/capita/year). [5] The highest consumption per capita was recorded in 2012 (104.7 Kg), while the smallest one was in 2013 (103.0 Kg). Concerning the potatoes production/capita one may observe that the biggest production was obtained in 2011 (202.3 Kg) and the smallest one, in 2012 (122.9 Kg). [3] A very important aspect is that Romania produces potatoes both for ensuring inner consumption and covering a part of external demand. [1]

Table 6. The evolution of annual potatoes consumption and production per capita at national level

Specification	UM	2010	2011	2012	2013	2013/2010 (%)
Romania	Average annual consumption per capita					
	Kg	103.9	103.3	104.7	103.0	99.9
	potatoes production per capita					
	Kg	162.2	202.3	122.9	164.6	101.4

Source: [9]; own calculations

Table 7 presents a dynamics of monthly average monetary costs per person for potatoes acquisition, both at national and Macro-Regional level. In accordance with official statistics, in 2014, monthly average expenditures per person for potatoes purchasing were 3.5 RON, with 2.9% higher than the ones in 2010. At Macro-Regional level, one may notice that the greatest costs were recorded in the 3rd Macro-Region (5.1 RON) in 2011. The lowest costs were noticed in the 1st Macro-Region (1.9 RON) in 2012.

Table 7.The evolution of potatoes acquisition costs at national and Macro-Regional level (monthly averages/person)

Specification	2010	2011	2012	2013	2014	2014/2010 (%)
Romania	3.4	4.1	2.9	4.1	3.5	102.9
Macroregion one	2.1	2.8	1.9	2.7	2.4	114.2
Macroregion two	3.5	4.2	2,.9	4.1	3.4	97.1
Macroregion three	4.4	5.1	3.8	5.3	4.5	102.2
Macroregion four	3.4	4.4	2.9	3.7	3.4	100

Source: [9]; own calculations

The evolution of potatoes economic accounts in agriculture are being presented in table 8. The value at potatoes producer's price registered significant fluctuations a period to another. It increased in 2010 with 16% compared with 2010. An issue that has a negative influence onto the potatoes sector in Romania is represented by the lack of subsidies on products, starting with 2011.

On the opposite, the smallest average production per hectare was obtained in the 2nd Macro-Region in 2012 (10,056 Kg/ha).

Concerning the export, in 2013 only 11.955 tonnes took the path of foreign markets. [11] During the analyzed period of time, there was noticed an increase of exports when potatoes productions obtained in the Community countries were strongly affected by adverse weather conditions.

Concerning the export, in 2013 only 11,955 tonnes took the path of foreign markets. [11] During the analyzed period of time, there was noticed an increase of exports when potatoes productions obtained in the Community countries were strongly affected by adverse weather conditions.

In order to rise the exported potatoes quantity, certain producers are focused on cultivating sweet potatoes. This category of potatoes are similar to sugar beet and are consumed in big quantities in South Korea.

Table 8. Economic accounts in agriculture at national level during 2010-2014

Specification	2010	2011	2012	2013	2014
Potatoes, including seed ones	2. Economic Accounts for Agriculture (current prices – Lei millions)				
Value to producer's price	4,358.67	6,598.61	3,025.29	5,693.87	5,057.57
Subventions for products	3.69	-	-	-	-
Value to base price	4,362.35	6,598.61	3,025.29	5,693.87	5,057.57
	3. Economic Accounts for Agriculture (prices of previous year- Lei millions)				
Value to producer's price	3,909.98	5,472.02	3,969.17	4,067.05	5,900.5
Subventions for products	3.01	4.63	-	-	-
Value to base price	3,913	5,476.64	3,969.17	4,067.05	5,900.5

Source: [9]; own calculations

The cultivation of sweet potato presents economic considerable advantages for domestic producers because: the outlet is ensured and the sale price reaches Euro 3-4 per kg.[6]

CONCLUSIONS

Following the analysis of potato market in Romania, resulted aspects, such as:
-the area cultivated with potatoes was reduced in 2014 in comparison with 2010;
-the most significant potatoes production was obtained in 2011 (4,076 thousand tonnes)
-the average potatoes production per hectare increased in 2014 with over 30% than in 2010;
-the basic potatoes price recorded fluctuations from a period of time to another;
-the potatoes average consumption remains at a high level;
-potatoes imports are significant due to lower prices;
-exports are not as the production, but are being favoured when the production in Community countries is below the level of consumption necessary.

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OBSERVATIONS ON COLEOPTERA FAUNA FROM THE DUMBRAVA SIBIULUI FOREST (SIBIU, ROMANIA) IN THE 2015 YEAR

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Abstract

The present paper deals with the fauna of 8 families of Coleoptera: Carcabidae, Scarabeidae, Cerambycidae, Silphidae, Elateridae and Staphylinidae in the Dumbrava Sibiului Forest of district Sibiu. The list of the 32 species of coleoptera is shown in the chart. Each species has also data of the microhabitat, the trophic spectrum, the ecology ant the geographical spreading.

***Key words*:** *Coleoptera, fauna, ecology, species*

INTRODUCTION

Dumbrava Sibiu Forest is a unique geomorphological unit, both morpho structurally and landscape.

The area is well studied in terms of vegetation and vertebrate fauna. The invertebrate fauna were studied over time as follows: Macrolepidoptere daytime [13,14] epigenous entomofauna inside the forest [8,15,19,20,21,26], xylophagous beetles [2,3,4,5,6].

Analyzing the climatic conditions of the area may be said to be characterized by middle and upper terraces with poorly evolved soils and hydrophobic soils whose genesis is linked to the presence of shallow to start alluvial aquifer with brown soils. The mineral substrate is everywhere gravel and sandy-skeletal deposits, which makes the natural drainage brown [7].

Some papers on carabids from mixed forests in Moldova (Romania) were published by Solomon L., Varvara M., (1986) [22] and also Varvara (2004, 2005) [23,24,]; while those in beech forests and in coniferous forests and besides it some collaborators published many papers on structure of the carabid communities in the field of potatoes, sugar beet, wheat, maize, sunflower, clover and in apple orchards in Moldova.

The observations on the taxonomic composition and ecological structure of populations of *Carabidae* in the same forest ecosystems are published in the other papers [1,21,25].

The analysis in terms of climate, the study area is located in Romania, in Sibiu in a region with sub-humid climate. Average annual rainfall is 662 mm. The average annual temperature is between 9.4 ° C. Aridity index has a value of 35 annual and monthly aridity of two clues about the value of 28 and only one falls below this value (in September) but without reaching the limit of dryness. From the analysis above parameters we can say that terrace where grasslands are located under forest to forest steppe zone limit.

MATERIALS AND METHODS

Because 2015 was not considered a quantitative analysis fauna of beetles, but qualitative collection was done using ground traps by fixed points collection.

The captured material was made periodically by taking out of each trap catches in cloth bags, with appropriate label. Were targeted geographically and numbered from 1-12 clockwise, from trap located at N.

The collected material was already dead introduced in glass containers in rubbing

alcohol, measurements being performed at the end of the study period [21].

The insects were collected in the Dumbrava Sibiului oak forest (Photo 1) situated in the Municipality Sibiu, in Sibiu County, at the contact between the Cindrel Mountains and the sediments of the piemontan plaine and hills in the S of the city Sibiu. „Dumbrava Sibiului" (GPS: 45°44'35''N, 24°05'51''E) has a surface of 978 ha and it is distributed in four forests. The traps were set in a circle of 12.5 m diameter [20].

The material was collected from April to August 2015.

Photo 1. Experience (Original photo)

RESULTS AND DISCUSSIONS

The list of species collected is presented in Table 1. Each species is accompanied by data on the microclimate, eco-geography, trophic spectrum and floor (sublevel) where vegetation was collected [12]. There were collected 32 species of beetles belonging to six families: *Carabidae* (14 species) [17], *Scarabeidae* (5 species) [18], *Cerambycidae* (1 specie), *Silphydae* (6 species), *Elateridae* (2 species), *Staphylinidae* (4 species).

Five *Carabid* species are springbreeders, and 4 species autumn breeders. The majority of species were forest species, mesophilic, zoophagous, Palaearctic.

The percentage of species in each family number is: *Coleoptera* with 14 species, *Silphydae* with 6 species, 5 species *Scarabeidae*, 4 *Staphylinidae* species *Elateridae* 2 and one representative species *Cerambrycidae* fine family.

Table 1. List of species collected in Dumbrava Sibiului Forest, in terms of 2015

Taxon	Microhabitat	Specrtu trofic	Ecogeografic element	Spreading
Carabidae Family				
Carabus cancellatus	Ground	Zoophagous	Oreal	Carpatic
Carabus gigas	Ground	Zoophagous	Arboreal	Palearctic
Carabus coriaceus	Ground	Zoophagous	Arboreal	Palearctic
Carabus violaceus	Ground	Zoophagous	Arboreal	Euro-Siberian
Carabus ullrichi	Ground	Zoophagous	Arboreal	European
Carabus scheidleri	Ground	Zoophagous	Arboreal	European
Carabus nemoralis	Ground	Zoophagous	Arboreal	Euro-Siberian
Harpalus latus	Ground	Zoophagous	Eremial	Euro-Asiatic
Pterostichus niger	Ground	Zoophagous	Oreal	Euro-Asiatic
Pterostichus melanarius	Ground	Zoophagous	Oreal	Euro-Asiatic
Pterostichus oblongopunctatus	Ground	Zoophagous	Oreal	Euro-Asiatic
Pterostichus assimilis	Ground	Zoophagous	Oreal	Palearctic
Agonum binotatum	Ground	Zoophagous	Eremial	Palearctic
Lonicera pilicornis	Ground	Zoophagous	Arboreal	Euro-Siberian
Scarabeidae Family				
Geotrupes mutator	Manure	Coprophagus	Eremial	Balcanic
Geotrupesstercorarius	Manure	Coprophagus	Arboreal	European
Geotrupes vernalis	Manure	Coprophagus	Arboreal	European
Onthophagus taurus	Manure	Coprophagus	Eremial	Palearctic
Onthophagus ovatus	Manure	Coprophagus	Arboreal	Euro-Asiatic
Silphidae Family				
Phosphuga atrata	decaying organic matter	Saprophagus	Eremial	Transpalaearctic
Silfa obscura	decaying organic matter	Saprophagus	Eremial	Euro-Asiatic
Thanotophilus rugosus	decaying organic matter	Saprophagus	Eremial	Euro-Asiatic
Oeceoptoma thoracica	decaying organic matter	Saprophagus	Arboreal	Euro-Siberian
Necrophorus vespillo	decaying organic matter	Saprophagus	Arboreal	Euro-Siberian
Necrophorus humator	decaying organic matter	Saprophagus	Arboreal	European
Staphylinidae Family				
Staphylinus erythropterus	Ground	Zoophagous	Arboreal	Euro-Siberian
Staphylinus olenus	Ground	Zoophagous	Arboreal	Transpalaearctic
Staphylinus caesareus	Ground	Zoophagous	Eremial	Euro-Siberian
Velleius dilatatus	Ground	Mixophagus	Eremial	Transpalaearctic
Elateridae Family				
Athous niger	Epigaion	Phytophagous	Arboreal	Euro-Siberian
Lacon murinus	Epigaion	Phytophagous	Ground	Euro-Siberian
Cerambycidae Family				
Morimus funereus	Ground	Phytophagous	Ground	Transpalaearctic

Photo 2. *Carabus gigas* Creutz, Carabidae Family (Original photo)

Photo 3. *Carabus violaceus* L. Carabidae Family (Original photo)

Photo 4. *Staphylinus erythropterus* L., Staphylinidae Family (Original photo)

Photo 5. *Oeceoptoma thoracica* L., Silphydae Family (Original photo)

Photo 6. *Necrophorus vespillo* L. Silphydae Family (Original photo)

Photo 7. *Morimus funereus*, Cerambycidae Family (Original photo)

Observe dominant species of the family followed by species of *Coleoptera* and *Silphydae* family.These species are zoofage and saprofage, feeding on other species of insect or decaying organisms. In terms of the food spectrum stands zoophagous dominant species, phytophagous and xilophagous [9,10,11,16].

CONCLUSIONS

No Coleoptera discovered rare species, common species being collected. The only exception was a copy of *Morimus funereus* taxon Near Threatened.

Note the tree and codominant elements eremiale on the oreale.

In terms are dominant Eurasian zoogeographic species followed by Euro-Siberian ones.

One last observation to be emphasized is that the study had an exclusive quantitative character, but also from this point of view it is insufficient, the research work and collections will continue in the future.

Therefore I believe that the results are partial, they only reflects a certain extent of the structure of beetles communities in the Dumbrava Sibiului forest.

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OBSERVATIONS ON THE BIOLOGY OF SPECIES *Cydia pomonella* (WORM APPLE) IN AN ORCHARD IN THE TOWN SIBIEL, SIBIU COUNTY IN 2014 YEAR

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Abstract

In this paper, it was researched the biological and ecological orchard apple worm in the Sibiel Village, Sibiu County in terms of 2014 year. Given the increasing damage caused in recent years by the worm Cydia pomonella of apples in the orchard studied, two methods were used: through mass capture of adults with sexual attractant pheromone traps and stage of the study included minimum threshold temperature tracking the insect and by this, calculate the approximate insect biology and ecology on the average daily temperature, precipitation and humidity, for the application of effective treatments consistent with environmental protection is therefore necessary detailed knowledge of the biology of this insect for forecasting and warning treatments. As a conclusion, the use of pheromone traps proved the following advantages: reducing the pest population within the economic threshold, reducing the amount of insecticides for crop protection in some cases even their exclusion, environmental protection and getting ecologically clean agricultural production, keeping useful entomofauna.

***Key words*:** *apple orchard, Cydia pomonella, Sibiel village*

INTRODUCTION

Given the increasing damage caused in recent years by the worm moth *Cydia pomonella* especially in apple orchards and attacking other trees such as walnut. For the application of effective treatments consistent with environmental protection required detailed knowledge of the biology of this insect for forecasting and warning treatments. The most important and effective treatment should be applied in neon larva phase (between hatching and penetration fruit flesh). For this treatment to be effective it is necessary to know the precise maximum adult flight period of mating and oviposition by the female in order to accurately determine hatching and larval migration during the fruit to be attacked.

The investigations conducted so far found that in Europe and North America, experts have concluded that this pest has I-III generations per year in exceptionally favorable years could reach IV, V generations.

It was found that the life cycle of different species reported by the host plant, being different one on pomaceous (apple, pear) at the amigdalacee (appricot, peach) or nuts [11,12].

Apple worm presents in our country but also in the study area Sibiel village near Sibiu two generations per year and over winter in the larval stage fully developed in a cocoon of winter (hibermaculum) under the bark of trees. The larvae turn into pupae spring [8,9,10].

Pupated duration is closely linked to temperature, humidity, cocoons exhibition, ranging on average between 20-30 days [4,5,6].

MATERIALS AND METHODS

Tracking insect biology orchard was done on an area of 1,120 ha, from the edge of the village Sibiel located 22 km from the city of Sibiu [14]. The orchard is made up of local varieties of apple (Boicăn, Gustav, Pătul, Florin), with an experience of over 80 years

who have adapted the climatic conditions of the area.

To witness the biology of this insect I acted in two ways: through mass capture of adults with sexual attractant pheromone traps attractor type capsules purchased from the Institute of Chemistry at Cluj-Napoca, mounted with adhesive traps and regular reading capture curve to achieve maximum flight time and then calculating adult pre ovipozitar period, ovipozitar and submitting a clutch to be able to accurately calculate the time of hatching (larval stages during the period and neon).

Photo 1. Apple tree orchard in Sibiel (original photo)

The second stage of the study included minimum threshold temperature tracking the insect and by this, calculate the approximate insect biology and ecology on the average daily temperature, precipitation and humidity. Weather disk data were obtained from automatic weather station near Sibiu Airport.

Comparing the data obtained by the two methods of observation: pheromonal traps and insect evolution based on the calculation of the minimum temperature and compare that forecast and warning bulletins issued by Phytosanitary Unit Sibiu this data practically overlapped.

It shows that the biology of the insect does not depend directly phenological development phases of apple but only an average daily temperature, precipitation and humidity of the current year.

The conditions studied apple orchard in the village of Sibiel, Sibiu county, in 2014, the biology of the species was observed using pheromone traps, sexual Attractant capsules by capturing males, to establish maximum flight curve adults in order to determine the optimum moment treatment against codling.

Photo. 2. Attractant capsule (original photo)

Monitoring using pheromone traps is the most advanced and accurate than visual more research. Pest detection 5-7 days before the flight. Mass capture as a way to combat pest preclude the use of insecticides and other toxic agents [7].

For this purpose were installed three capsules attractant traps in different areas of the orchard about a trap about 400 m^2, on 26 April 2014. And reading was done in two days, so three readings per week.

RESULTS AND DISCUSSIONS

The first seizures were recorded on May 6, 2014 when the air temperature recorded was 18°C. Flight of the first generation of research and observations spread over a period of 38 days. For the second generation, the maximum flight curve was during 8 to 10 August 2014, at an interval of 37 days maximum flight to the first generation. In the analyzed phenological observations were made on 4 varieties: Boicăn, Gustav, Pătul, Florin, varieties that have not performed chemical treatments.

Beginning May 15, 2014 flight coincided with the beginning of the phenology of apple fruit had a diameter of 0.3 cm all varieties analyzed.

Maximum flight for the first generation

orchard analyzed (27 to 29 June 2014) corresponded phenology period when fruit varieties analyzed had a diameter of 1.2 cm.
Maximum curve flight II generation varieties taken under observation were classified into the period when apple fruit were 2.7 to 3 cm in diameter.

CONCLUSIONS

Weather appearance of the insect is drawn up taking into account reserve hibernating caterpillars. To this end, in August belts can be installed on trees trap the mites in diapause retire. In late autumn some of girdles rises and analyzed. Normal density (DN) is hibernating caterpillars media [1,2,3,4].

Photo 3. Installing traps in the apple (original photo)

If there is 5-6 caterpillars per tree DN can be said that the flight whose progeny will cause an attack of medium density.
Treatments warning is biological and ecological criterion. If biological criteria, determining the intensity of butterflies flying in both generations is done using pheromone baited traps attract capsule type produced by the Institute of Chemistry Raluca Ripan in Cluj-Napoca.
These traps were installed in trees crown and daily noted that the number of male butterflies were glued to the substrate trap. The intensity of butterfly flight gave us information on the number of offspring in each generation, on the other hand, the maximum catch is the maximum adult flight, settling egg mass filing date. After warning the first biologic treatment criterion is the maximum record clutch or when the first eggs laid are under red ring [15,16,17].
The second treatment is 10-12 days warns saddle and the second generation of the actual temperature is 975^{o}C summation [5,6].
In practical terms, warning first estimates for both treatments is to determine the number of days of laying the formula:

$$X_n = \frac{K}{t_n - 9} + \frac{56}{t_n - 9}$$

Or when tn-9 = 56^{o}C (counted from the filing first eggs) thermal constant of development codling (K) is 624^{o}C, the lower threshold of development (t) is 9^{o}C. The threshold for prolificacy (0) is 15^{o}C and thermal optimum (0t) is 30.5^{o}C. Lower threshold humidity (40%) is 15%, limits moisture favorable to the lower (40) and upper (Ho) being 55% and 75% [11,12,13].
As a conclusion of the study was conducted using pheromone traps proved that impact has the following advantages: reducing the pest population within the economic threshold, reducing the amount of insecticides for crop protection in some cases even their exclusion, environmental protection and getting ecologically clean agricultural production, keeping useful entomofauna.

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ASSESSMENT OF QUALITY MANAGEMENT IN ACCORDANCE WITH ISO 9001 FOOD INDUSTRY IN ENTERPRISES

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Abstract

The aim of the study was to evaluate the quality management according to ISO 9001 in enterprises of the food industry in the province Podkarpackie. Quality management in the food industry is closely associated with compliance with food hygiene rules set. This is to ensure the safety of its products and the protection of consumer health by ensuring proper functioning of the company and the high level of quality products and services. The study shows that the most important reason that encourage companies to implement ISO 9001 was to increase the prestige and quality of products and services, as well as and increase customer confidence. The most common difficulty in the implementation was the need to organize additional training for employees and raise awareness. Most significant positive change observed in the company after the implementation of the system was an increase in the quality of products and services and to improve communication with external partners.

Key words**:** *ISO 9001, quality, the company*

INTRODUCTION

In Poland, like in the European Union regulations have been introduced on the production and marketing of food, including regulations implementing the mandatory implementation and application of quality management systems. These actions are intended to ensure the health safety in food production, increasing the productivity of enterprises and improving the quality of the products [4].

Fast-growing market and intensively increasing competition force businesses to constantly improve quality. For this purpose quality management systems are implemented. Compliance with the rules laid down by them increases efficiency and ability to meet the ever changing customer needs. The quality management system is for enterprise a source of many benefits but also contributes to the difficulties and constraints as a consequence of changes in order to adapt operations to the requirements of the standard. An example might be a lack of commitment by employees, resistance to the implemented procedures and the need for organizing additional training and expanding their knowledge. In spite of that, its implementation and use influences increase in the quality of products and services and the prestige of the company, streamlining document flow, improving communication with customers and attracting new markets. This promotes more efficient and more effective implementation goals. Quality management in the food industry is closely linked to the respect of rules on food hygiene. This is to ensure the safety of its products and protect the health of consumers by ensuring a proper functioning of the company. This requires a comprehensive approach to the management system starting from knowing the expectations and requirements of customers, through appropriate management of core processes and ending with obtaining the complete satisfaction of customers [3], [5].

The quality management systems in enterprises are divided into mandatory, which

must be implemented in any establishment engaged in the production of food and non-compulsory, the use of which is voluntary and does not result of legislation [1].

The implementation of quality management systems confronts the entrepreneurs with the necessity of conducting organization according to the procedures contained in the standards. This involves additional costs, making changes in the company, training of staff and conducting special documentation [2].

The aim of the study was to evaluate the quality management standard ISO 9001 in the food industry enterprises in the province of Podkarpackie, PL. The scope of work included:

1.Identifying the reasons for the implementation of ISO 9001 in the food industry enterprises,

2.Identifying difficulties encountered during the implementation of ISO 9001 in enterprises,

3.Presentation of the benefits of the introduction and application of ISO 9001.

MATERIALS AND METHODS

In order to analyze the quality management standard ISO 9001 in the food industry enterprises in the Podkarpackie province at first the current state of knowledge in the field of quality management with special emphasis on ISO 9001was analyzed. Based on the literature, the importance of ISO 9001 in food processing enterprises and problems related to the implementation of the scheme and the benefits resulting from its use were identified. This made it possible to develop an interview questionnaire, which consisted of 18 closed questions. In the first part of the questionnaire questions were related to the study of the company, in particular organizational and legal form, scope of influence, date of creation, type of business. The questions in the second part were related to quality management standard ISO 9001. It was important to identify the causes of implementation and the difficulties and benefits of the system. In the second stage of the study was carried out in the period from March to December 2014. 20 companies from the Podkarpackie Province were surveyed. In the third stage, analysis and presentation of results using computer program Excel was made.

RESULTS AND DISCUSSIONS

The study involved 20 randomly selected food businesses located in the region of Podkarpackie. All of the selected companies have certified quality management system that complies with the requirements of ISO 9001. The size enterprises was determined based on the number of workers in their employment and distinguished micro, small and medium-sized organizations. The largest group were small businesses, employing from 9 to 49 employees (55%), then the medium with 50 to 249 employees (30%) and micro-enterprises consisting of 1 to 9 employees (15%).

Among the surveyed companies bakeries (35%) were the most. Then 25% concerned enterprises producing confectionery. Successively, companies engaged in the manufacture of prepared meals and confectionery production were represented with 20% equally. 15% of companies equally dealt with the production of meat products and wholesale groceries. Firms engaged in the production of mineral waters and soft drinks, fruit and vegetable processing, manufacturing delicatessen products and other activities comprised 10% of the entire group. The smallest part were companies producing dairy products (5%).

Analyzing the reasons that led the company to implement ISO 9001quality management system (Figure 1). Most companies considered increase in customer confidence (18.9%), raising the prestige of the company (13.5%). At the level of 12.2% was the improvement of work organization and improvement in the quality of products and services. No less important reason was the desire to improve the flow of documentation and information in the company (10.8%). Quite often were also: gaining new markets (9.5%), increased range of products (6.8%) and external requirement to have a quality management system imposed by law (6.8%).

Only 1.4% of companies have introduced ISO 9001 in order to reduce incurred costs.

Difficulties arising during the implementation of the quality management system are often a common cause of delays in the certification of ISO 9001 (Figure 2). The respondents most often pointed to the need to organize additional training for employees to expand their knowledge about the system (23.7%). Other frequently occurring difficulties were lack of commitment on the part of employees (16.9%) as well as failure to comply with the guidelines contained in the procedures and instructions (15.3%). The smallest part of the companies surveyed (6.8% each) mentioned the difficulty of language of the standard and financial barriers related to costs of implementing the system. None of the interviewed respondents specified the lack of commitment from management as obstacles in the implementation of ISO 9001.

Companies that decide to implement a quality management system are counting on the emergence of the positive effects resulting from the application of the guidelines contained in the standard. The study shows that the introduction of a quality management system according to ISO 9001 contributes to favorable changes in the company (Figure 3). Companies in particular are guided by the desire to increase the prestige of the company, increasing consumer trust and raising the quality of products and services. These aspects are very important for companies that apply for co-operation with consumers, for which ISO 9001 certification is a confirmation of the high quality of our products. According to the companies surveyed, introduction of ISO 9001 caused fulfillment of suggested aspects. On a scale of 1 to 5, where 1 meant a negligible change, and 5 very important, respondents rated the highest as positive changes associated with an increase in the quality of products and services (4.7), improved external communication with partners (4.6) and an increase in the company's prestige (4.5). Improvement of internal communication (4.05), reduced employee turnover (4.2) and streamlining document flow (4.4) were average positive changes. In contrast, the respondents mentioned a reduction in costs as the least significant of favorable modifications (3.15).

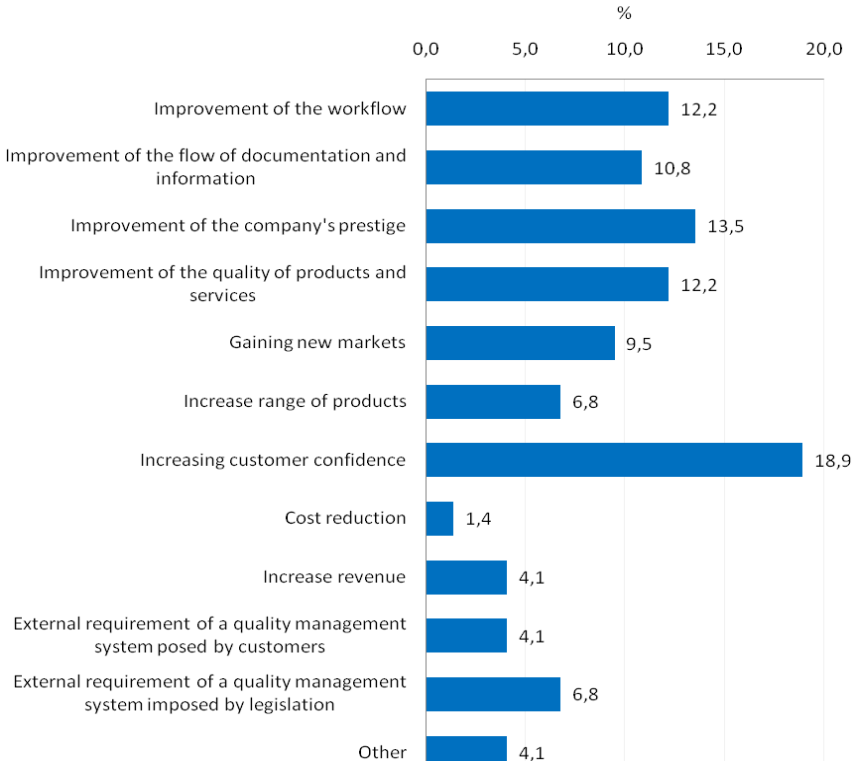

Fig. 1. Reasons for implementation Source: Own calculations based on studies

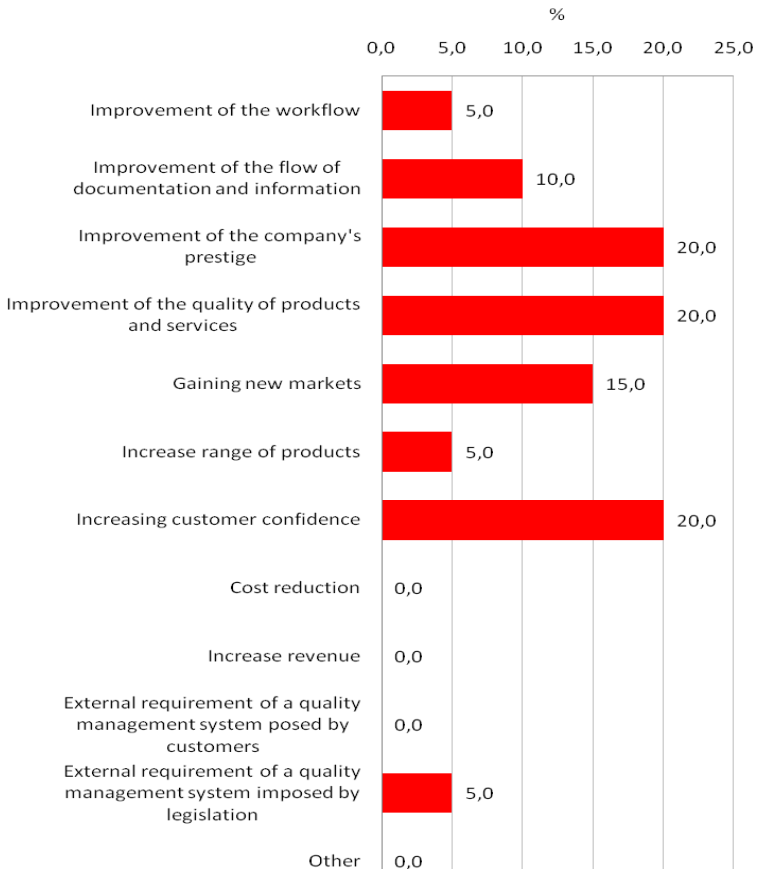

Fig. 2. The difficulties associated with the implementation of system
Source: Own calculations based on studies

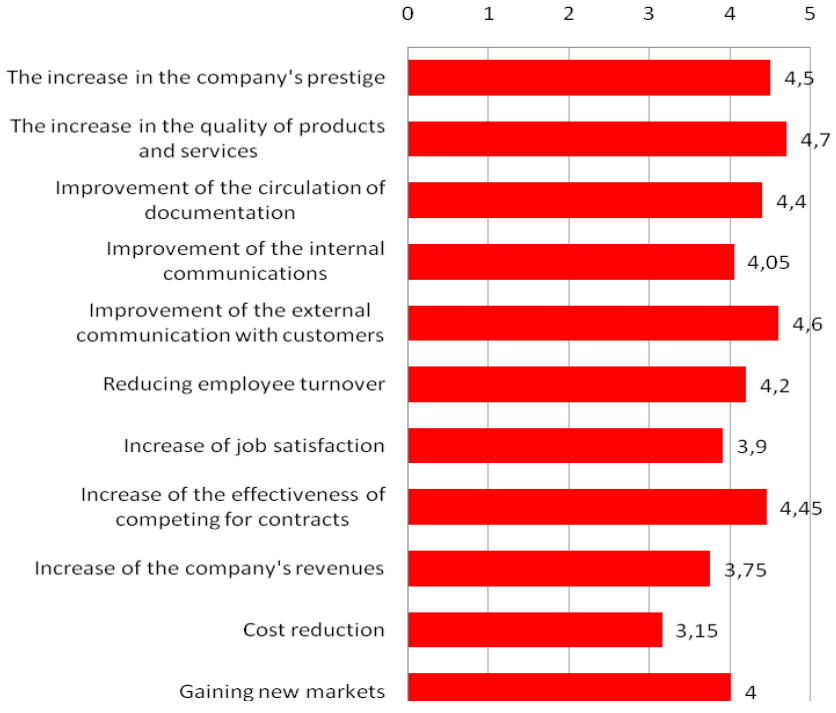

Fig. 3. Benefits of system implementation
Source: Own calculations based on studies

CONCLUSIONS

Quality Management System according to ISO 9001 is one of the not mandatory quality management systems implemented in enterprises of the food industry. Improving quality by adjusting activities to the procedures and instructions contained in the standard has a positive impact on the growth of the prestige and quality of offered products and services, streamlining document flow, an increase in competing for contracts, and improve internal communications. Due to the internal and external benefits resulting from the operation of a quality management system compliant with ISO 9001, it can be classified as effective tools for competitive advantage.

Analysis of the results obtained from the research allowed the development of proposals for evaluation of quality management in food industries enterprises according to ISO 9001.

Reasons for the implementation of quality management system according to ISO 9001 most often cited by enterprises are: increase customer confidence, increasing the company's prestige and the quality of products and services, as well as improving work organization, while the reduction of costs was the least decisive factor.

The most important motives that prompted the company to introduce a system were both internal and external causes: the prestige of the company, increasing customer trust and improving the quality of products and services.

Barriers and obstacles encountered during the implementation of ISO 9001 resulted mostly from the need to organize additional training for employees to expand their knowledge and a lack of commitment and failure to comply with the guidelines contained in procedures and instructions. Understanding the language of the standards and costs associated with implementation of the system were the smallest difficulty. This means that the staff is very skeptical to make changes in the company and is not prepared to adapt activities to the requirements of the standard. It can be concluded that by the time the first appearance of the economic benefits arising from the introduction of new rules, additional responsibilities for completion of the mandatory evidence are imposed employees, hence such a negative approach to any concept to modifying the scope of the tasks performed by them. It may be concluded that companies that implement a quality management system should attach more importance to training that help employees understand the ISO 9001 standard which contributes to improving the implementation of the system and helps prevent errors that might arise during the design phase of the system.

The positive aspects resulting from the introduction of ISO 9001 can include a significant increase in the number of regular customers, which is associated with the acquisition of their trust, and the gradual decrease in the number of complaints filed, which we can associate with an increase in quality of products and services. Very significant changes observed in the company after the introduction of the system include improving the quality of products and services and improving the external communication with customers. One can conclude that having ISO 9001 certification improves the company's prestige by what is perceived as a reliable and competent partner to do business.

The study also shows that ISO 9001 is more profitable to implement in larger companies, which employ more workers. Medium-sized enterprises are the most satisfied with the effects of introducing a system.

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