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## DETERMINANTS OF WOMEN PARTICIPATION IN FOOD CROP MARKETING IN ABIA STATE, NIGERIA

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### Abstract

*This study has its objectives as to describe the types of crops marketed by the women; to determine the factors that influence women participation in marketing of food crops in the study area and make recommendations based on the findings. A multi-stage sampling procedure was employed in the study. First, two Local Government Areas were selected from each of the three agricultural zones, this was followed by the random selection of twenty respondents from the selected Local Government Areas, bringing the total number of respondents to a hundred and twenty. Descriptive statistics and the probit model were used in analyzing the data collected from a set of questionnaire administered on the respondents selected. The results of the analysis showed that cassava, maize, water yam, sweet potatoes and cocoyam were the major food crops marketed by the women. The probit results indicate that age, experience, output, source of capital and source of labour were significant at different probability levels and with different signs. The study recommended that sources of income whether formal or informal sources should be made more accessible to women, amongst other things.*

**Key words:** food crops, marketing, participation women

### INTRODUCTION

Women play a vital role in the agricultural production in many countries including Nigeria. Their role spans from tilling of land, cultivation, harvesting, processing and marketing of produce. In fact, it is increasingly known in recent times that a major share of income of rural households are obtained through women activity, and sometimes even share of women income in the household economy is more than the share of men [5].

Rural women are active participants in retail trade and marketing, particularly where trade is traditional and not highly commercialized [3]. In many parts of Asia, women market foods such as vegetables; in West Africa, they distribute most major commodities; and in the Caribbean, women account for nearly all local marketing. Through their marketing efforts, women provide valuable links among farmers, intermediaries and consumers. Petty trade often thought of in the past as non-productive, in fact serves to stimulate the production and

consumption linkages in the local economy [3].

Participation has been defined by [11] as the ability of the people to choose voluntarily to be integral parts of a development process. There has been ample research evidence to buttress the argument of women's high level of participation and contribution to agribusiness and marketing of food crops in Nigeria. However, the degree of women participation varies from country to country. Their specific task, however vary from place to place, depending on cultures. According to [19], women participation on self employment (including marketing of agricultural produce) differs across different regions of the world.

Participation in marketing has been noted as both a cause and a consequence of economic development [4]. Marketing offers households the opportunity to specialize according to comparative advantage and thereby enjoy welfare gains from trade. Recognition of the potential of marketing as engines of economic development and structural transformation gave rise to a marketed paradigm of

agricultural development during the 1908s [15], that was accompanied by wide spread promotion of market liberalization policy agendas in sub-Saharan African, and other low income regions.

As household's disposable income increase, so does demand for variety of goods and services, thereby inducing the demand- side market participation, which further increases the demand for cash and thus supply side market participation.

Gender in equality has been known to affect the overall performance and output of women involved in agricultural marketing among other agribusiness activities [20]. These include high level of poverty, vulnerability to external and uncontrollable hazards, and restricted access to productive resources, amongst others.

As women participation in different economic activities and intra-family decision making process are important indicators of their empowerment there arises the need to know the determinants of women participation in agribusiness, using marketing of food crops as a case study. The overall objective of the study is to examine the determinants of women participation in the marketing of food crops in Abia state, Nigeria. The specific objectives are to (i) describe the types of food crops marketed by the women (ii) assess the determinants of women participation in food crop marketing in the study area and (iii) make recommendations based on the findings of the study.

## MATERIALS AND METHODS

### Study Area

The Study area was Abia state. Abia state is in the south east geo-political zone of Nigeria and has its capital at Umuahia. The state was carved out of Imo state in August 27, 1991. It has 17 Local Government Areas and three agricultural zones of Aba, Umuahia and Ohafia. Aba and Umuahia are referred to as the urban areas and the rest are rural areas. The state shares common boundaries with Ebonyi State to the North and to the South and south west with Rivers state to the East

and South east with Cross River and Akwa Ibom state and to the North West is Anambra state. [8].

The population of Abia state is 2,833,999 [12]. The population of the urban areas are Aba north 107488, Aba south 423852, and Umuahia north 220,660 amounting to a total population of 752000 persons [8]. 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. [8].

Agriculture is the major occupation of the people and subsistent agriculture is prevalent and about 70 percent of the population engage in it. The main crops are yam, cassava, rice and cocoyam and maize, while the cash crops includes; oil palm, rubber, cocoa, banana, and various types of fruits.

The people of Abia are traders and Aba is regarded as one of the commercial centres in the country. 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 Ukwaeast, and the long juju of Arochukwu.

### Selection of Respondents

Multi-stage sampling procedure was adopted in the study. First two Local Government Areas each were selected from each of the three agricultural zones of Abia state. After which, twenty women were selected randomly from these Local Government Areas, making a total of one hundred and twenty (120) women.

### Method of Data Collection

Data for the study were primary data, which were collected through the aid of a set of questionnaire administered to the respondents. All the respondents returned their questionnaire and the therefore were used in the analysis.

### Method of Data Analysis

Objective (i) was analyzed using of descriptive statistical such as frequencies and percentages etc., while objective (ii) was realized by probit model.

### Specification of Model

The probit model is specified as follows;

$$Y_{(1,0)} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$$

Where:  $Y_{(1,0)}$  is the dependent variable, which is the participation index

$X_1$  = age of the woman respondent (years)

$X_2$  = educational attainment (years)

$X_3$  = household size (number of persons)

$X_4$  = number of years in the marketing food crops

$X_5$  = income (₦)

$X_6$  = output (kg)

$X_7$  = capital source (1= informal sources 0= formal sources)

$X_8$  = labour source (1= hired sources 0= family labour)

$\mu$  = error term

$b_0$  = constant

$b_1$ - $b_8$  = coefficients

Probit analysis is a specialized regression model of binomial response variables. Probit modeling is used for explaining a dichotomous dependent variable with the empirical specification formulated in terms of latent response variable [18]. In this study, dependent variable Y, is a utility index of participation in marketing of food crop activities. Participation takes the discrete values of 1 for participation in marketing of food crops, 0 for non-participation.

## RESULTS AND DISCUSSIONS

### Types of Food Crops Marketed By the Women in the Study Area

Table 1. Types of food crops marketed according to ranking

Food crops	Frequency	Percentage
Cassava	89	74.17
Maize	78	65
Water yam	62	51.67
Sweet potatoes	60	50
Coco yam	50	41.67

Source: computations from field survey, 2011.

Among the crops marketed, cassava ranked first among others. As shown in Table 1 below, 74.17 percent of the respondents attested that they participated in the sale of cassava. Maize accounted for 65 percent to rank the second most marketed produce among the crops. Water yam ranked third among the crops. In this case, 51.67 percent of

the respondents participated in the sale of water yam. Fifty percent of the respondents indicated that they sold sweet potatoes while 41.67 percent of the respondents sold cocoyam. However, the responses were multiple in nature

### Determinants of Women Participation in Food Crop Marketing in Abia State, Nigeria

The estimates of the determinants of women participation in food crop marketing in the study area as shown in Table 2 indicate that age, experience, output, source of capital and source of labour were significant at different probability levels and with different signs.

The coefficient of age of the respondents was significant at 10 percent level and had a positive sign. This implies that with increasing age, there is the probability of women participating in the marketing of food crops. Many studies have revealed that those who fall within the active age brackets engage in agriculture and related activities given the drudgery nature of the enterprise [1].

Table 2. Estimates of the determinants of participation in food crop marketing by women in Abia state, Nigeria.

Variables	Coefficients	Standard error	z-test
Age	0.04945	0.02380	2.08*
Education	0.01358	0.07232	0.19
Household size	0.01644	0.1023	0.16
Experience	0.00236	0.0796	0.03
Income	5.9388	1.1498	5.16***
Output	0.7077	0.1416	4.99***
Capital source	0.5778	0.1422	4.06***
Labour source	-0.8106	0.3081	-2.63**
Constant	-2.9501	1.6642	-1.77

LR  $\chi^2$  19.17\*\*\*

Prob  $\chi^2$  0.0001

Pseudo  $R^2$  0.654

Note: \*, \*\*\* denotes 1% and 10% significant levels respectively

Source: Computations from field survey, 2011.

This result is plausible, given the fact that, in the rural areas, these food crops are sold by women who more or less sit in their stalls without much stress as the products are also harvested with in the areas. As [16], put it, most women who engage in programmes in

women in agriculture do that during spare times. This result is also in line with [7].

The coefficient of output was also significant at one percent probability level with a positive sign. This implies that, the larger the output from their farms, the greater the probability women in the study area participating in food crop marketing. Among the rural dwellers, there is usually the need for some cash to pay for other household needs, such as school fees, medicine and other consumer goods, coupled with the fact that there is poor storage facilities, large outputs may prompt women into participating in the sale of these food crops. This study consolidates that of [9].

Source of capital which was dummied was significant at one percent level with a positive sign. This implies that the ability to raise funds from in formal sources could lead to women participation in food crop marketing. Formal sources of credits have been known to have conservation lending practices which often times, deny women the required credits. Informal sources become handy sources of funds. According to [17], credit from informal sector dominates agricultural financing in the rural areas. Within the parley of agricultural financing, informal credit sources are unquestionably most popular. Collateral free lending, proximity, timely delivery, and flexibility in loan transaction are some of the attractive features of informal credit [10]. This result is very plausible and in line with [6].

The coefficient of income was significant at 99 percent confidence level with a positive sign. This implies that higher income could lead to higher probability of women participating in food crops marketing. While credit is a problem for all small businesses, the lack of access to credit and financial services is particularly acute for women. Therefore, richer women will be more disposed to participate in business, food crop marketing inclusive than poorer ones. This result is in line with [14, 2, 13].

Sources of labour was also significant in explaining women participation in food crop marketing in Abia state at five percent probability level but with a negative coefficient. This means that there is a negative

relationship between hired labour and marketing of food crops by women. This is possibly because women who are usually cash constrained may not afford to pay or incur additional costs on hired labour

The LR  $\chi^2$  was 19.17 which is significant at one percent level, while the pseudo  $R^2$  was 0.654 meaning the 65.4 percent of the variability has been explained in the equation. However, it is possible that there were some other variables that should have been included in the model.

## CONCLUSIONS

Women participation in agricultural production and the marketing of agricultural produce in particular is an age long activity. However, this study has revealed the factors which could influence women in participating in the marketing of food crops in Abia state Nigeria.

The study therefore recommends that sources of income whether formal or informal sources should be made more accessible to women. This will enable them source for the required funds needed to support their businesses. Again, output of agricultural crops should be encouraged. This is because, as output increases, women will be encouraged to go into its marketing for more income for their upkeep and that of their families.

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## THE BIODIVERSITY OF THE MELLIFEROUS PLANTS IN THE SURROUNDINGS OF THE TOWN SEBES (ALBA COUNTY) AND THEIR ECONOMICAL IMPORTANCE

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### Abstract

*The goal of our research is to analyze the biodiversity of the melliferous plants in Alba County, mainly in the surroundings of Sebes by identifying the melliferous plants from the spontaneous flora and of the tree species without inflorescence. In the same time there were analyzed other aspects such as: the thermic index of the blooming (T), the average data of starting of the blooming, the honey production (kg/ha) and the apiarian weight. The methods and the techniques that were used in the study were as follows: the use of the bibliographical resources, the observation, the use of the method of direct collecting, getting photos, and the determination of the botanic materials in the lab. There were identified 48 melliferous species from the spontaneous flora and 5 tree species without inflorescence (manna honey). In Alba County does regularly average productions on bee families, superior to those done in the country due to a valuable melliferous potential.*

*Key words:* biodiversity, melliferous flora

### INTRODUCTION

The rupestrian paintings, having a magic potential on the walls of the caves in Paleolithic establish the fact that the man of those eras knew the bees and we can imagine how, in its activity as a collector was competing with the animals in finding the honey from the honey combs of the little flying bees in order to provide the daily necessary food.

During the ancient times the man's interest for bees could be seen in the writings coming from the mythology of the people. Aristotle had a scientific interest in analyzing the bees, who in his work *The History of the Animals* dedicated a great part to these invertebrates. Plinius the Old in an encyclopedic spirit describes and put into a relationship with the man the bees species found on the entire surface of the world known at that time. *Naturalis Historia* contains data regarding the relation man-bees and bees-plants. The relation man-bees continued to go on, knowing in the same time the hard work of a poor apiarist as well as the glory of the symbolic exhibiting of the bees on the imperial mantle.

The interest in bees for their lives and behavior reached a summit in the thorough researches of Karl von Frisch (1886-1982), which had an echo in the entire savant society and for which he received the Nobel Prize in 1973, being considered afterwards one of the *founders fathers* of the new biological science, Ethnology. His researches were shared and developed regarding the bees as well as other species of animals by Konrad Lorenz and Nikolaas Tinbergen, awarded with the Nobel Prize alongside Karl von Frisch.

Till nowadays the bees are in the centre of the fundamental scientific research giving data to the molecular biology in elucidating the mystery surrounding the role of genes in the configuration of the bee's behavior. K. Dawkins, researcher and an adept of the synthetic theory in the actual Darwinism, exposed in his book *The Selfish Gene* an experiment on families and species of bees, the role of genes in forming and transmitting the behavior at these [4].

The second component of the binomial is formed by plants. The researches done during the time demonstrated that the raising of bee

families can't be profitable if in the area were the bee garden is situated there aren't resources of nectar and pollen for bees. The apiarists emphasized the importance of knowing the melliferous base in the activity area of the bees, the period of blooming of the flowers, the quantity nectar and pollen that can be collected by these. The melliferous plants are the totality of plants with nectar or pollen but there are also mixed plants giving both pollen and nectar. All these are forming what is called the melliferous base. The secret of a profitable apiculture from an economic point of view requires the apiarist's capacity of settling the bee garden taking into consideration the melliferous plants in the area.

The present study stresses the analysis of the biodiversity of the melliferous plants in the Alba County, mainly in the surroundings of the town Sebes, by identifying the melliferous plants in the spontaneous flora and the arboreal species without inflorescence.

## MATERIALS AND METHODS

The researched area refers to the administrative territory of Alba County (Fig. 1), but the researches have been done mainly in the surroundings of the town Sebes.

The investigations took place during 2010-2013 with the participation of the students from the department Of Agricultural Sciences and the Protection of the Environment within the "Lucian Blaga" University in Sibiu.

In the researches that took place regarding the fulfillment of the proposed goals there were taken into consideration specific methods:

- the use of the bibliographic resources requested by the goal and objectives of the study;
- the observation regarding the floristic inventory in Alba County, mainly in Sebes and its surroundings, taking down the identified species during the trips;
- the use of direct gathering, a quantitative method for the plants that couldn't be identified in the researched area, these were going to be studied in the lab. For the sampling there were used some simple tools and materials: little shovel and a special box for plants;

- there have been taken a lot of pictures coming to complete the data obtained in the field;
- the processing of the information from the field, the determination of the botanic material in the lab in order to establish the floristic list [1], [2], [3], [5], [6], [7], [8], [11].
- the study centered round the species *Apis mellifera* L.

## RESULTS AND DISCUSSIONS

The Alba County is situated in the central part of Romania, occupying a surface of 624,200 ha. being dominated by the mountainous area, the town Sebes is situated in the area of influence of the mountain and at the limit of separation of The Secaselor Plateau with the river Mures passage. Due to its geographic position the town Sebes is characterized by a medium continental climate having an average yearly temperature of 9.3C.

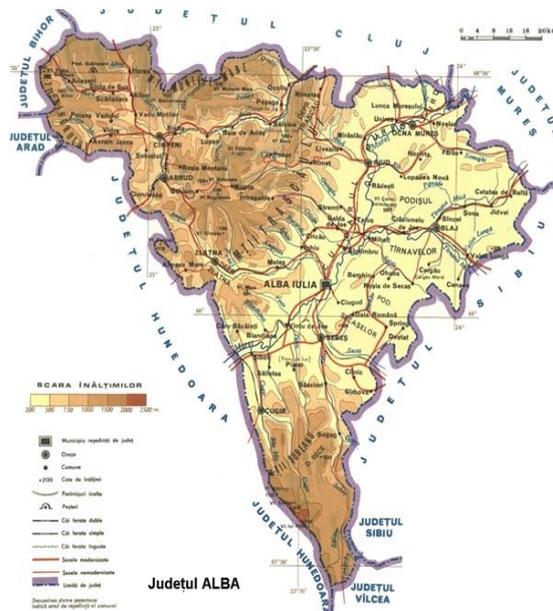


Fig. 1 The map of the Alba county  
source: <http://pe-harta.ro/alba/>

The flora in the Sebes area is influenced by the particularities of the climate, altitude, relief, hydrographic basin but also by the changes done by man. The vegetation is framed at the floor of the oak and forest steppe. The forests are dominated by the oak alongside with the horse beam, sycamore maple, maple tree, elm

tree, ash tree, birch, lime tree, wild cherry tree and crab apple tree. Due to the biologic and climate conditions the shrubs occupy an important role (the blackthorn, the hip rose tree, cornel tree or the common elder). The hills are dominated by the pastures and hayfields, which alongside the pastures and hayfields in the fields are an important melliferous source [13].

The melliferous plants in the researched area offer to the bees nectar and pollen. Their production is not a big one. There are, anyhow some very melliferous species and due to the succession of blossoming during all the active season can assure together with the melliferous trees and shrubs a very important maintaining harvesting for the development of the bee families. The statistics of honey shows that there are done approximately 180 tones, and the average for a bee family is estimated at 16.07kg. honey per family, this being above the average apiarian production in Romania.

Table 1. Melliferous plants identified in the spontaneous flora in the surroundings of the town Sebes

Nr	The species	The thermic index of blooming (T°C)	The average data of blooming	Honey production (kg/ha)	The apiaria n weight
1	2	3	4	5	6
1	Salcâmul alb ( <i>Robinia pseudacacia</i> L.) (Fabaceae)	600-765	10-20.05	800-1200	Very big
2	Teuil argintiu ( <i>Tilia tomentosa</i> Moench) (Tiliaceae)	1400- 1450	17-27.06	1200	Very big
3	Floarea-soarelui ( <i>Helianthus annuus</i> L.) (Asteraceae)	1000-1100	24.06-30.07	34-122	Very big
4	Zmeurul ( <i>Rubus idaeus</i> L.) (Rosaceae)	1038-1235	05-15.06	50-200	Very big
5	Izma broastei ( <i>Mentha aquatica</i> L.) (Lamiaceae)	1400-1575	22-30.06	220	Big
6	Rapita mare ( <i>Brassica napus oleifera</i> L.) (Brassicaceae)	220-330	10-20.04	40-100	Big
7	Rapita mică ( <i>Brassica rapa oleifera</i> L.) (Brassicaceae)	220-330	10-20.04	30-100	Big
8	Salcia albă ( <i>Salix alba</i> L.) (Salicaceae)	100-135	20-30.03	100-150	Big
9	Sparceta ( <i>Onobrychis viciaefolia</i> Scop) (Fabaceae)	1038-1235	05.05-06.06	120-300	Big
10	Tei pucios ( <i>Tilia cordata</i> Mill) (Tiliaceae)	1050-1100	02-12.06	600-1000	Big
11	Trifoiul alb ( <i>Trifolium repens</i> L.) (Fabaceae)	765-940	20-30.05	100-250	Big
12	Afinul	525-680	05-15.05	15-30	Middle

	( <i>Vaccinium myrtillus</i> L.) (Ericaceae)				
13	Cais ( <i>Prunus armeniaca</i> L.) (Rosaceae)	200-300	11-23.03	25-40	Middle
14	Castanul sălbatic ( <i>Aesculus hippocastanum</i> L.) (Hippocastanaceae)	475-525	27.04-07.05	30-100	Middle
15	Ceapa seminceră ( <i>Allium cepa</i> L.) (Liliaceae)	1330-1540	20-30.06	70-150	Middle
16	Cimbrisorul ( <i>Thymus serpyllum</i> L.) (Lamiaceae)	1230-1430	15-25.06	150-220	Middle
17	Cireșul ( <i>Cerasus avium</i> L. Moench) (Rosaceae)	220-330	10-20.04	30-40	Middle
18	Coacăzul negru ( <i>Ribes nigrum</i> L.) (Grossulariaceae)	275-395	14-24.04	20-50	Middle
19	Corobătică ( <i>Salvia verticillata</i> L.) (Lamiaceae)	1330-1540	20-30.06	400-600	Middle
20	Dovleacul ( <i>Cucurbita pepo</i> L.) (Cucurbitaceae)	765-940	20-30.05	40-50	Middle
21	Izmă bună ( <i>Mentha piperita</i> L.) (Lamiaceae)	1620-1870	05-15.07	100-200	Middle
22	Izmă creată ( <i>Mentha spicata</i> L.) (Lamiaceae)	1620-1870	05-15.07	100-200	Middle
23	Jaleșul sălbatic ( <i>Stachys recta</i> L.) (Lamiaceae)	1130-1335	10-20.06	150-250	Middle
24	Lucerna ( <i>Medicago sativa</i> L.) (Fabaceae)	680-850	15-25.05	25-200	Middle
25	Mărul ( <i>Malus domestica</i> Borkh) (Rosaceae)	350-450	20-30.04	30-42	Middle
26	Măzarichea ( <i>Vicia pannonica</i> Cr.) (Fabaceae)	765-940	20-30.05	30-50	Middle
27	Mazarichea de primăvară ( <i>Vicia sativa</i> L.) (Fabaceae)	850-960	25-31.05	10-30	Middle
28	Măzarichea păroasă ( <i>Vicia villosa</i> L.) (Fabaceae)	765-940	20-30.05	30-100	Middle
29	Murul de miriște ( <i>Rubus caesius</i> L.) (Rosaceae)	798-960	22-31.05	30-50	Middle
30	Muștar sălbatic ( <i>Sinapis arvensis</i> L.) (Brassicaceae)	765-940	20-30.05	40	Middle
31	Păducelul ( <i>Crataegus monogyna</i> Jacq.) (Asteraceae)	550-645	01-14.05	35-100	Middle
32	Păpădia ( <i>Taraxacum officinale</i> L.) (Asteraceae)	176-275	05-15.04	200	Middle
33	Porumbarul ( <i>Prunus spinosa</i> L.) (Rosaceae)	350-450	20-30.04	25-40	Middle
34	Prunul ( <i>Prunus domestica</i> L.) (Rosaceae)	300-350	15-25.04	20-30	Middle
35	Roișița ( <i>Melissa officinalis</i> L.) (Lamiaceae)	475-502	28.05-20.06	100-150	Middle
36	Salvia de câmp ( <i>Salvia pratensis</i> L.) (Lamiaceae)	798-960	22-31.05	280	Middle

37	Salvia ( <i>Salvia officinalis</i> L.) (Lamiaceae)	1750-1980	10-20.07	200-400	Middle
38	Scaul dracului ( <i>Eryngium campestre</i> L.) (Apiaceae)	1750-1980	10-30.07	100-300	Middle
39	Sovărvul ( <i>Origanum vulgare</i> L.) (Lamiaceae)	1130-1335	10-20.06	70-80	Middle
40	Trifoiul roșu ( <i>Trifolium pretense</i> L.) (Fabaceae)	1230-1430	15-25.06	25-50	Middle
41	Trifoiul mărunț ( <i>Medicago lupulina</i> L.) (Fabaceae)	1230-1450	07-27.06	30-40	Middle
42	Urzică moartă alba ( <i>Lamium album</i> L.) (Lamiaceae)	680-850	15-25.05	100-180	Middle
43	Urzică moartă ( <i>Lamium purpureum</i> L.) (Lamiaceae)	80-135	20-31.03	50-90	Middle
44	Albăstriță ( <i>Centaurea cyanus</i> L.) (Asteraceae)	1320-1463	02-22.07	50-60	Small
45	Brusturul ( <i>Arctium lappa</i> L.) (Asteraceae)	1275-1450	15-27.07	30-50	Small
46	Castravetele ( <i>Cucumis sativus</i> L.) (Cucurbitaceae)	600-730	20.06-16.08	20-100	Small
47	Căpșunul ( <i>Fragaria moschata</i> Duch) (Rosaceae)	200-320	20.04-29.05	30-40	Small
48	Lucerna galbenă ( <i>Medicago falcata</i> L.) (Fabaceae)	680-850	15-25.06	30	Small

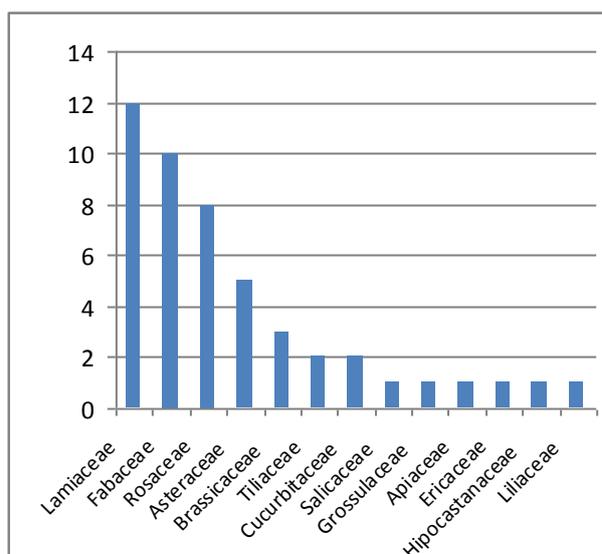


Fig. 2 The graphic representation of the melliferous plants on families

In the literature of specialty there are known 1,000 species of melliferous plants, from which 200 are important for the apiculture [5], [6], [7], [8]. From these, in the researched area there were found 48 species of melliferous trees, which belong to a number of 13 botanic families [9], [10]. The list of the botanic families in the order of the numeric number is presented in table 2 and figure 2.

Table 2. The list of the botanic families with melliferous species, their numeric and relative abundance of these in the surroundings of the town Sebes (Alba County)

Nr.	Family	Numeric abundance	Relative abundance (%)
1	Lamiaceae	12	25,00
2	Fabaceae	10	20,84
3	Rosaceae	8	16,67
4	Asteraceae	5	10,42
5	Brassicaceae	3	6,25
6	Tiliaceae	2	4,17
7	Cucurbitaceae	2	4,17
8	Salicaceae	1	2,08
9	Grossulariaceae	1	2,08
10	Apiaceae	1	2,08
11	Ericaceae	1	2,08
12	Hipocastanaceae	1	2,08
13	Liliaceae	1	2,08
	Total	48	100,00

Analyzing the data of the graphic1 results that 35 melliferous plants (72.93%) belong to 4 botanic families. Firstly comes the *Lamiaceae* family with 12 species (25%), followed by the *Fabaceae* family with 10 species (20.84%). On the third place is the species belonging to the *Rosaceae* family with 8 species (16.67%) and on the fourth place is the *Asteraceae* family with 5 species (10.42%). A number of six botanic families registred only a species of melliferous plants (2.08% each).

Almost half of the 48 analyzed melliferous species (45.48%) belong to the botanic families *Lamiaceae* and *Fabaceae*.

The period of blooming of the melliferous species is during March (11<sup>th</sup>-23<sup>rd</sup> March 2013) *Prunus armeniaca* L. (apricot) and its ends in August *Cucumis sativus* L. (16<sup>th</sup>-20<sup>th</sup>) (cucumber).

From the point of view of the apiarian weight the analyzed melliferous base is high. From the total of 48 melliferous species, 4 species (8.33%) have a very big apiarian weight; 7 species (14.58%) have a big apiarian weight; 32 species (66.66%) have middle apiarian weight and 5 species (10.41%) represent a small weight.

The biggest production of honey (kg/ha) was obtained from the species; *Rabinia pseudocata* L., *Tilia tomentosa* Moench (1200 kg/ha) and *Tilia cordata* Mill (600-1000kg/ha).

In the Alba County the beech forest and the evergreen ones still cover large areas in The Metaliferi, Trascau Mountains and Sebes. From the total surface of 624,200 ha of the county, 79,022 ha (12.66%) is covered by woods. The resin trees occupies an area of 34,044ha (435), the beech 28,494 (36%), the oak 8.036 ha (10%) and different other hard species 7,851 ha (10%) and different soft species 533ha (1%).

The trees from these woods, besides their forestry importance constitute an important source of nectar and pollen. In the same time the production of honey is completed by the production of manna. The manna honey is the kind of honey that doesn't come from the nectar of the flowers. Manna comes from two places: the sweet secretions of the trees (vegetal origin) or the sweet secretions of the aphids (animals origin). The bees remade the sweet drops in case the surrounding flora doesn't cover their necessity. The arboreal species that assure the manna production in the researched area belong to the following plants families: *Pinaceae*: *Abies alba* Mill, (fir tree), *Picea abies* L., H. Karst (spruce fir) having a big apiarian weight; *Fagaceae*: *Fagus sylvatica* L. (beech), *Quercus petraea* L, having a middle apiarian weight and *Corilaceae* with the species *Corylus avellana* L (hazel nut tree).

## CONCLUSIONS

In the Alba County there were identified 48 species of melliferous plants belonging to a number of 13 botanic families. The biggest number of melliferous species belongs to the families: *Lamiaceae* (12 species), *Fabaceae* (10 species), *Rosaceae* (8 species), *Asteraceae* (5 species). On the opposite side are the families: *Salicaceae*, *Grossulariaceae*, *Apiaceae*, *Ericaceae*, *Hipocastanaceae*, and *Liliaceae* with one representative.

The methods and the techniques used for the study were: the use of the bibliographic resources, the observation regarding the floristic inventory; the use of direct sampling, the quantitative methods, taking photos and the

determination of the botanic material in the lab.

The period of blooming of the melliferous plants in the researched area is during the period March-August, the most favorable period being during the harvesting from May to June.

Although the production of honey is not big with the exception of three species (*Robinia pseudacacia* L. *Tilia tomentosa* Moench and *Tilia cordata* Mill.) due to the succession of blooming during the active period, the melliferous plants assures together with the melliferous trees and shrubs an important maintaining harvesting for the development of the bee families.

There were identified 5 arboreal species without inflorescence (manna honey): *Abies alba* Mill. (fir tree) *Picea abies* L., H. Harst (spruce fir), *Fagus sylvatica* L. (beech), *Quercus petraea* L. and *Corylus avellana* L. (hazel nut tree). The species of resinous trees in the woods in the Alba County have the biggest weight producing in the same time manna honey in the hot years and few rains. The resinous trees are followed by the beech, the following species occupying a more restrained area and the soft species are almost of no importance.

Bees present an importance in the agricultural economy by the production of apiarian products as well as for their contribution to the pollination of the majority of the known plants.

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## ECONOMIC-FINANCIAL DIAGNOSIS BASED ON THE DATA PROVIDED IN THE BALANCE SHEET OF S.C. AUGER PETRUȘ S.R.L. IN THE INTERVAL 2009-2013

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### Abstract

*The analysis performed and presented in this paper is based on an agricultural business in the Călărași County, namely S.C. Auger Petrus S.R.L. The basic activity of the company is represented by cultivating cereals ecologically, on an area of 700 ha of wheat, maize, sunflower, peas, lucerne, etc. The analysed company expanded its ecologically cultivated area by purchasing new land, as well as by leasing new areas of land. Also, the company has its own silo made up of three units with a capacity of 3,000 metric tons each, a laboratory where to analyse the cereals on entering and leaving the silo, as well as good technical equipment, namely: tractors, combine harvesters, seeders, agricultural combiners, plows, trailers, irrigation pumping station. From the data processed and presented in the company's financial balance, we noticed the evolution of the efficiency level correlated with strategies employed by the company.*

**Key words:** net assets, working capital, the need for working capital, financial structure ratios, capital rotation ratios

### INTRODUCTION

The sustainable development of agriculture, an important objective of national and international agricultural policies, aims at implementing techniques and technologies which, in order to obtain agricultural produce, allow for environment protection without decreasing the producers' economic profitability[2].

The equity analysis in a company studies the insolvability risk, namely the company's incapacity to pay its debts to third parties [7]. Financial analysis is based on the data provided by Balance Sheet and Profit and loss account and the main used method is ratio method. [1,3,4,6].

In this context, we considered it necessary to monitor firstly, for comparison purposes, the assets according to their degree of liquidity and, secondly, the liabilities according to their degree of chargeability.

In this endeavour, this paper aims at presenting the results of the analysis facilitated by the assets and liabilities, so as to

emphasise the way in which long-term financial equilibrium can be estimated by means of identifying permanent needs and resources, and the short-term financial equilibrium can be estimated by means of identifying temporary needs and resources [5].

### MATERIALS AND METHODS

The basis in elaborating this paper was represented by the analysis of financial-accounting documents (the balance sheet accompanied by the profit and loss account) and the processing of data provided by the company, as well as capturing the economic performances by means of analysing the indicators that were representative for the interval 2009-2013.

The gathered data aimed at analysing the structural evolution of the indicators that highlighted the financial equilibrium at company level: net assets, working capital, the need for working capital, net treasury [7][8].

**The "Net Assets" (NA)** are calculated as Assets minus (Debts of less than one year plus Debts of more than one year)

**The „Working Capital" (WC)** namely Equity plus Debts of more than one year minus Fixed assets

**The „Need for Working Capital" (NWC)** namely (Current assets plus Advance payments minus Cash register and bank accounts) minus (Debts of less than one year plus Debts of more than one year plus Advance revenues)

**The „Net Treasury" (NT)** is the difference between WC and NWC

We also emphasised the structural evolution of the indicators specific to the diagnostic analysis of the company in the ratios system: financial structure ratios; the capital rotation ratios [7][8].

**The „Financial Equilibrium Ratios**

**The „Fixed assets financing ratios" (the working capital ratios) = Permanent Capitals/Fixed assets**

**The „Liquidity ratios"**

**The „General liquidity ratio" = Current Assets/Debts of less than one year**

**The „Low liquidity ratio" = (Accounts receivable +Cash)/Debts of less than one year**

**The „Immediate liquidity ratio" = Cash/Debts of less than one year**

**The „Solvency ratio" = (Equity + Total Debts)/Total debts**

**The „Debt-to-equity ratio"**

**The „Leverage ratio" (debt coefficient) = Total debts/Equity**

**The „Financial debts ratio" = Total debts/Permanent capitals**

**The „Financial independence ratio" =Equity/Permanent capitals**

**The „Reimbursement capacity ratio" = Debts of more than one year /Self-financing capacity**

**The „Debt cost" = Financial expenditures/Debts of more than one year**

**The „Assets and liabilities structure ratios"**

**The „Fixed assets ratio" = Fixed assets/Assets\*100**

**The „Current assets ratio" = Current assets /Assets\*100**

**The „Stocks ratio" = Stocks/Assets\*100**

**The „Commercial receivables ratio" = Accounts receivable/assets\*100**

**The „Cash ratios" = Cash/Assets\*100**

**The „Global financial autonomy ratio" = Equity/Liabilities\*100**

**The „Global debt-to-equity ratio" = Total debts /Liabilities\*100**

**The „Capital rotation ratios"**

**The „Capital rotation span through the turnover" = Total debts/TO\*360**

**The „Global rotation speed" = TO/Total debts**

**The „Stocks rotation speed" = TO /Stocks**

**The „Receivables rotation speed" = TO/Receivables**

## RESULTS AND DISCUSSIONS

The analysis of the company' balance sheet in the interval 2009-2013, as well as the analysis of the assets and liabilities, which are the basis for ensuring financial equilibrium, allowed us to identify the economic-financial status of the analysed company.

Firstly, we notice that the company's net assets, which express the value of the assets achievable at a given moment, was positive and had an upward trend, represented by a healthy economic management which maximised the company's value and strengthened the equity (Table 1). Except for 2012 when the company's net assets had a lower value – as the company recorded a negative financial result. In this situation, the company was directly exposed to the risk of insolvency.

Table 1. Evolution of the net assets (RON)

	2009	2010	2011	2012	2013
Total assets	3,394,122	3,181,114	3,528,760	3,414,387	4,765,168
Total debts	2,753,939	2,523,325	2,753,084	2,836,214	3,936,200
Net assets (NA)	640,183	657,789	775,676	578,173	828,968

Source: processed from the annual financial statements of S.C. Auger Petruş S.R.L. 2009-2013

On the other hand, the positive working capital recorded in the analysed interval emphasises that the company has enough permanent capitals that ensure the funding for net fixed assets and illustrate the fact that the current assets were higher than the short term debts.

Table 2. Evolution of the working capital (RON)

	2009	2010	2011	2012	2013
Equity	640,183	657,789	775,676	578,173	578,173
Debts of more than one year	1,836,068	1,404,152	978,279	142,862	373,352
Fixed assets	1,807,048	1,818,307	1,340,637	1,136,779	771,360
Financial working capital	669,203	243,634	413,318	-415,744	180,165

Source: processed from the annual financial statements of S.C. Auger Petruş S.R.L. 2009-2013

Thus we may say that the company was in a state of financial balance, due to the highly developed production activity, having enough liquidity to pay off short-term debts. The favourable situation in connection with the suppliers is also represented by the need for working capital whose positive value is due to company's investment policy which used short-term loans to sustain the activity. In 2012, the working capital recorded a negative value because the company's current assets were not enough to pay off short-term debts. For this reason, we may say that the company was in a state of financial imbalance.

The negative need for working capital recorded in 2012 emphasises the fact that the company temporarily cancelled its supplies and stock renewals.

Table 3. Evolution of the need for working capital (RON)

	2009	2010	2011	2012	2013
Current assets	1,587,074	1,362,807	2,188,123	2,277,608	3,993,808
Cash register and bank accounts	63,648	752	63,885	48,203	44,569
Debts that must be paid off in one year	917,871	1,119,173	1,774,805	2,693,352	3,562,848
The need for working capital	605,555	242,882	349,433	-463,947	386,391

Source: processed from the annual financial statements of S.C. Auger Petruş S.R.L. 2009-2013

\* advance expenditures, treasury bank loans, advance revenues have zero values

For this reason, we may say that the company was in an unfavourable state which affected the production activity.

The net treasury indicator results from the difference between the working capital and the need for working capital, but it is most convincing in connection to the financial equilibrium result at company level. The fact that the company records a net positive treasury with a downward trend reflects its dependence on external financial resources.

Table 4. Evolution of the net treasury (RON)

	2009	2010	2011	2012	2013
Financial working capital	669,203	243,634	413,318	-415,744	430,960
The need for working capital	605,555	242,882	349,433	-463,947	386,391
Net treasury	63,648	752	63,885	48,203	44,569

Source: processed from the annual financial statements of S.C. Auger Petruş S.R.L. 2009-2013

In order to assess the financial equilibrium achieved at company level, we analysed the financial structures ratios in the interval 2009-2013.

In the case of the analysis of the assets and liabilities structure ratios (Figure 1), by analysing the liabilities we noticed that the company's financial state deteriorated, as the global debt-to-equity ratio (the ratio of total debts to total liabilities) recorded the highest value in 2012, amounting to 83.1%. Regarding the global financial autonomy ratio, which examines financial autonomy in its overall funding, it increases slightly from 18.9% in 2009 to 22% in 2011, in the context in which the minimum acceptable level is de 30%.

On the other hand, the assets structure reveals an increasing fixed assets ratio until 2010 when it was 57.2%, which was especially due to the high ratio of technical equipment, machinery and installations. The decrease in the fixed assets ratio from 38% in 2011 to 16.2% in 2013 is favourable to the company because it will be able to perform a

technology conversion in order to adjust to the market requirements, by rapidly turning it into liquidity.

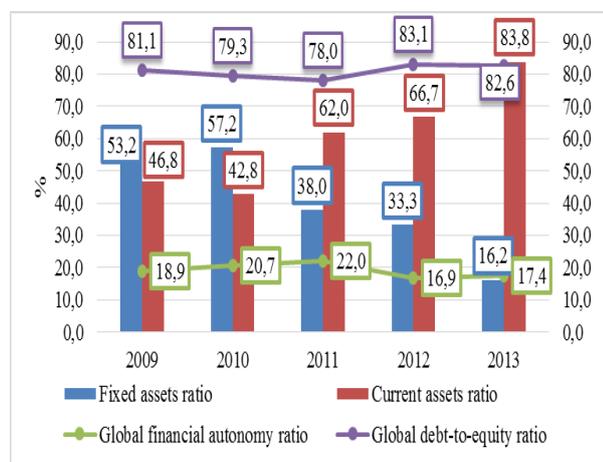


Fig. 1. Evolution of assets and liabilities structure ratios in the interval 2009-2013

The current assets ratio increased from 42.8 in 2010 to 83.8% in 2013. As shown in Figure 2, this is especially due to the increase in accounts receivable.

Regarding the stocks ratio, we notice a decrease from 29.9% in 2009 to 19.4% in 2013, indicating a favourable situation for the company because the decrease in stocks influenced the increase in turnover. The increasing commercial receivables ratio (from 15% in 2009 to 63.5% in 2013) emphasises the issues encountered by the company in reimbursing the clients.

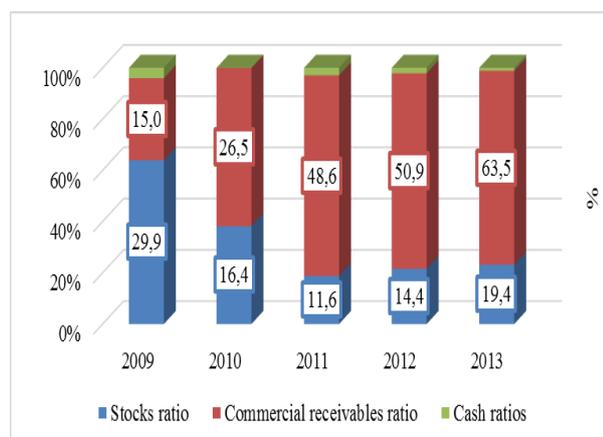


Fig. 2. Evolution of stocks rates, accounts receivable and cash in the interval 2009-2013

The fixed assets financing ratio (Figure 3), used in emphasising the company's financial equilibrium, decreasing in 2012 reflects a

worsening financing situation, even if we notice an increase in the value of long-term debts in 2009, 2011 and 2013.

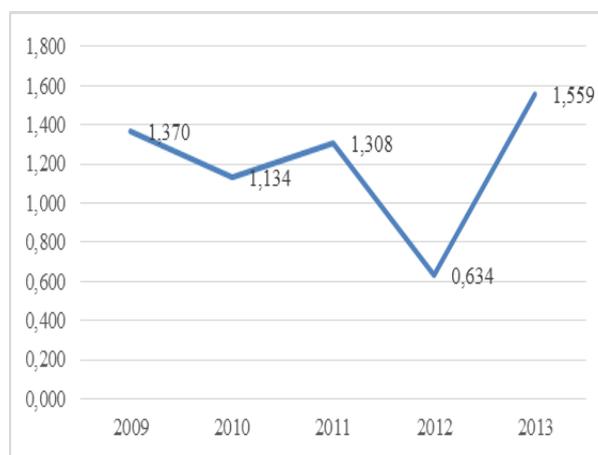


Fig. 3. Evolution of the fixed assets financing ratio (working capital ratio)

This fact is confirmed by the general liquidity ratio (Figure 4) which, through its value greater than 1, proves that the company will be able to pay off its chargeable debts. The decrease in this indicator in 2012 proves that the company underwent a shortage of treasury in the context of debts not being reimbursed.



Fig. 4. Evolution of liquidity ratios

The evolution of this indicator, accompanied by an increase in the low liquidity ratio in the interval 2009-2011, proves that the company does not use stocks to pay off chargeable debts and thus the insolvency risk is low. Nevertheless, the financial risk the company was exposed to was very high considering that the immediate liquidity rate was lower than 0.3%, which highlights the company's low capacity to reimburse debts using the existing

cash. But the company offsets this last indicator with an increasing value of the stocks and accounts receivable which allows for achieving an approximately constant solvency ratio (about 1.3) during the analysed interval.

The debt-to equity ratio of the analysed company could be highlighted using the analysis of the debt-to-ratios presented in Figure 5.

Thus, the financial leverage recorded values greater than one and decreasing from 4.302 in 2009 to 3.549 in 2011, which indicates the company's independence from its debtors.

On the other hand, the financial debts ratio, increasing in the analysed interval, caused difficulty to the company when accessing new bank loans, as this indicator exceeds the normal value of 0.5%, and the reimbursement capacity ratio reached 79.8 in 2010, the company having a normal financial independence ratio (under 0.5).

Regarding the debt-to-equity cost, it ranged between 0.2-0.6, having a higher value than the profitability ratio, which triggers a positive leverage effect on its return on equity.

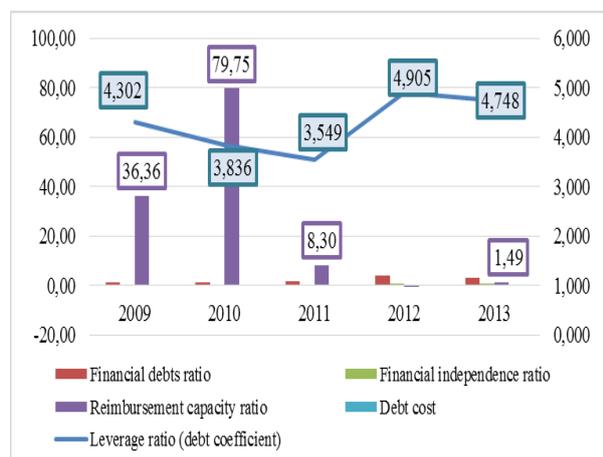


Fig. 5. Evolution of debt-to-equity ratios

Another perspective on the situation presented by the balance sheet indicators dynamics is provided by the analysis of rotation ratios which measure the equity items renewal rate, expressed by the number of rotations (Figure 6). Thus, the global rotation speed was of 0.6 rotations/year in 2010, as the company could

not cover its production activity with proceeds from its clients, but incurred short-term debts. Regarding the stocks rotation speed, in 2009 it was of 1.8 rotations/year; the number of rotations increased, reaching 5.8 rotations/year in 2011; because the company had more and more liquidity invested in stocks.

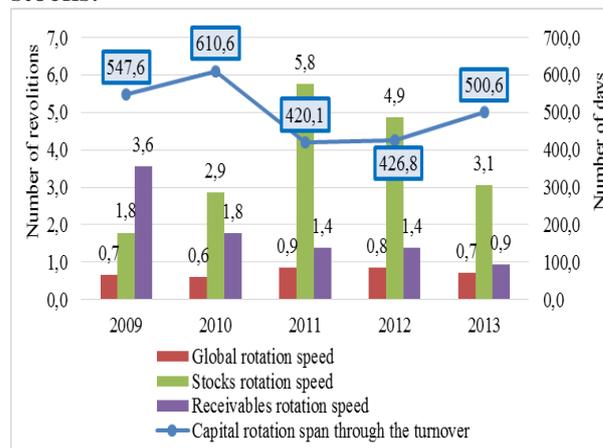


Fig. 6. Evolution of the stocks rotation speed, accounts receivable and capitals

The accounts receivables rotation speed reached only 0.9 rotations/year in 2013, from 3.6 rotations/year in 2009, so it allowed the company to have a negative balance as it could not recover its accounts receivable in an interval as short as possible.

## CONCLUSIONS

The analysis performed on the company S.C. Auger Petrus S.R.L., in the Călărași County, an agricultural business with vegetal profile, having 750 hectares, in the interval 2009-2013, aimed at capturing the financial equilibrium at company level, as well as the structural change of the indicators specific to the diagnostic analysis in the ratios system. The main conclusions drawn from this analysis are:

- the positive working capital emphasises that the company had enough permanent capitals to ensure the financing of net fixed assets;
- the positive net treasury values during the entire analysed interval indicates a good economic profitability, which allowed the company to remain on the market;

-the financial leverage values greater than one and decreasing indicate the company's independence from its debtors;

-the company underwent an insolvency risk in 2012 due to drought conditions - this affected the supplies and stock renewals which were temporarily cancelled and led to difficulties in reimbursing short-term debts.

-the company has an approximately constant solvency ratio, even in the context of increasing stocks and accounts receivable.

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## REMARKS ON THE ECONOMIC-FINANCIAL RATE OF RETURN FOR A LARGE ECOLOGICAL FARM IN SOUTHERN ROMANIA

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### *Abstract*

*Ecological agriculture is a developing sector in Romania, the farms' profitability depending directly on their physical and economic size. Large ecological farms are fewer in this sector, but due to their size they succeed in dealing better with high investments costs and in managing more effectively the process of production, animal husbandry or crop cultivation. The methodology used in this paper is based on the data gathered from an agricultural business of 750 hectares in the southern part of Romania and includes calculations specific to economic-financial rate of return, starting from the company's economic outturn account. The analysis performed and presented in this paper contributes to increasing the knowledge and importance of the information provided by this ecological farm's economic-financial rate of return.*

*Key words:* intermediate management balances, economic-financial rates of return

### INTRODUCTION

The main objective of conventional agriculture is to maximise economic efficiency, unlike ecological agriculture which monitors each of its components and characteristics considering the ecological, economic or social aspects, which have a balanced ratio [2]. In terms of the ecological aspect, it monitors the quantitative and qualitative potential of the soil, the economic one monitors the material and financial values in use, and the social one monitors the workforce [2].

Most farms involved in ecological agriculture in Romania own small areas of land, ranging between 5 and 50 hectares, and in many cases even less than 5 hectares. But in the southern part of Romania, where there are vast areas of land, with high technological potential, there are ecological farms larger than 50 hectare, some even amounting to 1,000-2,000 hectares. Our endeavour focused on the economic-financial analysis of such a large farm (750 hectares) in order to emphasise the economic-financial behaviour displayed under the economic conditions in the past few years. In this context, we deemed it necessary to

analyse the economic outturn account by applying the indicators which make up the intermediate management balances and the rates of return. Thus, this paper aims at analysing the research into economic-financial rate of return, as well as the diagnostic analysis of the company by means of the rate of return system.

### MATERIALS AND METHODS

The technical and financial-accounting data analysed in this paper were collected from the accounting records of the agricultural business S.C. Auger Petrus S.R.L. This is an ecological agricultural business in the Calarasi County, with about 750 hectares of land cultivated with wheat, maize, sunflower, peas and lucerne, etc.

*The methodology used in analysing the economic-financial rate of return for the surveyed company involved:* the analysis of the profit and loss account through the intermediate management balances: the trade margin; profit and loss for the period; value added; the gross operating surplus; the operating outturn; the profit and loss outturn; the self-financing capacity [1],[4].

**The ‘Trade margin’ (TM)** is the difference between Sales of goods and Purchases of goods

**The ‘Profit and loss for the period (Plp)** is the Sold outturn plus Stored outturn plus Fixed outturn

**The ‘Value added’ (VA)** is made up of the Profit and loss for the period plus the Trade margin minus Consumptions from third parties

**The ‘Gross operating surplus’ (GOS)** is given by (Value added plus Operating subsidies) minus (Employee expenditure plus Tax expenditures)

**The ‘Operating outturn’ (OO)** is the Gross operating surplus plus Other operating revenues minus Other operating expenditures

**The ‘Profit and loss outturn’ (Plo)** is given by the Operating outturn plus Financial and exceptional revenues minus Financial and exceptional expenditures minus Corporate tax

**The ‘Self-financing capacity’ (SFC)** namely the Gross operating surplus plus Other operating revenues minus Other operating expenditures plus Financial and exceptional revenues minus Financial and exceptional expenditures minus Corporate tax

We also monitored the structural and dynamic evolution of the indicators specific to the company’s diagnostic analysis by means of the rate of return system [1],[4].

**The commercial rates of return**

**The ‘Gross operating margin ratio’** is calculated as the Gross operating surplus divided by the Turnover

**The ‘Net operating margin ratio’** is the Operating outturn divided by the Turnover

**The ‘Value added margin ratio’** results from the Gross operating surplus divided by the Added Value

**The economic rates of return**

**The ‘Economic rate of return’** (economic asset rate of return) is given by the Economic outturn divided by the Total assets

**The ‘Accumulated gross margin ratio’** is calculated as Gross operating surplus divided by the Turnover

**The ‘Capital rotation coefficient’** results from the Turnover divided by the Total assets

**The ‘Gross economic assets rate or return’** is given by the Gross operating surplus divided by the Total assets

**The financial rates of return**

**The net ‘Financial rate of return’** namely the Net outturn divided by the Equity (without unallocated profit)

**The ‘Financial rate of return before tax’** is given by the Outturn before tax divided by the Equity (without unallocated profit)

**RESULTS AND DISCUSSIONS**

The company’s operation and rate of return are emphasised more eloquently by the information provided in the profit and loss account, by means of which we used the *intermediate management balances method* (Table 1).

The company’s trade margin is important in 2009, when the revenues from the sales of goods accounted for 12.85% of the overall sales. The low value of the margin especially in 2013 reflects the fact that the company promoted a trade policy of high prices, which influenced the decrease in sales.

By analysing this data, we notice that the company recorded a slight increase in the sales of goods compared to the purchasing price, as it targeted the sales of its own products.

Table 1. The intermediate management balances in the interval 2009-2013 (RON)

	2009	2010	2011	2012	2013
Trade margin	167015	0	1874	24425	-451280
Profit and loss for the period	966961	734979	2289982	1724933	2814792
Value added	-237184	-294835	-341550	315236	120460
Gross operating surplus	103129	94648	42432	-37092	353059
Operating outturn	102778	94648	142827	-168126	303251
Profit and loss outturn (Net profit)	50492	17606	117887	-197505	250795
Self-financing capacity	50492	17606	117887	-197505	250795

Source: processed from the annual financial statements of S.C. Auger Petruş S.R.L. 2009-2013

The profit and loss for the period has the highest values in 2011 and 2013, being influenced by the high value of the production sold, stored and used for own needs.

Also, the value added has positive values in 2012 and 2013 due to the increase in the value obtained by means of using the factors of production.

The negative values exhibited by this indicator in the interval 2009-2011 reflect the company's inability to add value to the goods sold, as the consumption associated with third parties does not exceed the dynamics of the profit and loss for the period.

The gross operating surplus, decreasing in the interval 2010-2012, reflects the fact that the company did not have the capacity to finance the operating activity and to pay off its equity and loans.

But, beginning with 2013, the increase in this indicator reflects a state of financial equilibrium reinforced by the operating outturn which reaches a maximum of 303.3 thousand lei in 2013.

The net profit and the operation self-financing capacity reached a maximum of only 250.8 thousand lei in 2013.

During this interval, the company was profitable, which is demonstrated by the positive values of the operating outturn and profit and loss outturn. In 2012, the company exhibits inefficiency throughout its entire operation.

The evolution of the rates of return (Figure 1) indicates the fact that the company's commercial activity reached an approximately constant level during the analysed interval.

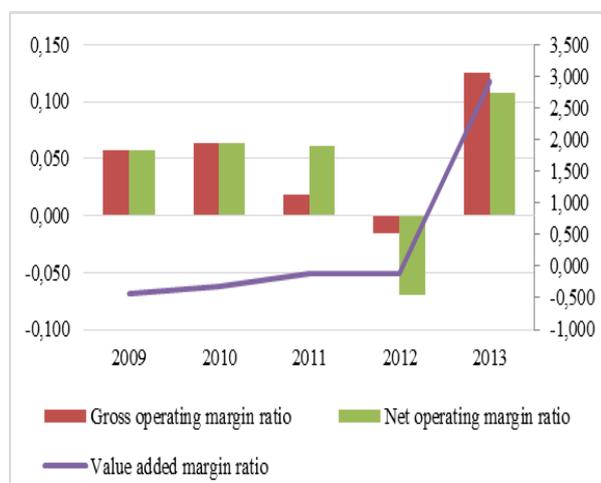


Fig 1. The commercial rates of return in the interval 2009-2013

The negative value obtained in 2012 by the trade margin ratio demonstrates the inefficiency of the operating activity.

Regarding the company's economic rate of return (Figure 2), increasing in 2009, 2011 and 2013, it reflects the efficiency of using the equity allocated to the company's production activity, which is increasing, and it demonstrates that the company had a regular level of financial equilibrium.

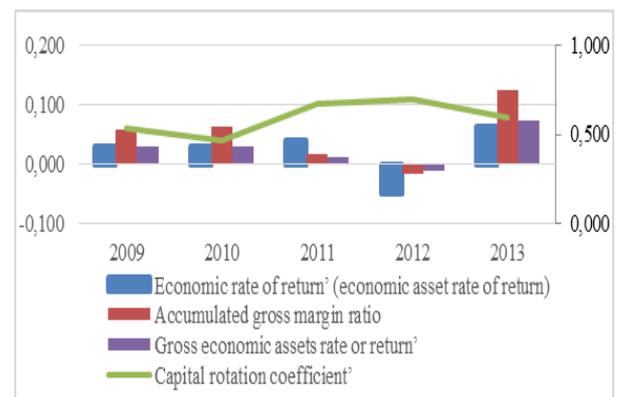


Fig. 2. The economic rates of return in the interval 2009-2013

Under these conditions, the financial rate of return (Figure 3) increased from 0.903 in 2011 to about 1.921 in 2013, which demonstrates the company's capacity to obtain net profit through its equity, while in 2012 the value was negative.

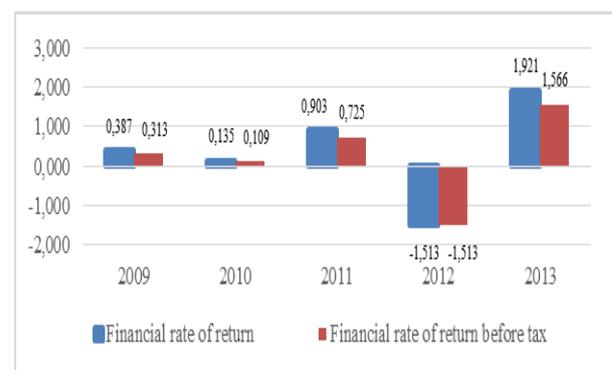


Fig. 3. The financial rates of return in the interval 2009-2013

The rates of return indicate that the company was slightly efficient in the interval 2009-2011.

## CONCLUSIONS

The economic-financial analysis (2009-2013) performed for an ecological agricultural business of over 750 hectares allowed us to draw the following conclusions:

-the company managed to secure a higher value added per product as compared to 2009;

but it decreased its commercial activity;

-the economic rate of return almost doubled, especially in the context of faster capital rotation;

-the net financial rate of return increased almost five times compared to 2009, reflecting the increase in the equity capacity to yield profit.

In conclusion, the company has a good economic-financial status, with an overall increase in economic and financial rate of return, which directly depends on climatic and environment conditions which can have a negative effect on its market stability (as was the case in 2012).

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## STUDY CONCERNING FOREST ECOLOGIC RECONSTRUCTION ON DEGRADED LAND IN RANGE OCOLUL SILVIC "VALEA CIBINULUI", SALISTE, ROMANIA

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### **Abstract**

*The study examines the stationary conditions, determine solutions to improve degraded land, assessing the cost of ecological restoration work needed in the area of improving degraded lands at Rapa - Copăcel, estimated benefits of the project and its viability. Objectives of the paper: need to introduce in the circuit of productive forest lands within the improvement of the area "La Rapa - Copăcel" danger zone where activation of the phenomena of degradation (erosion, landslides) predominate. Out of 102.33 ha as area for improvement, the effective area of 101.6 ha is forested, representing a difference of 0.73 ha, 1.2 m wide strip that is to be the place for hedges. Viability of the project results from the ratio calculated benefit/cost = 2.3 which justifies the need and opportunity for investment. Opportunity project results in immediate and potential beneficial effects of the a forestation namely stabilization by stopping land erosion and landslides with positive influences on human settlements, infrastructure and communication lines, reducing the intensity of land degradation processes and the gradual improvement their production capacity as the direct effect of forest cultures, the role of forests in improving the main factors of environmental water, air, climate, reducing extreme values of climatic factors (temperature, evapotranspiration, wind speed, humidity) and air purification by the ozoning phyithoncide releasing the destructive effect of microbes; regulating rainfall, ensuring constant and permanent water flow, reducing the effects of drought and floods, improving stationary conditions for the maintenance and development of herbaceous vegetation and forest. It specifies the role and sanogene functions of the forest – ambient of the forest, an constructive and necessary factor for the ecosystems and human health, and its other roles: aesthetic role "attribute of all forests" - contemplating a sylvan landscape with positive effects on the psyche (lights, shadows, colors, contrasts, echo), thus improving the appearance of the landscape area surrounding Loamnes; diversifying and increasing social functions, conservation of biodiversity, creating a favorable climate for wildlife, creating database, nectarous economic effects are related to obtaining wood in a wood shortage area.*

**Key words:** degraded land, af forestation, environment, forestry, reconstruction

### **INTRODUCTION**

Ecological reconstruction of soils must take into account general measures of protection of the land and specific measures for agriculture, presented in previous reports. [3, 4, 5, 10] It requires sustained promotion of the objectives and measures set out in the National Strategy and National Action Plan to combat desertification, drought and land degradation. [12] According to a lot of researchers [2, 7, 9] the Romanian development depend of such of strategic objectives like as: application of the principles and practices of sustainable development into the programs and policies of Romania; reaching the average level of existing

sustainable development indicators in EU member states.

### **MATERIALS AND METHODS**

The objectives of the research are:(a) to design, compare, and implement solutions for ecological restoration of degraded lands; (b)to identify and test recovery techniques of degraded lands; (c) ecosystem restoration; (d) to identify revegetation techniques.

Describe actions for ecological restoration of degraded lands and improvement of soil quality:

In the analyzed territory, demarcated twelve units Station (U.S.). These were grouped into four types of resorts degraded by erosion and

displacement (TS). The four types Station, with compositions (formulations) suitable afforestation (F1) ... (F4) are:

**-TS I** - Land tilt (less 60) affected by weak to moderate erosion with regional soils (brown clay illuviated), moderately deep, loamy, representing 36.73 ha.

(F1) 50St 25Fr (C, m Pa, Pa, St r) 25Lc (Sat, Pd) with 5000 seedlings / ha in the hearth of 80x60 cm, 40x40x40 cm pit at St. 30x30x30 cm and the rest of the species . with loamy texture.

**-TS II** - Courts strongly undulating ground tilt (less 80) affected by recent landslides stepped weak to moderately fragmented, largely maintaining the humus horizon surface without excess water with moderately deep soils with clayey texture -clay, low carbonated (regosols moderately eroded islands pseudorendzine) on clay marl deposits on the substrate marl and clay, representing 27.87 ha. (F2) 75 Sc 12.5 Fr (Ml, C, Str) 12.5 Lc (Sat, Pd) - 5000 seedlings / ha; mixture in bunches of 100-150 m<sup>2</sup> acacia and bunches of 25-40 m<sup>2</sup> for mixed species and shrubs. Preparing the ground: hearts of 80/60 cm.

**TS III** - Undulating land with low slope (5-60) affected by old and recent landslides, grass, local hydrophilic species with a less disturbed soil complex (pseudo regosol rendzinic not eroded or poorly eroded soil gleic representing 34.36 ha.

(F3) 50 Fr 25 St r (C, Pa, MI) 12.5 A nn.12, 5LC (Let Pd) with 5000 seedlings / ha (ash, the best land, red oak, the more settled portions with poor drainage, alder, red oak under the same conditions and stagnant water around microplateau). Preparing the ground: Vetra 80/60 cm

**-TS IV** - Micro-depressions with permanent excess of water, hygrophile vegetation (reed, rush, rush) pseudogleic marshy soil, representing 2.44 ha. (F4) 50An.n 50Sa with 5000 seedlings / ha.

Site preparation: hearts of 80/60 cm.

## RESULTS AND DISCUSSIONS

### Preparing land for afforestation

How to prepare the land for most situations, it is in the form of hearths, process which was

applied to 70.45 ha, given that the land was mingled, inaccessible to tractor. The 31.15 ha land not affected by landslides, but powerful fallow, it was provided that the preparation by plowing US2, US9-integral and U.S. 6 part.

**Hearts** (with dimensions of 60x80 cm with the longer side contours) were arranged in a parallelogram, at a distance of 1.0 m on the level curve and 2.0 m on the line of greatest slope. hearts depth is 12 to 15 cm, provided that penetrate beneath the fallow to be removed.

**Plowing** was done with tractor drawn plow at a depth of 25-30 cm along the curve. Was plowing followed by disking operation executed disc harrow, tractor mounted, working depth of 10-15 cm. It is advisable to prepare the ground by plowing a year before plantation.



Photo 1. Preparing the land

### Paving the hearth and making plantations

The land affected by weak to moderate erosion, but not subject to landslides, generally former arable land, fallow, the main species was chosen oak base that supports both heats of summer, even accompanied by drought and frosts in winter, plus compared to the oak, vegetation and soils can compact, relatively high clay content.

As a species mixture was introduced, 25% ash, and the privet bushes was chosen. Between oak and ash mixture (sycamore) was done in bunches, not to be removed first species, due to the delay of growth in the early years; Instead, between oak species and shrubs help on the one hand, and between ash species and shrubs help, on the other hand, the mixture will be private. 5000 seedlings were used per hectare, 1.0 scheme x 2,0 m.

In order to combat mildew oak crops was

sprinkling them with Sulfavit (wetttable sulfur) for five years.

Said composition (F1) was applied to 36.73 ha (representing 37% of the effective area of woodland) in the US2, US4, US5, US6% to US9.



Photo 2. Preparing the land and making plantations

Undulating land affected by landslides updated with moderate fragmentation and prevalence soil surface species basis, participating in 75%, the locust, thanks to its breeder of degraded land: planting less demanding with high power tillers and drajonare, with rapid growth in the early years, securing and covering the field after four or five years after planting. His choice was considered perimeter results in another improvement from the nearest perimeter Rapa - Copăcel and having conditions similar to its stationary: acacia brushes created 18 years ago by former land slide realized a diameter average of 10.6 cm and a height of 11.7 m, with well conformed copies, is a Class III production. At present, the land is consolidated and stabilized against landslides. As main species mixing, chosen as in the previous case, all the ash entering the formula in 12.5% likely to be accompanied by Malin American bird cherry, red oak. It should be noted that, except for red oak, all species proposed for mixed formulas (F1) and (F2) are also represented in nearby crops or as separate patches (ash, cherry pussy, Malin U.S.) or disseminated, in both cases with a good development.

The mixture will be in bunches of 100-150 sqm acacia and 25-40 sqm of mixed species and shrubs. Ash will be installed preferably free places or even opposed slight slope, located at the base of old gear slipping

Instead, American Malin can be introduced into the mixture with acacia (safer on the edge bunches of acacia), being one of the few species that can withstand the sublevel acacia. Among the shrubs mentioned in the formula, underbrush white hawthorn can be used for fixing the sliding surfaces detachment with small bump (0.5 - 1.0 m) with underbrush, we obtained very good results on terms plantations similar and hawthorn as noted increases spontaneously, under the most difficult, even within the perimeter at Rapa - Copăcel.

Culture density of 5,000 seedlings/ha. Said composition (F2) is applied to the 27.87 hectares (27% of the effective area of the perimeter) in US3, US7, US12.

Low sloping land with old slides and present a less disturbed soils complex, sometimes with pronounced wet and hygrophile vegetation, the main species used is ash, participating in 50%; Alternatively, you can use red oak (25%) and black alder (12.5%), the rest of the composition is completed by shrubs. Ash is planted on well-drained land, red oak, poorly drained portions and alder, especially around microplateau stagnant water. 5000 were used seedlings / ha.

Said composition (F3) is applied to the 34.56 hectares (34% of the effective area of the perimeter of) the lower portion of the study most of the units.

The micro-depressions with permanent excess water, hydrophilic vegetation (reed, rush rush) were used in equal proportions, the white alder and willow; introduced especially towards the periphery and around those microzones and the second, on their premises, the model performed even within the perimeter where there are enough copies (some willow căprească) installed naturally in such pools.

Insofar as land allows, we can do that microzones drainage using open ditches.

Said composition is applied to 2.44 ha (about 3% of the actual forested perimeter), the lower portions of most units of study.

As technology work as planting seedlings expected to be made in ordinary pits 40x40x40 cm for oak from formula (F1) and

30x30x30 cm for the remaining species in the prepared field as hearths or plowing.



Photo 3. Black alder and willow seedlings by excess moisture in micro-depressions

## CONCLUSIONS

The analysis documentation and discussions revealed the aspects mentioned below.

The study examined the stationary conditions, determined solutions to improve degraded land, assessed the cost of ecological restoration work needed in the area of improving degraded lands at Rapa-Copăcel, estimated benefits of the project and its viability.

The necessity of putting on the productive forest land in the area of improvement of their La Rapa - Copăcel, the danger zone activation phenomena of degradation (erosion, landslides) predominate.

Of the total 102.33 ha as area destined to be improved, the effective forested area was 101.6 ha, representing a difference of 0.73 ha 1.2 m wide strip that is to be considered hedges.

Estimate work in the project is estimated at 2,406,193 lei.

The benefits resulting from this project regarding the wood mass and carbon storage totalized Lei 5,524,281. Viability of the project resulting from the benefit/cost ratio is 2.3 which justifies the need and opportunity for investment.

The project opportunity results from the benefic effects of immediate and future reforestation works as follows: [8]

-Stabilization by stopping land erosion and landslides with positive influences on human settlements, infrastructure and communication lines

-Decrease the intensity of land degradation processes and the gradual improvement of their productive capacity under the direct effect of forest crops.

-The role of the main factors in improving the forest environment water, air, climate

-Decrease extreme values of climatic factors (temperature, evapotranspiration, wind speed, humidity).

-Air purification by fitoncide ozonizing and releasing the destructive effect of microbes.

-Adjusting rainfall, ensuring constant and permanent water flow, reducing the effects of drought and floods, improving stationary conditions for maintaining and developing herbaceous vegetation and forest.

-The role and functions of the forest sanogene - constructive and necessary factor for the forest environment health human ecosystems.

-Aesthetic role "attribute of all forests" - contemplating a forest landscape with positive effects on the psyche (lights, shadows, colors, contrasts, echo), thus improving the appearance of the area surrounding landscape of the Loamnes, diversification and increasing social functions.

-Conservation of biodiversity.

-Creating a favorable environment for wildlife.

-Create database bees.

-Economic effects are related to the production of wood in a wood-deficient area.

The role of forests in retaining dust and industrial pollutants - carbon storage through photosynthesis given that "pollution has no borders." [1, 11]

To adopt appropriate solutions as it is necessary to pursue further work carried out and perform experiments on different species best suited to stationary conditions, afforestation technologies adopted, the effect of amendments and fertilizers etc. [6, 13]

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## THE IMPACT OF FERTILIZATION AND FOLIAR STIMULATION PRODUCTS BOTH ON INCREASING THE RESISTANCE TO MAJOR PHYTOPATHOGENS ATTACKS, AND ON INCREASING THE QUANTITY AND QUALITY OF WINE GRAPES HARVEST

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### Abstract

*The paper aimed to demonstrate the impact of fertilization and foliar stimulation products both on increasing the resistance to major phytopathogens attacks, and on increasing the quantity and quality of wine grapes harvest. Applying the foliar fertilizer products Plonvit Kali (c1), Tytanit (c2) and Optysil (c3) to vines, for a period of three years (2011/2013), in phenophases of intensive growth of shoots and grapes at approved dosages, simultaneously with pesticide treatment, not only a reduction of pathogenic fungi attack was obtained, but also and an increase of harvest without diminishing the quality of the grapes.*

**Key words:** *phytopathogens attacks, quality of wine grapes, fertilization stimulation products, foliar stimulation products*

### INTRODUCTION

As a result of considerable practical experience from 1987[1], 1990[2], 1993[3], 1994[4], 2001[5], the impact of certain chemicals in the composition of foliar or basic fertilizers on improving resistance to disease in plants was observed, acting by favoring the synthesis of resveratrol or other stilbene compounds. Based on these observations, in the period 2011-2013, in the viticultural centre of Valea Călugarească, we experimented on an area of 6050 m<sup>2</sup> on the effects of fertilizer and stimulation products for increasing resistance to disease attack.

For this purpose, three products were selected: a crystalline foliar NPK fertilizer (c1), which is soluble in water and has in its composition (g / kg product): total nitrogen 110; P<sub>2</sub>O<sub>5</sub> – 120; K<sub>2</sub>O – 380; MgO – 1; SO<sub>2</sub> – 11; B -0.3; Co- 0.01; Cu – 0.3; Fe- 1.5; Mn – 0.7; Mo- 0.02; Zn – 0.7 and Titan – 0.01. The treatment was done with 1kg / ha / in phenophases BBCH 61 (start blooming) BBCH 71 (beginning of fruit development) and BBCH 75 (berries reaching 50% of normal size).

Another product used (c2) is based on titanium and has in its composition (g/l) MgO

65, SO<sub>3</sub>-130 and Ti- 8.5. It was administered at a dose of 0.2 l / ha / treatment in the same phenophases as the previous product (BBCH 61, 71 and 75).

The last item checked (c3) has in its composition 200 g/l SiO<sub>2</sub> and Fe 24 g/l. It was administered at a dose of 0.5 l / ha treatment in phenophases BBCH 61, 71 and 75.

The three products have good compatibility with a large number of plant protection products.

In order to check the effect of these products, we determined the frequency, the intensity and the degree of attack produced by the major damaging agents, as well as the quantity and quality of the harvest.

### MATERIALS AND METHODS

The parameterization of the effects of the phyto-sanitary intervention programs on the main plant phytopathogens was performed by determining the intensity and severity of the produced attacks and by calculating the degree of attack.

The frequency of attacks is the relative value of the number of attacked plants or plant organs (n) relative to the number of plants or

organs observed (N).

For pathogenic fungi that cause mildew and powdery mildew in grapevine, the frequency was determined in three phenological moments: after blooming, in berry growth and at grapes compaction. For the gray mold only in the compaction phenophase – ripe start. Measurements were performed by direct observations on a number of plants 100 leaves and 100 grapes for each iteration.

The intensity of the attack is the relative value which gives the degree of plant attack coverage or range, a ratio of the infested area to the total area.

The intensity, as well as the frequency, were determined for pathogenic fungi that cause mildew and powdery mildew in grapevine in three phenological moments: after blooming, in berry growth and at grapes compaction. For the gray mold only in the compaction phenophase – ripe start. Measurements were performed by direct observations on a number of plants 100 leaves and 100 grapes for each iteration.

The degree of attack (GA) is the expression of the expanded seriousness of the attack on the plant or on the total number of plants on which we perform observations.

## RESULTS AND DISCUSSIONS

### 1. The influence of fertilization and foliar stimulation products experimented upon in the viticultural centre of Valea Călugarească over the period 2011 -2013 regarding the degree of attack (Ga%) produced by mildew (*Plasmopara viticola*)

The observations performed were related to the frequency and intensity of attacks in three phenophases (after blooming, berry growth and compaction) and we calculated the ratio of the degree of attack (frequency x intensity per 100). In terms of the favourability degree for the development of the fungus that causes mildew in grapevine, 2011 seemed to be the best: the attack intensity to the untreated control was 76%. 2012 and 2013 registered less amounts, with mildew occurring only sporadically.

Distinct differences were observed, significant and very significant, due to the influences of all products tested vs controls. The product

which has silicon and iron in its composition (C3) manages to provide the plant, both leaves and grapes, increased resistance to the fungus attack (66% as compared to 100% in the control). Results on the influence of foliar stimulation products tested on the attack (GA%) produced by *Plasmopara viticola*, in 2011-2013, are displayed in the chart below (Fig. 1):

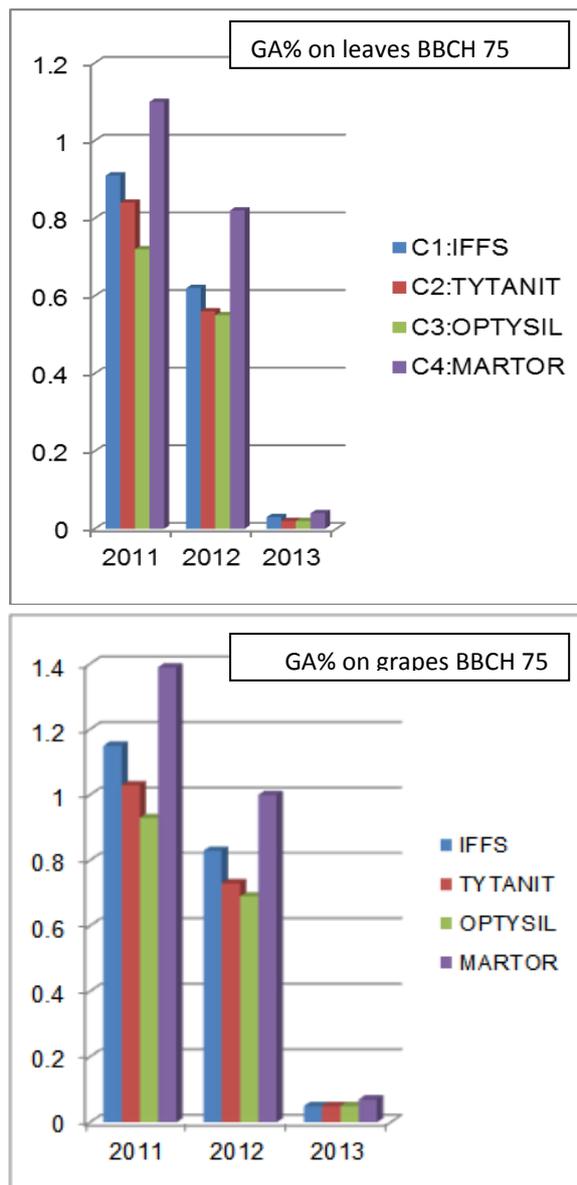


Fig. 1. The influence of foliar stimulation products tested on the attack (GA%) produced by *Plasmopara viticola* on leaves and grapes, in 2011-2013

### 2. The influence of fertilization and foliar stimulation products experimented upon in the viticultural centre of Valea Călugarească over the period 2011 -2013 regarding the

**degree of attack (Ga%) produced by powdery mildew (*Uncinula necator*)**

In 2011 the pressure of infection was high, and the intensity of the attack to the untreated control was 81.4%. Although the threat of infection was very low in 2012 and 2013, results on the impacts of fertilization products show the same trend.

After analyzing the results, we can conclude that the fertilization and stimulation products contribute to increasing plant resistance to this fungus. We present the results in graphical form illustrating the influence of fertilizing and foliar stimulation products tested on the degree of attack (Ga%) produced by powdery mildew (*Uncinula necator*) on vines in 2011-2013 (Fig. 2).

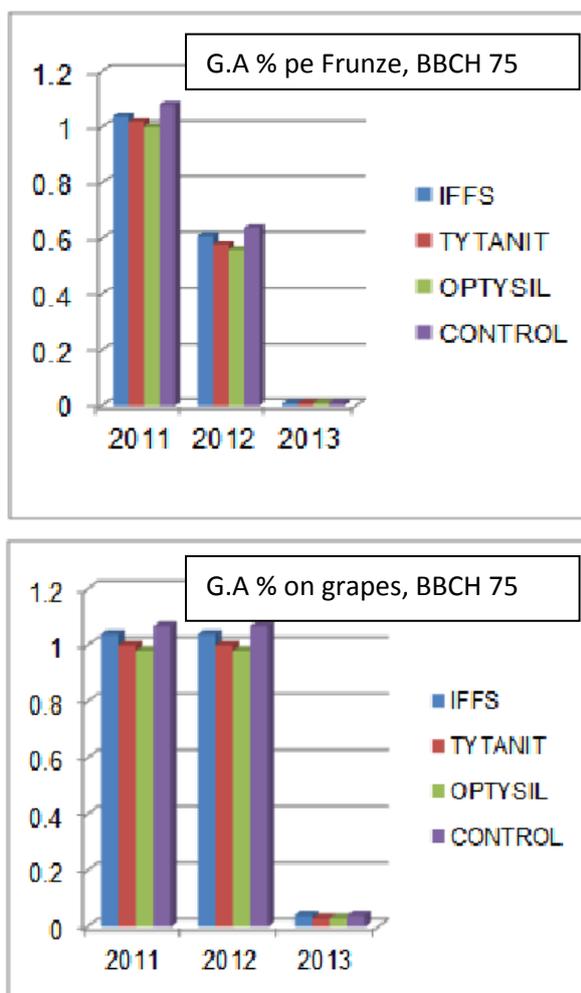


Fig. 2. The influence of fertilization and foliar stimulation products tested on the attack (GA%) produced by *Uncinula Necator* on leaves and grapes, in 2011-2013

**3.The influence of fertilization and foliar stimulation products experimented upon in the viticultural centre of Valea Călugarească over the period 2011 -2013 regarding the degree of attack (Ga%) produced by the grapevine gray mold (*Botrytis cinerea*).**

In the case of gray mold we also note the positive influence of the tested substances on vine plant resistance.

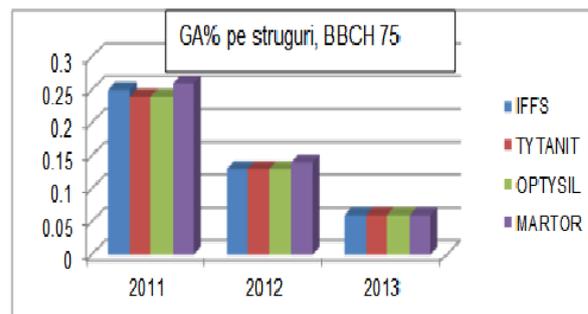


Fig. 3. The influence of fertilization and foliar stimulation products tested on the attack (GA%) produced by *Botrytis cinerea* on grapes, in 2011-2013

We can clearly observe a production increase brought by the use of the tested products in all three years of experiments:

Table 1. The influence of fertilization and foliar stimulation products experimented upon in the viticultural centre of Valea Călugarească over the period 2011 -2013 regarding the grape production (kg / vine plant)

Year	2011	*	2012	*	2013	*
Product	Kg/vine BBCH 85	%	Kg/vine BBCH 85	%	Kg/vine BBCH 85	%
c1 - IFFS	2.8	112.5	3.08	114.9	3.68	105.4
c2 - TYTANIT	2.71	108.8	2.98	111.2	3.54	101.4
c3 - OPTYSIL	2.79	112.1	3.07	114.6	3.55	101.7
c4 - control	2.49	100.0	2.68	100.0	3.49	100.0

\*difference vs control

**4.The influence of fertilization and foliar stimulation products experimented upon in the viticultural centre of Valea Călugarească over the period 2011 -2013 regarding the the content of sugar in unfermented wine.**

According to the chart below we can say that the products have brought a production increase without significantly influencing the content of sugar in unfermented wine.

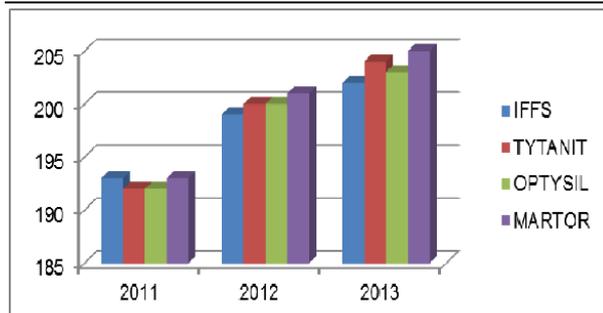


Fig. 4. The influence of fertilization and foliar stimulation products over the period 2011 -2013 regarding the content of sugar in unfermented wine

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## CONCLUSIONS

The fertilizing and stimulation products had an important impact on production resistance to damaging agents. These results combine the effects of two influences: intake of nutrients and the effect of reducing the damage caused by phytopathogenic agents. If we consider the influence of these products in reducing the mildew attack on grapes, it was by 27-36% lower.

Among the tested products fertilizer C1 is constantly noted, with distinctly significant differences, also demonstrating stimulation effects, alongside with the product named Optysil which, as we remember, diminished the studied pathogenic fungi degree of attack of (mildew, powdery mildew, gray mold).

These products make a crop contribution ranging between 110 – 115 % in the years 2011 – 2012. In 2013, when the pressure of infection was very low, these products influence on yield was of only 102-105%.

It is also worth noting that in the case of production increases, the crop quality, expressed by the accumulated sugars, was not diminished.

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## NATIONAL AGRICULTURAL POLICY

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### Abstract

*This article aims to point out that Romania believes that the CAP is essential for achieving all the objectives of the 2020 Strategy, acting in an integrated manner with other Community policies, the contribution which they make through employment in agriculture and related sectors, contributing to the social inclusion objectives and planning, through the role it can play alongside other policies (environment, cohesion, research and development, social) in an effort to achieve the target of reducing emissions of greenhouse gases such as and the substantial role of knowledge and innovation in agriculture and food industry, to achieve the goals of competitiveness in the local and global market and addressing environmental issues. For CAP objectives to be achieved is still needed in view of the EU 2020 strategy to ensure adequate funding of the CAP.*

**Key words:** competitive agriculture, social inclusion, Common Agricultural Policy

### INTRODUCTION

Romania is a country of farmers. Its long history is a rich agricultural country deeply tied to land people. The peasants of Romania went through many crises and changes over the centuries, but their relationship with the land remained strong. Now, Romanian farmers are again at a crossroads. The last twenty years have meant for Romania restructuring of agriculture to the former communist system, with a new focus on the market. With the fall of communism in the early 1990s, the Romanians were returned to rural areas finding comfort and stability in small-scale agriculture [7].

Today, many of the old challenges remain, and new challenges have emerged. In twenty years, Romania has turned into an open country, a part of the global market. Since joining the EU in 2007, Romania began to face new problems, and began to work in a new framework to solve these problems. Moving, Romania must find its place in Europe and must learn to thrive in a new set of circumstances.

Romanian agricultural population size is overwhelming, with an unprecedented percentage of the population in Western

Europe since industrial revolution. Romania's EU accession changed the image and character of European agriculture, and now the EU is in the process of changing the image and character of Romanian agriculture. Romania has an agricultural population five times higher than the EU average and double compared to the next country in line. The fall of communism in 1989, 28.5% of the population was engaged in agriculture. This percentage increased to 43.5% in 2001, as the population brought the communist system in urban areas moved back to the relative stability of rural and subsistence agriculture. By 2008, the population involved in agriculture decreased to approximately 30%, as the population began to die old and new opportunities appears in urban areas. This percentage is staggering compared to Western Europe, where the population involved in agriculture in France was 3.4%, 2.2% in Germany and the UK is only 1.4% of employment. The importance of agriculture in Romania simply can not be ignored.

Romania is a relatively large country in the EU, with particularly good farmland. Romania is a predominantly rural country, with 60% of the country is classified as rural. Much of the population lives in rural areas,

with 47% of the population living in rural areas since 2008, much higher than the EU average of 15%. Rural areas in Romania occupy about 14.7 million hectares of farmland and comprise more than four million farms.

Within the EU, Romania appears to be the country most dependent on agriculture and the country with the largest number of farmers from Union as a whole. Not only has the highest percentage of farmers in the EU, farmers in Romania represent 20% of the entire workforce in the EU mobilized in agriculture. Agriculture represents 6.6% of Romania's GDP [9].

## **MATERIALS AND METHODS**

In order to set up this paper a large documentation was needed based on the EU Regulations regarding CAP and also using the main articles published on this topic during the last years. A critical approach of the collected information was carried out by authors and the core of the results belongs exclusively to their opinions.

The main idea was to emphasize the fact that CAP is essential for achieving all the objectives and priorities included in the EU 2020 strategy.

Social inclusion objectives and planning play an important role in the EU policy besides the other objectives regarding the other environment, cohesion, research and development, social policies.

As the EU strategy for the prospect 2020 to be achieved, it needs a corresponding funding, a reason to analyze this aspect in the present paper too.

## **RESULTS AND DISCUSSIONS**

### **A new CAP for the period 2014-2020**

CAP was created by the Treaty of Rome in 1957. He began operation in 1962 and had the following objectives: to increase productivity, ensure fair living standards for the agricultural community, to stabilize markets [5], ensure the availability of food and provide reasonably priced food. Today the CAP is

acting as an umbrella under which agriculture works in the European Union. Policy is extremely complex, consists of several different sections and often contradictory.

In February 2014, the European Commission published a report summarizing the main directions of development of this common policy in 2014-2020 and policy implications at national level, but also on agricultural production in the Member States. According to the analysis CAP is a bridge between the expectations of EU citizens' regarding agriculture and farmers expectations in countries facing economic and environmental challenges, is also an investment in the Community budget in a strategic sector in terms of food security, environment and growth economic rural areas [4]. To meet these expectations in the new context of financing, funds allocated under the Common Agricultural Policy and rural development programs of the Member States will be mainly directed towards the following objectives: increasing the competitiveness of European agriculture on global and national level; diversity conservation farming systems in EU countries; thus adapting agricultural production to new environmental challenges of climate change and protection of natural resources [2].

In this context, it should be noted that in June 2013, the Community institutions have adopted a regulatory framework that draws new lines of development and reform of the CAP. New CAP reform was shaped by a full public debate with citizens and the national community, with the objective of enabling adaptation CAP to new challenges in terms of EU rural development sector in the medium and long term. According to the new directions of development and reform of the CAP the period 2014-2020, it will focus on three pillars: ecology and efficiency in agriculture, ensuring a healthy diet at affordable prices and revitalization of rural communities.

### **The impact of the new EU CAP on the Romanian agriculture development**

Romania strongly supports the idea of a fair distribution of direct payments between

Member States. Also claimed and asserted that the future CAP should not be kept current discrepancies, so that the CAP should not be a policy with two speeds.

Romania does not consider appropriate the Commission proposal for introducing an upper limit (cap) the level of direct payments to large farms. In this regard, on 21 February 2011 at Brussels, Czech Republic, Germany, Italy, Romania, Slovakia and the UK have signed a joint declaration on opposition to the introduction of any maximum threshold of direct payments received by large farms, suggested in Commission Communication on the CAP after 2013.

Romania considers the opening shown by the Commission to support small-scale agriculture by introducing a support system dedicated to small farms contributing to strengthening competitiveness and maintaining the vitality of rural areas. In this respect it will support the definition of new eligibility criteria simpler to manage and easier to implement.

It also will support measures to create opportunity for young farmers to get a decent income, giving them the opportunity to become more involved in agriculture and its rejuvenation, given the current context of active aging in agriculture [6].

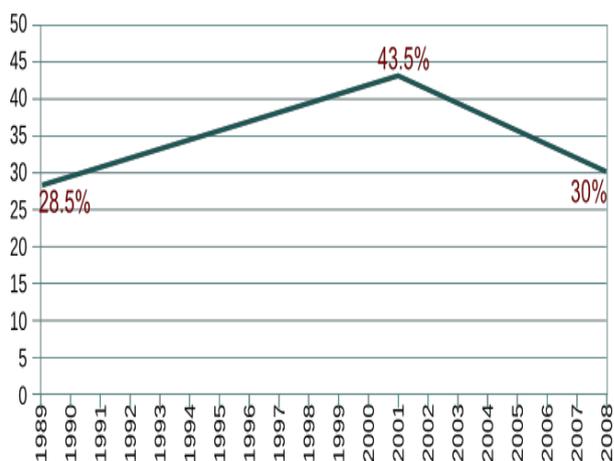
Romania supports maintaining current market intervention instruments to act as a safety net in times of crisis [3] and looking for new tools in order to maintain a competitive EU agriculture in relation to third countries; continuation after 2013 of sectorial programs (wine, beekeeping, disadvantaged, etc.) having a significant impact on Romania, as well as specific support currently provided under art. 68 of Regulation no. 73/2009.

Thanks to the new socio-economic context created by the onset of the financial crisis, the agriculture sector should be recognized as an integral strategic and active community, impacting not only the provision / supply of foodstuffs, but also on society by creating jobs and enhance the non agricultural activities in rural areas.

EU enlargement and the specific rural areas require a new vision to address the common

agricultural policy in order to comply with its basic principles: maintaining a single market; financial solidarity [11].

The social dimension of agriculture is important as this sector contributes significantly to employment in rural areas and ensuring a fair standard of living for farmers (see fig. No. 1).



Source: www.eurostat.ro

Fig. 1. Romanian population employed in agriculture between 1989 and 2008

Agriculture and in particular Pillar II contributes to economic and social development through rural development, maintaining cultural heritage, proper use of natural resources, especially through job creation in rural areas [13].

Regarding actions to revise the CAP, Romania supports the importance of maintaining a consistent level of budget allocated to Pillar II.

To Romania is important increasing competitiveness, sustainable management of natural resources and balanced territorial development. Their funding must meet the specific needs of Member States, including providing greater flexibility [14].

Romania appreciates the Commission's initiative to create a new period for the new scheduling for measures by interconnecting existing ones in response to the needs of specific groups or areas. In this respect, Romania supports the inclusion of a package to support small farmers in order to avoid phenomena present in Romania, as depopulation, abandonment of agricultural

land and increase their economic capacity to provide public goods [10].

The actions that should focus the new package to the small farmers must cover aspects: increasing their financial support; simplify the conditions for accessing funds; establish specific measures to promote products; specific measures aimed at advising, consulting, training and credit to this category of farmers; development of local distribution channels in order to facilitate direct access of consumers to the products of small farmers (organic farming, traditional or local products) and support local markets; establishment of conditions and requirements on minimum standards for achieving production and marketing, tailored financial capacity of small farmers [12].

With regard to risk management package, it supports the continuation and development of financial engineering measures, the assurance tools, access to credit, guarantees, equity etc., which are essential for increasing the competitiveness of the agricultural sector, with the particularities of this sector [1].

Regarding the development of a Community Strategic Framework ERDF, ESF, Cohesion Fund, EAFRD and EFF, replacing the sectorial approach in the current scheduling period, which establishes separate guidelines for Cohesion Policy, the Common Agricultural Policy and Politics Fisheries and Maritime Affairs, Romania supports in principle the proposal, provided that the new approach does not lead to decrease allocations for these policies.

We recognize the importance of strengthening coordination mechanisms and systems of European policies and instruments for their implementation, but we believe that the current political line of Pillar II in the future CAP should be maintained and their implementation in Romania, to achieve nationally [8].

#### **The new CAP 2014-2020 budget**

CAP Budget allotted period 2014-2020 amounts to 373 billion for the 28 Member States and Romania has allocated funds 17.5 billion, up from the previous budget year 2007-2013 (EUR 13.8 billion). These

additional funds will be fully exploited if the Romanian farmers will capitalize, particularly through direct payments system, the opportunities offered by each of the three directions of development outlined above. Note that although the total funds for Romania increased to Pillar II - Rural Development which fell by 13.5%. Now, under the new Common Agricultural Policy (CAP), the future financial period 2014-2020, Romania will receive 7.1 billion Euros for the National Rural Development Programme, with over one billion Euros less than in the previous financial cycle.

So will be less money for modernization of agricultural holdings, establishment of processing units and other investments, much needed rural areas. On the other hand, although the new CAP provides maintenance support system Scheme (SAPS), received subsidies for Romanian farmers in 2014-2020 will still be much lower than those granted to other European countries.

The grant awarded to farmers in Romania this year is only 147 Euros/ha, compared to 250 Euros/ha, as is the European average. According to Minister of Agriculture, Daniel Constantin, next year subsidy on the surface will be up 177 Euros/ha for areas up to 30 hectares and 147 Euros/ha for areas larger than 30 hectares.

And for Romanian farmers to receive subsidies at the EU average have to wait until 2020, whereas the European Council decided that the convergence period should be extended for six years.

This will be a huge disadvantage in competition with farmers in other EU countries where subsidies are 700-800 Euros/ha and even higher. It further supports the idea that rural development policy remains under the CAP (allocations and implementation at national level will continue to be the responsibility of the Ministry of Agriculture and Rural Development) [15].

It should be noted that we must take into account the particularities of the new Member States, the agricultural sector plays an important role in the national economy and ensure maintenance in real terms of support to

agriculture so as to overcome, by this, structural problems and achieving the convergence.

For the EU-15, the proposed measures lead to budget savings of 337 million Euros for the year 2006 and approximately 186 million in

2010. For the Central and Eastern European countries seeking EU membership, the EU budget will bear additional expenses of 88 million Euros in 2007, expenditure increased annually to 241 million in 2013 (Table 1).

Table 1. Projected expenditure EU-25 and effects of CAP reform (Euro million)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EU-25	42979	44474	45306	45759	46217	46679	47146	47617	48093	48574
EU-25 expenditure	41681	43642	44395	45156	46123	47568	48159	48805	49451	50099
<i>of which EU-15</i>	<i>41320</i>	<i>41339</i>	<i>41746</i>	<i>42183</i>	<i>42802</i>	<i>43569</i>	<i>43513</i>	<i>43513</i>	<i>43513</i>	<i>43513</i>
<i>candidates -10</i>	<i>361</i>	<i>2303</i>	<i>2649</i>	<i>2973</i>	<i>3321</i>	<i>3999</i>	<i>4646</i>	<i>5292</i>	<i>5938</i>	<i>6586</i>
Differences	1298	832	911	603	94	-889	-1013	-1188	-1358	-1525
Savings by CAP reform, for rural development				228	751	2030	2420	2810	3200	3343
				228	475	741	988	1234	1481	1481

Source: www.eurostat.ro

Romania will receive in total in 2014-2020 multiannual financial years, 39.88 billion Euros - structural and cohesion funds and agricultural funds – compared to 33.5 billion Euros as was allocated in 2007-2013. That is an increase of 18%. Romania has the largest budget percentage increase of all EU countries. In other words, Romania has achieved the maximum that could be obtained in terms of cohesion funds because it was hard to get 2 bn. Euros more cohesive (21.8 bn. Euros compared to 19.8 bn. Euros the current multiannual financial year), while the rate of absorption of funds between 2007-2020 is down.

Between 2014 and 2020 the CAP funds allocated to Romania are + 27% (in total). The Common Agricultural Policy (CAP) will receive 17.5 billion Euros, up 27% compared to current year appropriations in the multiannual financial framework of the Union (13.8 bn. Euros).

Within the CAP, the two pillars - "direct payments" and "rural development" - sums compared looks like direct payments to farmers: + 47.5%. The direct payments to farmers will receive 10.3 billion Euros in Romania compared to 5.6 billion Euros in 2007-2013. The Rural Development: 13.5%, Romania was allocated 7.1 billion Euros, compared to 8.2 bn. Euro between 2007 and 2013 (minus 1.1 billion Euros). Within the CAP will be a "flexibility", meaning that 25% of the total amount can be transferred from

one pillar to another - from direct payments to rural development and vice versa.

In the next financial year, the money can be spent within N + 3 (three years after the date agreed that a project will be completed), compared to N + 2 now - that the whole allocation should be absorbed within 10 years of the onset of the financial year. VAT on projects with EU money will be eligible for funding (VAT may be paid from non-refundable amounts). National co-financing rate for the Structural Funds remain 15% (85% European funds, 15% own money). On rural development financing rate will remain at 25% (75% EU money, 25% own money). If an EU country has a financial assistance agreement with either the IMF or the EU, national co-financing that period decreases to 5% for structural funds (5% national co-financing, 95% EU money), and the development rural to 15% (15% national co-financing, 85% EU money). Pre-financing (money given before EU) will be 3% of a project. For countries which in 2010 had an agreement with the IMF and EU funded, pre-financing percentage will be 4% - so for Romania pre-financing percentage is 4%, for cohesion funds, as well as those relating to rural development.

## CONCLUSIONS

In Romania, 55% of CAP funds now go to the second pillar. Romania has struggled throughout against modulation, wishing that

most of the money be directed to Pillar I, money that would more easily distributed and absorbed. This is a mistake. Although it will be difficult, Romania must send even more money into rural development and hard work to overhaul rural education and so they can better absorb these funds. Without an effective rural development Romania can truly benefit from the common European market place and it is Romanian authorities to ensure that this happens.

In general terms, it would be good to have a vision in which Romania should move forward with its agricultural policies. Romania needs of agricultural policies adapted to national specificities, taking into account the fact that Romania is part of the European Union. They need while representing the interests of Romania and its citizens and to blend also with European policy, respecting European standards. It is a difficult task, but far from impossible. The underlying key is to ensure that policies are written and implemented in accordance with Romanian history and current situation. Rather than trying to turn the country overnight or even worse, hopefully foreigners to develop policies and invest in Romania, politicians must develop unique policy to deal with the situation existing in Romania. A country with a rich agricultural tradition like Romania should be able to create its own agricultural vision and to implement it.

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## ESTABLISHMENT FOR BREAKEVEN POINT IN ORGANIC FARMS WHOSE SURFACE IS LESS THAN 5 HECTARES

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### *Abstract*

*Organic agriculture is economically viable, respond the exigencies demand for healthy food and high quality is an agriculture which guarantees the protection and enhancement of natural resources in the long term and forward them unaltered future generations. The paper aims to establish breakeven in organic farm with surface less than five hectares farm which benefits from substantial financial compensation. We considered that the relevant calculation method is the calculation of profitability using gross margin calculating for each type of activity on the farm. In the absence of this support the activity in ecological system production would not be profitable one.*

**Key words:** organic farm, breakeven

### INTRODUCTION

Organic agriculture is a method of production that accounts for traditional knowledge of farmers and which integrates scientific progress, social trends and responding to the needs of the specific environment and at the same time, providing quality products to consumers from everywhere. [8]

The main objective of organic agriculture is to protect the biosphere and Earth's natural resources excluding the use of chemical fertilizers, pesticides synthetic and herbicides, prevention methods play an important role in combating pests, diseases and weeds.

The principles underpinning organic agriculture are universal, but the techniques used are adapted to the climatic conditions, the resources and local traditions.

Organic agriculture becomes a production method that require capacity of observation and reflection.

Organic agriculture is economically viable, respond the exigencies of the application for healthy food and high quality is an agriculture which guarantees the protection and enhancement of natural resources in the long term and forward them unaltered future generations.

Based on the sustainable agricultural

production systems that organic farming aims to ensure production of food items on agricultural holdings by reducing inputs, particularly pesticides and chemical fertilizers.

The reason that organic production capacities increase is represented by advantages that shall submit for agricultural producer. [5]

Organic agriculture has the following disadvantages: low production, high production cost, disadvantages that can be compensated by a higher price. [3, 4]

For our country organic agriculture objectives are: increasing the surface and create new internal market for organic products with a potential contribution priority to the needs society and food safety and a clean environment; contribution to the promoting sustainable rural economy with employment in rural areas and increasing interest in rural areas.

Organic agriculture has developed particularly after European Union integration in view of the need to align legislative requirements. [9]

Thus the number of operators in organic farming increased 355.9% in 2012 compared to 2006, the largest increase was recorded for the area cultivated with vineyards and 294 ha in 2006 to 7781.33 ha in 2012 followed by

arable crops from 4560 ha in 2006 to 174,643.95 ha in 2012, while pastures and hayfields increased from 51,200 hectares in 2006 to 105,835.57 ha in 2012. [10,11]

The paper aims to establish breakeven in organic farm with surface less than five hectares farm which benefits from substantial financial compensation.

## MATERIALS AND METHODS

We considered that the relevant calculation method is the calculation of profitability using gross margin calculating for each type of activity on the farm.

Gross margin is the essential economic indicator that reflects the economic efficiency of the production activity, as expressed in lei / unit of production (hectare arable land, animal head, etc.).

Knowing farm income and variable costs, gross margin can be calculated by subtracting all variable costs of production related revenues one production unit; relationship for calculating the gross margin is:

$$\text{Gross margin} = \text{Revenue} - \text{Variable costs}$$

At the level of a farms which performing many activities (with several branches of production) by summing all the gross margins of all branches of production, total gross margin is obtained.

Usually, it provides a complex image of the profitability of the farm; but, for the image to be complete, this requires correlation of total gross margin with the amount of fixed costs.

According to economic dictionary the profit is a surplus obtained by selling products over the cost of production. [1]

The profit is absolute size of profitability. Obtaining profit it is essential for the activity unfolding because it provides sources of investment and fosters introducing scientific and technical progress.

Interests us in the analyzed unit:

$$\text{Gross profit} = \text{Total revenue} - \text{Total expenses (lei)}$$

$$\text{Net profit} = \text{Net income-tax / profit (lei)}$$

Profitability is an economic category complex, which reflects in a synthetic form entire efficiency economic activity of a farm.

In conditions of market economy, the profitability is extremely important. [7]

Profitability rate is the relative size of profitability that reflects the results of all stages of activity [2] and ensures resources to increase economic activity.

$$\text{Gross profit rate} = \frac{\text{gross profit}}{\text{total expenses}} \times 100$$

$$\text{Net profit rate} = \frac{\text{net profit}}{\text{total expenses}} \times 100$$

Breakeven - reflects the dimension of the activity to which the revenue from the sale of products are equal to expenditures the profit is zero.

In conclusion, the breakeven point is the point where the operating revenues cover operating expenses and result of exploitation is zero. After this threshold operating activities becomes profitable.

This paper refers to the farm in organic agriculture system with surface between 0.3 and 5 ha, because amount of the financial support is differentiated as follows:

-1180 lei, which is the equivalent to 270 euro financial compensation amounts awarded in 2013, compared to 2012, of operators enrolled in organic agriculture - vegetal sector with holdings ranging from 0.30 - 5 ha, inclusive.

-845 lei, which is the equivalent to 192 euro financial compensation amounts awarded in 2013, compared to 2012, of operators enrolled in organic agriculture - vegetal sector with holdings ranging from 5.1 - 20 ha, inclusive.

SC AMOLEG SRL, Țândărei town, Ialomita is subject to control for organic agriculture and has the following structure cultures:

Table 1. Crop structure

Crop structure	Unit A	
	ha	%
Wheat	1.03	22.6
Corn	2.12	46.3
Sunflower	1.42	31.1
TOTAL	4.57	100

Source: SC AMOLEG SRL, own calculation

At the farm level have been calculated revenues, expenditures and the economic efficiency indicators of crops, namely wheat, corn and sunflower, according to table 1.

## RESULTS AND DISCUSSIONS

To establish the break-even on farms with surface less than five hectares and ecological activity was taken into account a farm that meets these conditions.

Table 2. Revenues for wheat

No.	Specification	Quantity (kg)	Unit price (lei/kg)	Value (lei)
<b>1.</b>	<b>Gross Product</b>			
1.1.	Gross product from sold productions	2100	0.8	1680
1.2.	Subsidies	-	-	1180
<b>1.3.</b>	<b>Gross product total</b>	-	-	<b>2860</b>

Source: Own calculations

Table 3. Analysis of the structure of production costs for wheat

No.	Specification	Value (Lei)	Structure %
<b>2.1</b>	<b>Variable expenditure, d.c. .:</b>	<b>2360</b>	<b>90</b>
	- Seed	700	27
	-Fertilizers - livestock manure	650	24
	- Herbicides	-	-
	- Fungicides	-	-
	- Insecticides	-	-
	- Irrigation Water	-	-
	-Mechanical works by third parties	560	21
	- Insurance	-	-
	-Other administrative expenses	330	13
	- Seasonal workers (weeding)	120	5
	- Expenditure supply	0.2	
<b>2.2</b>	<b>Fixed expenditure, d.c.:</b>	<b>255</b>	<b>10</b>
	- Permanent workforce	210	8
	- General expenses	45	2
	- Interest rate	-	-
	- Amortization	0.14	-
	- Lease	-	-
<b>2.3</b>	<b>Expenditure total</b>	<b>2615</b>	<b>100.0</b>

Source: Own calculations

The crops efficiency from economically is proven through gross margin comparison of different activities, in our case, different crops.

Farmers will have to turn to those cultures which assure a positive gross margin, profit and give up increase to the crops with negative gross margin, leading to financial losses.[6]

Wheat crop in this situation it proves profitable agricultural activity without making a profit exceptional, although ensuring a positive gross margin, according to table 2, 3 and 4.

The culture should be maintained to allow the a judicious crop rotation system and ensure coverage of autumn crops at least 20% of the total area of arable land on the farm, cross-compliance condition.

Table 4. Analysis of economic efficiency indicators per hectare wheat

No.	Specification	Value (Lei)
1.	Gross Product	2860
2.	Variable costs	2360
3.	Gross margin	500
4.	Fixed Expenses	255
5.	Gross profit	245
6.	Total expenditure	2615
7.	Gross profit rate (%)	9.3
8.	Income tax	39.2
9.	Net profit	205.8
10	Net profit rate (%)	7.8

Source: Own calculations

Corn crop in this situation it proves a profitable agricultural activity because it provides a positive gross margin and profit per unit of cultivated area, according to table 5,6 and 7.

Table 5. Revenues for corn

No.	Specification	Quantity (kg)	Unit price (lei/kg)	Value (lei)
<b>1.</b>	<b>Gross Product</b>			
1.1.	Gross product from sold productions	3200	1	3200
1.2	Subsidies			1180
<b>1.3</b>	<b>Gross product total</b>	-	-	<b>4380</b>

Source: Own calculations

Table 6. Analysis of the structure of production costs for corn

No.	Specification	Value (Lei)	Structure %
<b>2.1</b>	<b>Variable expenditure, d.c.:</b>	<b>3540</b>	<b>89</b>
	- Seed	800	20
	- Fertilizers - livestock manure	500	13
	- Herbicides	-	-
	- Fungicides	1200	30
	- Insecticides	-	-
	- Irrigation Water	-	--
	- Mechanical works by third parties	600	15
	- Insurance	-	-
	-Other administrative expenses	310	8
	-Seasonal workers (weeding)	130	3
	- Expenditure supply	0,18	-
<b>2.2</b>	<b>Fixed expenditure, d.c.:</b>	<b>450</b>	<b>11</b>
	- Permanent workforce	400	10
	- General expenses	50	1
	- Interest rate	-	-
	- Amortization	0,09	-
	- Lease	-	-
<b>2.3</b>	<b>Expenditure total</b>	<b>3990</b>	<b>100.00</b>

Source: Own calculations

Table 7. Analysis of economic efficiency indicators per hectare corn

No.	Specification	Value (Lei)
1.	Gross Product	4380
2.	Variable costs	3540
3.	Gross margin	840
4.	Fixed Expenses	450
5.	Gross profit	390
6.	Total expenditure	3990
7.	Gross profit rate (%)	9,8
8.	Income tax	62,4
9.	Net profit	327,6
10	Net profit rate (%)	8,2

Source: Own calculations

Table 8. Revenues for sunflower

No.	Specification	Quantity (kg)	Unit price (lei/kg)	Value (lei)
<b>1.</b>	<b>Gross Product</b>			
	Gross product from sold productions	1400	1,3	1820
1.1.				
1.2.	Subsidies	-	-	1180
<b>1.3</b>	<b>Gross product total</b>	-	-	<b>3000</b>

Source: Own calculations

The culture of sunflower it proves in this situation the most profitable agricultural activity because it provides the increased gross margin and the highest return per unit of land area, according to table 8, 9 and 10.

Table 9. Analysis of the structure of production costs for sunflower

No	Specification	Value (Lei)	Structure %
<b>2.1</b>	<b>Variable expenditure, d.c.:</b>	<b>1880</b>	<b>86</b>
	- Seed	450	21
	-Fertilizers - livestock manure	400	18
	- Herbicides	-	-
	- Fungicides	-	-
	- Insecticides	-	-
	- Irrigation Water	-	-
	- Mechanical works by third parties	600	24
	- Insurance	-	-
	-Other administrative expenses	310	14.5
	-Seasonal workers (weeding)	120	5
	- Expenditure supply	0,9	-
<b>2.2</b>	<b>Fixed expenditure, d.c.:</b>	<b>310</b>	<b>14</b>
	- Permanent workforce	250	10.5
	- General expenses	60	3.5
	- Interest rate	-	-
	- Amortization	0,12	-
	- Lease	-	-
<b>2.3</b>	<b>Expenditure total</b>	<b>2190</b>	<b>100.0</b>

Source: Own calculations

Table 10. Analysis of economic efficiency indicators per hectare sunflower

No.	Specification	Value (Lei)
1.	Gross Product	3000
2.	Variable costs	1880
3.	Gross margin	1120
4.	Fixed Expenses	310
5.	Gross profit	810
6.	Total expenditure	2190
7.	Gross profit rate (%)	37
8.	Income tax	129.6
9.	Net profit	680.4
10	Net profit rate (%)	31

Source: Own calculations

### Comparative analysis of the profitability of cultures.

To decide which culture is more economically efficient to farm, the farmer must compare gross margin between different cultures. In perspective he will be oriented to those crops which ensures a positive gross margin and

profit and give up to those that have negative gross margin and lead to financial losses.

Table 11. Influence of structure of the gross margin per farm crops

Cultura	Area		Gross margin in Lei/ha	Gross margin /activity	%
	Ha	%			
Wheat	1.03	2.2	500	515	13.2
Corn	3.12	4.4	840	1780.8	45.8
Sunflower	5.42	6.3	1120	1590.4	41
TOTAL	4.57	100		3886.2	100

Source: Own calculations

Analyzing the structure of crops on the gross margin is observed low share of total farm gross margin of wheat. Maintaining culture is required from the cross-compliance requirements, which do not allow the cultivation of sunflower two years consecutive on the same soil and provide coverage of at least 20% of the area of autumn crops. The farmer will need make the most efficient this culture. Another solution may be represented by replacing this culture with other crops autumn which have sales prices more attractive (rape, barley beer).

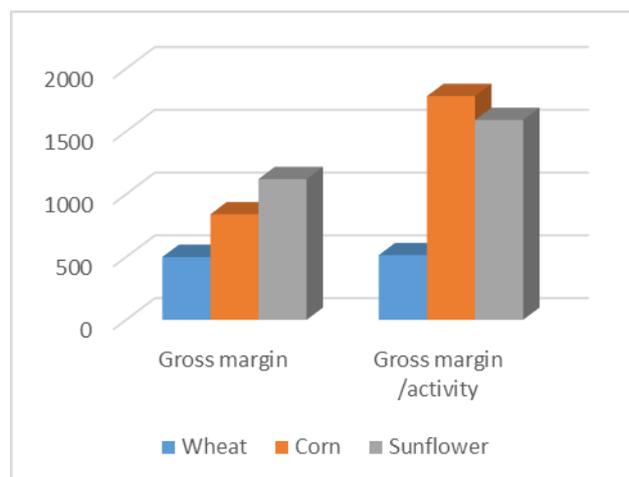


Fig.1. The gross margin in the farm

Although the most gross margin per hectare is obtained from sunflower, per activity, the highest gross margin has corn crop due to larger surface.(figure 1)

## CONCLUSIONS

Following the results obtained it is found that this farm certified organic has a profitable activity, surpassing break even, so each culture and total unity.

The profitability activities is due to the financial support given to subsidize organic agricultural activities. Without this support the production activity would not be a profitable, because they yields obtained are much lower than in the intensive system production, and also the selling price of organic products has declined significantly in recent years.

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## QUANTIFYING AGRI-FOOD EXPORT POTENTIAL AND EAST-WEST ORIENTATION APPROACH: EVIDENCE FROM MOLDOVA

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### Abstract

*This research reflects the agri-food export potential of the Republic of Moldova, measured by different methodological ways - production outputs, experienced exported amounts. It was established a potential related comparative study on the agri-food export dynamics and analyzed specific indicators for European Union and CIS oriented export flows.*

**Key words:** agri-food, export, flows, potential

### INTRODUCTION

For Moldova, as other Central and Eastern European countries, many changes had occurred during the transformation process to a market economy in the agricultural and food trade environment. An important part of the transformation process is trade liberalization.

Agri-food potential showed different levels of its manifestation in the resulted indexes, including export aggregation, on EU and CIS directions.

### MATERIALS AND METHODS

This study approaches dynamic and evolutionary issues in setting potential and its reflection on export activity. For the analysis of agri-food trade indicators were used the data from National Bureau of Statistics and International Trade Center (ITC) during 2001-2012, including commodity groups, divided in agricultural products and foodstuffs. [7]

### RESULTS AND DISCUSSIONS

Primary calculations proved that quite different percentage shares of exports in domestic agricultural production volume [6] implies a serious fragmentation over 2006-2012 period. Percentage share revealed in Figure 1 demonstrates the expression of export potential. Assuming that, once

registered, the exported quantities show *a priori* the current development of export potential, the percentage share of values intended for the external market should emphasize the dynamic component.

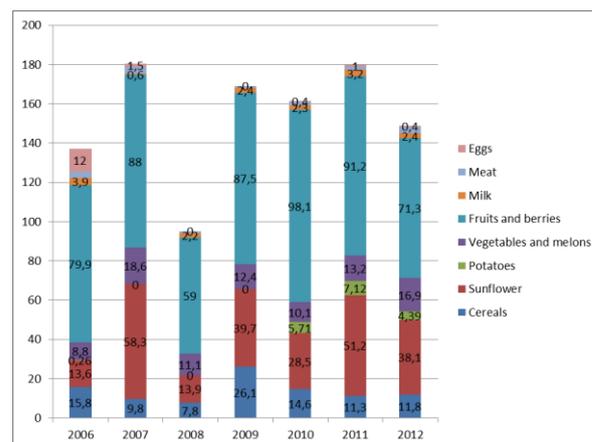


Fig.1 Evolution of exports share in gross agricultural output volume, by categories, 2006-2012 years, %

Source: based on data from the National Bureau of Statistics

Analyzing the share of exports in gross agricultural output we see that cereals had a component of the export in that period which never fell below 7%, but not exceed 27%; as the mean of the period, 13.8% figure would be realistic. Sunflower position, compared to the previous item, is more open to the external market, with values between 13.6 and 58.3% (in 2007), having thus an average of 34.7% or more than 2.5 times higher than that of the grain. Potatoes, however, does not present a relevant source for export (the consumption being

involved), with export share values of a maximum of just over 7%; during the years 2006-2009 they recorded insignificant or null values.

Vegetables experienced constant developments of increasing the share of exports starting in 2010 (10.1%), also registering a maximum of 18.6% in 2007, and the average per period is little over 13%. Last vegetable item, and the most important of all as the openness to export are fruits and berries that have not values across the period under 50 percent. Although reflect fragmented developments - with pairs "decrease-increase" in the period 2006-2009, there is a fairly significant declining of the share of export in the years 2010-2012 and that in conditions of constant consumption and production increase, which attests most likely the issues related to market conditions and other factors of competitiveness, especially lately.

However, fruits and berries remain the strong point in national agricultural production export, reflecting an average of share of over 82 percentage points.

In the category of animal products, we can't highlight some leaders compared to the rest of the items analyzed, since the share of export of these products is quite diminished. In analyzing the group, then we can observe that milk records 2-3% of export orientation of the total domestic production, reaching an average that barely exceeds 2.4 percentage points. An even worse situation is found at meat, which has quite significant disparities between production and consumption – in respect of deficit, this product having a maximum of export share of only 3.6% (in 2007) and an average per period slightly exceeding 2.2%. In turn, the eggs have periods when there have not been registered exports (such as 2008-2009) or it is about some fairly small quantities, with an upper limit of 12% in 2006, these had manifested themselves in the conditions under which the domestic consumption uses 89-90% of the total domestic production.

These connotations are arising from the interpretation of the objective reality of the national agricultural sector, without (until

now) achieving a reference to the historical reference - thus allowing to assess "the lost potential", highlighted from the historical and economic circumstances. That way since statistics considers that the maximum value of agricultural production in the national territory was obtained in 1985-1990 [7], we can support the idea of the possibility of repeating such economic and agricultural experiences in this regard using those references (table 1).

Table 1. Scenario for estimating the untapped/lost export potential

Item	1 Production 000 tons 1971- 1980/ 1981- 1990	2 Production 000 tons 2011	3 Production difference 000 tons (2-1)	4 Percentage export share % 2011	5 Export difference, 000 tons, 2011 Compared to 1971- 1980/ 1981- 1990 (on the basis of the indices 4 and 1)
Cereals	2554.5	2457.1	-97.4	11.3	-11
Sunflower	318	427	+109	51.2	+55.8
Potatoes	409.9	350.8	-59.1	7.12	-4.2
Vegetables	1289.3	361.5	-927.8	13.2	-122.4
Fruits, berries	950.7	378.4	-572.3	91.2	-521.9
Milk	1511	560	-951	3.2	-30.4
Meat	530	159	-371	1.7	-6.3
Eggs, million units	1129	705	-424	1	-4.2

Source: based on data from the National Bureau of Statistics

To quantify the effects of a certain volume of production (as well as areas exploited on crops) on untapped potential, we used the compared diagnosis to the present period of the values recorded in the historical highs - from Soviet times, whether during the years 1971-1980 or 1981-1990 - these values demonstrate the possibility of achieving these based on the resources capabilities and the use of export share may be classified as a constraint limiting in value terms the references used.

In this way, of plant yields only sunflower in the exposed historical conditions, may present a potential exploited, because the cultivated area, as well as quantity of volume exceed those of the reference period. Among other cultures, however, the situation is exactly reversed. The least valued potential we see at fruits and berries, which currently expose a

production of over 2.5 times lower than that in the reference data; this is reflected upon the significant productions untapped for the export and the amount is reaching over 520 thousand tons. This position is followed by vegetables, which showed significant reduction at the cultivated area (over 47,000 ha) and harvested production quantity (over 927 thousand tons), thus occupying the second place after the fruit and berries at export "lost" potential - over 122 thousand tons. Next are cereals, which although have more area than in the reference period (with over 137 thousand ha) due to reduced productivity, the production difference relative to the reference is negative, with values of over 97 thousand tons, which is directly reflected in the quantity of export, which decreased by 11 thousand tons. In loss was found to be potato crops, with productions of almost 60 thousand tons less than the reference and export losses slightly over 4000 tons.

Reference to animal products is noticed the large decrease at milk production, it reaches to over 950 thousand tons and, finally, to more than 30 thousand tons of untapped export. Also important are the decreases in production of meat and eggs, with 371 thousand tons, and respectively, with 424 million units. So meat is not exploiting over 6 thousand tons annually for the export, and taking into account the slightly but growing trend of export share in its production, the lack of export exploitation may be more significant, and in the case of eggs is equivalent to missed opportunities of more than 4 million units annually.

It is important to note that agri-food products have a large share in country's trade activity. During 2008-2012 the share of agri-food products in the total trade was about 40% [4]. During the same period, the share of agri-food imports was about 12%. The agri-food trade balance of Moldova is so far positive, 135541,4 mio US dollars in 2012 (table 2).

In Moldova's agri-food exports about 80% belongs to agricultural products (commodity group 01-15) and only 20% to food processing industry products.

Table 2. Evolution of Moldova's agri-food trade flows, 2008-2012

	2008	2009	2010	2011	2012
Agri food exports, mio US dollars	594996	604745.7	732211	917103.1	878881.1
Agri food imports, mio US dollars	631390.5	513583	591522.2	687784.6	743339.7
Agri-food trade balance, mio US dollars	-36394.5	91162.7	140688.8	229318.5	135541.4
Share of agri food exports in the total amount of exports, %	37.3	47.1	47.5	41.3	40.6
Share of agri food imports in the total amount of imports,%	12.8	15.6	15.3	13.2	14.2

Source: based on data from the National Bureau of Statistics

Main exported products are vegetal products, vegetable or animal fats and oils, foodstuffs. The exports of vegetable products mostly increased in the analyzed period, except from the sharp decrease in 2012 caused by the severe drought that affected the production and as result the exports. From this group of products a higher share belongs to edible fruits and oil seeds, exports of both increasing in the last years.

Being however a very complex aspect, agri-food export potential is manifested very different at the level of economic partners, the respective rankings bring new perspectives to track this potential. With the help of tops, we can thus determine the most competitive food products on the CIS and EU market, also to determine Moldova's global ranking for each of these products [9].

The respective agri-food exports ranking for the CIS orientation are represented below:

After developing a cumulative ranking on periods, we can clearly highlight that of the food products exported to the CIS in 2009-2012, the wine of fresh grapes is the product positioned as leader, reaching values higher than 112 thousands USD in 2012 ; simultaneously, this product decreases its global position (Republic of Moldova decreased its world rank from 16 to 20 places only in 4 years) in front of more competitive wines, as volume, price and positioning, such as

those of South Africa, Chile, Australia, etc.

Table 3. Ranking of items in the agri-food exports value to CIS, global positioning on top products of the Republic of Moldova, 2009-2012, thousand USD

Product/HS Code	Agri-food exports to CIS on top, years, value thousands USD				World rank for top 5, 2009/2010 2011/2012
	2009	2010	2011	2012	
1. Wine of fresh grapes/ 2204 (S1)	107,659	115,460	104,854	112,642	16/17/19/20
2. Apples, pears and quinces, fresh/ 0808	44,687	50,252	57,032	40,048	21/23/22/25
3. Prepared or preserved vegetables/ 2005	20,952	16,479	18,804	14,464	x
4. Spirits, liqueurs, other spirit beverages/ 2208	20,924	31,499	34,804	49,863	45/44/42/39
5. Cane or beet sugar and chemically pure sucrose, in solid form / 1701	19,284	25,233	1,964	3,629	x
6. Safflower, sunflower/cotton-seed oil&fractions / 1512	19,094	10,670	2,340	1,625	x
7. Apricots, cherries, peaches, nectarines, plums & sloes, fresh/ 0809	13,560	22,676	23,440	28,898	25/25/25/21
8. Grapes, fresh or dried / 0806	12,993	12,730	16,535	13,018	x
9. Tobacco unmanufactured; tobacco refuse / 2401	9,872	13,783	14,187	10,503	x
10. Sunflower seeds, whether or not broken / 1206 (S2)	8,856	10,441	30,500	19,574	14/12/9/12

Note: S<sub>1</sub>, S<sub>2</sub> show similar commodities for CIS and EU oriented exports that are analysed for top 5 rank  
Source: based on ITC data

Of the group of fruits, apples, pears and fresh quince are the most competitive products on the CIS market, cumulating an export value of more than 40 thousands USD, and at global level they show a fluctuating trend, the state of 2012 year positioned Moldova on 25th place worldwide on the exports of these products. Position spirits, liqueurs and other spirituous beverages showed basically the best performance in the value dynamic of exports to CIS countries, thus becoming one of the most competitive products on this market. In 4 years, the value export of this item has increased more than 2.4 times, and on the global market Moldova climbed 6 positions in 2009-2012. Sugar suffered a very unstable dynamic, with value decreases over 5.3 times and vegetable oil on the CIS market has continuously decreased its export, with reductions of over 11.7 times in 2012

compared to 2009. Adverse effects were recorded on fresh apricots, cherries, peaches, nectarines, plums and sloes, fresh, which showed a very good potential on CIS market, the values of 2012 (28.8 million USD) are 2.1 times higher than those of 2009, positioning Moldova on the 21th place in the world on the export of this production in 2012 (with a growth trend). Grapes, like vegetable preparations showed sinusoidal developments, with points of decreasing towards 2010 and 2012. Tobacco position, although it showed a positive trend in 2009-2011 (from 9.8 to 14.1 thousands USD of export value), 2012 is the period when the trend seems to go towards decline on the CIS market; and Moldova's leader on the world market is the item sunflower seeds, ranking the country on the 9th place of all exporting countries as export value in 2011, period during which the country recorded the most important export to CIS countries - 30.5 thousands USD.

The same ranking taking into account the EU orientation is presented below:

Table 4. Ranking of items in the agri-food exports value to EU, global positioning on top products of the Republic of Moldova, 2009-2012, thousand USD

Product/HS Code	Agri-food exports to EU on top, years, value thousands USD				World rank for top 5, 2009/2010 2011/2012
	2009	2010	2011	2012	
1. Nuts / 0802	35,145	46,239	55,937	70,047	21/20/20/18
2. Sunflower seeds, whether or not broken / 1206 (S2)	21,920	25,706	66,038	33,827	14/12/9/12
3. Safflower, sunflower/cotton-seed oil&fractions / 1512	20,226	29,518	65,174	77,762	22/23/23/18
4. Wine of fresh grapes / 2204 (S1)	19,407	18,333	20,676	20,852	16/17/19/20
5. Wheat and meslin / 1001	18,382	16,692	9,301	5,297	x
6. Fruit & vegetable juices, unfermented / 2009	13,985	14,274	28,835	29,012	51/47/42/43
7. Rape or colza seeds, whether or not broken / 1205	11,675	8,095	27,748	736	x
8. Cane or beet sugar and chemically pure sucrose, in solid form / 1701	10,486	5	7,346	25,691	x
9. Barley / 1003	10,169	13,399	14,418	1,473	x
10. Bread, biscuits, wafers, cakes and pastries / 1905	4,928	5,662	9,088	11,178	x

Note: S<sub>1</sub>, S<sub>2</sub> show similar commodities for CIS and EU oriented exports that are analysed for top 5 rank  
Source: based on ITC data

Orientation of flows towards the European Union generated specific developments of some product groups which do not have top positions in the country's exports to the CIS. This is the case of nuts, which have become a clear leader in the ranks of export value in the years 2009-2012 to the EU, doubling in this period its value from 35.1 thousands USD in 2009 to 70 thousands USD in 2012. These developments have led to the lifting of Moldova in the world rankings on the export of these products, positioning the country on the 18th place in 2012. Major export values also had sunflower seeds, which reached an important peak in 2011 - over 66 thousands USD of export value (defeating this item 1.7 times to the CIS oriented export in 2012) and vegetable oil has shown very good export dynamic to EU market, with the values above 3.8 times higher in 2012 (77.7 thousands USD) compared to 2009 (20.2) positioning the country, as in the case of nuts, on the 18th place worldwide in 2012. Wine of fresh grapes, leader in the range of agri-food products exported to the CIS, ranks an average position for the export to EU, with values of 5.4 times lower in 2012 compared to the values oriented for CIS, however with a positive trend, showing an export of 20.8 thousands USD in 2012. Although quite well positioned in 2009, wheat and meslin has significantly decreased their export by 2012, period during which they recorded an export of only 5.2 thousands USD, instead fruit and vegetables unfermented juices have made an important contribution to the increase of agri-food exports to the EU, having increasing values (in 2012 - more than double compared to 2009), and the contribution on the global market was an important one, raising Moldova with 8 positions in just 4 years (more than any other product specified here from the top of agri-food export to EU and CIS) and they are along with oil, ones of the most competitive domestic agri-food products, particularly that they felt such dynamics namely on the EU market - demanding in terms of promotion, quality and standards requirements, health aspects. Rapeseed and sugar showed very fragmented

trends, with a maximum of 27.7 thousands USD (rapeseed in 2011) and a minimum of 5 thousand USD (sugar in 2010, period when sugar export value maximum to CIS had been recorded - over 25.2 thousands USD). However, more pronounced is the trend of barley, which had export with increasing values, from 2009 to 2011, from 10.1 to thousands USD, but that decreased more than 10 times in 2012, counting only 1.4 thousands USD; a category with a clear export potential is bread, biscuits, wafers, cakes and baked goods that during the reference period have showed consistently positive developments, from exports of 4.9 mln. USD in 2009 to over 11.1 thousands USD in 2012.

For the purposes of a synthesis enunciation that would involve the export potential and competitiveness ranking aspects at the level of worldwide exporters, it reveals the diminishing order below that ranks agri-food groups as follows:

1. *Sunflower seeds* - the position of the reference period- 14/12/9/12
2. *Wine of fresh grapes* - 16/17/19/20
3. *Nuts* - 21/20/20/18
4. *Vegetable oil*- 22/23/23/18
5. *Fresh apples, pears and quinces*- 21/23/22/25
6. *Fresh apricots, cherries, peaches, nectarines, plums and sloes*- 25/25/25/21
7. *Spirits, liqueurs, other spirituous beverages* - 45/44/42/39
8. *Fruit and vegetable unfermented juices*- 51/47/42/43

These tariff headings (8 in total), having positive dynamics in export value and ranking on relatively high positions in the world top, they proved to be quite efficient and competitive in the context of agri-food export, and some of them (such as nuts, for example, on the EU market and wine, spirits on the CIS market) demonstrated growing dynamics and market shares on the markets that became traditional for some agri-food groups to be exported.

For the appreciation of the country's comparative advantage (or a particular sector) Bela Balassa [1, p.99-123] elaborated the method that reveals the "Revealed

Comparative advantages” (RCA). This method is based on the assumption that the implicit comparative advantages find their reflection directly in the trade flows. According to Balassa, comparative advantages are manifested in relatively high shares of a particular product/sector in the structure of exports. In the same time the relative limitations are reflected through low shares of a product/sector.

The RCA index or Balassa index is an indicator that characterizes the ratio of a commodity *i* in the total amount of country’s exports and the share of this commodity in the total amount of world’s exports. This index is based on observed trade patterns. This index is defined as:

$$B = (X_{ij}/X_{it})/(X_{nj}/X_{nt}) \quad (1)$$

where:

X – export; *i* – a country; *j* – a commodity; *t* – a set of commodities; *n* - a set of countries.

If  $B > 1$ , then a comparative advantage is revealed. The standard deviation of this index across products can be used as measure of the comparative importance of inter-industry specialization or intra-industry trade.

An alternative specialization of revealed comparative advantage was developed by Vollrath [10, p.265-280] and was called Relative Trade Advantage (RTA). The RTA index is calculated as the difference between relative export advantage (RXA) or Balassa index and relative import advantage (RMA):

$$RTA = RXA - RMA \quad (2)$$

Where,  $RXA = B = (X_{ij}/X_{it})/(X_{nj}/X_{nt})$ ;

$RMA = (M_{ij}/M_{it})/(M_{nj}/M_{nt})$ ;

M – import.

The positive value of RTA indicates comparative trade advantages, while negative value indicates comparative trade disadvantages. When RTA is greater than zero, then a comparative advantage is revealed, which means that a sector of the country is relatively more competitive in terms of trade.

To evaluate the competitiveness of Moldavian

agri-food products on EU markets was calculated the Revealed Trade Advantages index (RTA) as a measure for inter-industry trade.

Moldova has relative trade advantages on the EU market for 7 of 24 agricultural commodities and foodstuffs. The highest RTA index values in 2012 were registered for preparations of vegetables, fruit, nuts or other parts of plants (10.68), Edible fruit and nuts; peel of citrus fruit or melons (7.71), live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage (5.54). comparative trade disadvantages in 2012 were observed on the following commodity groups: live animals (-1.4), Fish and crustaceans, molluscs and other aquatic invertebrates (-2.13), Edible vegetables and certain roots and tubers (-1.53), cereals(-0.54), Preparations of cereals, flour, starch or milk; pastrycooks’ products (-1.14), Tobacco and manufactured tobacco substitutes (-2.09). Overview is reflected in table 5 below.

Table 5. Moldova’s Relative Trade Advantages with EU, by agri-food products

RTA > 1	RTA < 1	RTA switching values
06.Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	02.Meat and edible meat offal	04.Dairy produce; birds’ eggs; natural honey; edible products of animal origin, not elsewhere specified or included
08.Edible fruit and nuts; peel of citrus fruit or melons	07.Edible vegetables and certain roots and tubers	11.Products of the milling industry; malt; starches; inulin; wheat gluten
15.Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	10.Cereals	12.Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder
20.Preparations of vegetables, fruit, nuts or other parts of plants	17.Sugars and sugar confectionery	24.Tobacco and manufactured tobacco substitutes
22.Beverages, spirits and vinegar	19.Preparations of cereals, flour, starch or milk; pastrycooks’ products	
	21.Miscellaneous edible preparations	

Source: own calculations based on data from the National Bureau of Statistics

Beside the commodity groups with revealed trade advantages and comparative trade disadvantage, we can observe that a number of products during the analyzed period have

switching values for RTA index. The commodity group HS 05 (Products of animal origin, not elsewhere specified or included) and HS 12 (Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder) increased their relative trade advantages on the EU market. Therefore, the RTA index for these commodity products had increased during 2001-2012 from -0.68 to 4.11 for HS 05, and from -1.15 to 2.05 for HS 12. An opposite tendency was observed for the commodity group HS 24 (Tobacco and manufactured tobacco substitutes) whose values decreased from 0.19 to -2.09.

For assessing the intra industry trade there were developed some indicators, from which the most used is the Grubel-Lloyd index (GL) [2]. According to it, intra industry trade is determined as the trade between countries, where the costs of exports of particular sector is corresponding to the costs of imports of same sector. The GL index determines the share of intra industry trade in the total amount of exports of a particular sector. For computing this index is needed to sum particular trade flows. The index is changing in values from 0 to 100.

$$GL_i = \frac{[(X_i+M_i)-|X_i-M_i|]}{X_i+M_i} \times 100\%, \quad (3)$$

Where,  $GL_i$  – index of intra industry trade;

$X_i$  - value of export in industry i;

$M_i$  - value of import in industry i;

$X_i + M_i$  - total value of trade;

$|X_i - M_i|$  - trade balance of industry i.

The closer the GL value is to 100, the more important is intra industrial trade, and the closer is GL value to 0 the more important is inter-industry trade. In order to establish an average level of intra-industry trade, Grubel and Lloyd proposed the weighted index to arrive at an overall measure of intra industry trade.

The traditional measure of intra industry trade is used and the Grubel Lloyd index is calculated as:

$$GL_i = 1 - \frac{|X_i-M_i|}{(X_i+M_i)} \quad (4)$$

Where,  $X_i$  is the export in a certain line of goods and  $M_i$  is the import in the same commodity group.

The value of  $GL_i$  index can vary between 0 and 1. The higher the value of this index, then the higher is the level of intra industrial trade.

The analysis of Moldova's intra-industry trade with agri-food products is based on the Grubel-Lloyd index (GL). The intra-industry trade index for Moldova was calculated by commodity groups, as well as by trading partners (CIS countries, EU countries), and by agricultural and foodstuffs.

Concerning the agri-food trade during 2001-2012 by main trading partners the high level of intra-industry trade is common for both EU and CIS countries. If for CIS countries the index was increasing during this period, for EU countries the level of intra-industry trade basically did not changed (table 6).

Table 6. GL index results for Moldovan agri-food products, by country groups

Country groups	2008	2009	2010	2011	2012
CIS countries	0.99	0.96	0.93	0.95	0.96
EU countries	0.99	0.97	0.97	0.94	0.97
Total	0.99	0.98	0.97	0.96	0.98

Source: own calculations based on data from the National Bureau of Statistics

A high level of intra-industry trade might be based on factors as: geographical closeness, shared border, same level of development, similar preferences, language, institutional conditions and transport routes [3]. Such situation is specific for the increasing values of GL index in CIS countries, particularly for nearest neighbours as Ukraine.

At the same time, a diagnosis of export flows to the most important destinations of national agri-food products must be combined with the growth criteria, which will reveal the future development potential and present arguments in favor of certain policies of geographical orientation identification [5]. The overall picture (reflected in table 7) alleges a quite important positive trend, with an average growth of Moldova's agri-food export of + 10.1% during the reference period (2008-2012).

CIS oriented flows and reported to total agri-food export showed steadily declining weights, which show a gradual loss of this market that recorded an average negative growth (-4.5%) and it can be categorized as a destination "losing <5%".

Russia's share amounted in most years (except in 2008) more than half of exports to CIS and shows a dynamic "growing <5%" (+3.9%) which reveals a potential, but a fairly reserved one.

A second important partner of the CIS-Ukraine, shows a general trend as export destination in decline "losing >5%" (-12.1%), which also contributed to the negative dynamics of CIS.

The other key partner for Moldova - European Union has, unlike CIS, an average overall increase of national agri-food export of +5.1%, which allows us to classified it as "growing >5%" potential, especially that all agri-food categories have been on a positive dynamic.

Table 7. Geographical dynamics of agri-food exports on the most important markets, 2008-2012

Destinations	Average growth (2008-2012), %	Potential characteristic
<b>CIS total</b>	<b>-4,5</b>	<b>losing &lt; 5%</b>
Russia, total	+3,9	growing < 5%
Ukraine, total	-12,1	losing > 5%
<b>EU total</b>	<b>+5,1</b>	<b>growing &gt; 5%</b>
Romania, total	-4,1	losing < 5%
<b>Other countries</b>	<b>+3,5</b>	<b>growing &lt; 5%</b>

Source: own calculation based on ITC data

Abstracting Romania's situation as a very important partner for Moldova (this country deals the 3rd - the 4th part of the whole agri-food export to the EU), we estimate a negative dynamic context, bringing arguments for cataloging Romania as presenting a "losing <5%" potential issue (-4.1%).

Geographic group "Other countries" sums up fragmented shares of national total agri-food export and the overall increase average in the reference period is +3.5%, close to the dynamic of Russia (+3.9%), which reserves a potential, although a moderate one - "growing <5%".

Meanwhile, agri-food export competitiveness can be relevantly quantified by Herfindahl export concentration index (resultative and for diversification) as shown in table 8, which presents the market orientation share analysis and thus reveals the performance and flexibility of exports [8].

Table 8. Geographical dynamics of agri-food exports on the most important markets, 2008-2012

Product	Importers, top 3, 2012	Share of destination country in exports of product, %	Export concentration index (Herfindahl)
Wine of fresh grapes	1. Russia	28.5	0.17
	2. Belarus	25.6	
	3. Kazakhstan	10.4	
Spirits, liqueurs, other spirituous beverages	1. Russia	31.5	0.22
	2. Ukraine	25.9	
	3. USA	16.2	
Nuts	1. France	26.2	0.11
	2. Iraq	14.2	
	3. Greece	8	
Apples, pears and quinces	1. Russia	93.5	0.88
	2. Belarus	3.5	
	3. Kazakhstan	2.2	
Apricots, cherries, peaches, nectarines, plums and sloes	1. Russia	93.9	0.89
	2. Belarus	5.8	
	3. Macedonia	0.1	
Grapes	1. Russia	75.5	0.60
	2. Belarus	14.1	
	3. Romania	9.5	
Sunflower seeds	1. Ukraine	22.5	0.14
	2. New Zealand	20.6	
	3. Great Britain	16.8	
Sunflower oil	1. Italy	60.1	0.40
	2. Romania	16.1	
	3. Spain	9.6	
Fruit and vegetable juices, unfermented	1. Poland	38.1	0.25
	2. Austria	25.9	
	3. Germany	17.7	
Vegetables prepared or preserved otherwise than by vinegar	1. Russia	70.3	0.53
	2. Belarus	15.5	
	3. Kazakhstan	9.8	
Cereals	1. New Zealand	26.3	0.14
	2. Turkey	13.1	
	3. Belarus	12.6	
Sugar	1. Romania	51.9	0.35
	2. Poland	20.2	
	3. Bulgaria	15.5	
Meat and edible offal	1. Russia	99.5	0.99
	2. Kazakhstan	0.3	
	3. Belarus	0.2	
Vegetables	1. Russia	90.2	0.82
	2. Belarus	5.1	
	3. Romania	2.5	
Dairy, eggs, honey	1. Russia	33.8	0.24
	2. Kazakhstan	32.6	
	3. Germany	11.3	

Note: USA Federal Trade Commission considerations for Herfindahl index level of concentration limits

CIS – CIS countries, EU – EU countries, Other states – other countries

Source: own calculations based on ITC data

Assessment in the table 8 reveals some quite interesting trends. First of all it is about the structure of top markets share for national agri-food products. Analysis of the major products export reveals an important domination of CIS countries (marked in red), especially in the export of wines, spirits, apples, pears and quinces, grapes and other fruits with high share in agri-food export.

An example of performance would be, in this respect nuts, which on the one hand, has an important place in export, they managed selling of production to the EU (France, Greece - as top destinations) and also other countries (Iraq) and on the other hand, they showed a very good performance to export concentration index, reflecting its lowest value of all products analyzed - 0.11.

From the respective description we can deduce two summaries:

- Within *CIS*, the most important partners for Moldova proved to be Russia, Belarus, Kazakhstan and Ukraine, which are absolute leaders in 4 of 15 top agri-food categories (wine, apples, pears and quinces, prepared or preserved vegetables and meat), that rank absolute positions in about 23.5% of said items. *EU* countries are leaders in their turn at 3 positions out of 15 - sunflower oil, fruit and vegetable juices and sugar. Union partners showed a greater geographical diversification for top countries, such as Romania, Great Britain, Poland and Germany, but also Italy, Portugal, France, Austria, Bulgaria, Spain and Greece. From the group "Other countries" important partners for our products were New Zealand, USA, Iraq, Turkey and relatively Macedonia.

- Out of total 15 positions of significant agri-food products, only 4 recorded a moderate concentration (and diversification) - wine, nuts, sunflower seeds and cereals, rest of the products showed high or very high concentrations, such as meat, fruit and vegetables.

## CONCLUSIONS

The study showed that the recovery of lost potential, relative to the major values during

1970-1990, will be an important challenge in situation of capacity loss for most agri-food products (except only sunflower), thereby affecting the production export.

In Moldova's agri-food exports about 80% belongs to agricultural products (commodity group 01-15) and only 20% to food processing industry products.

Main exported products are vegetal products, vegetable or animal fats and oils, foodstuffs.

Geographically, the reorientation of Moldovan exports defined itself since 2006, when the EU share in total exports of Moldova exceeded for the first time the CIS share, and in terms of tariff classification in the period 2006-2012 the top positions of agri-food export were held by beverages, fruits, vegetables, animal and vegetable fats.

According to the obtained results for RTA index we can notice some advantage in certain agri-food products with EU countries. These are: edible fruits and nuts; animal or vegetable fats and oils; preparations of vegetables, fruit, nuts; beverages. Nowadays, the comparative advantages of Moldova are not fully used. This is explained by decreasing or switching values of RTA index for some commodities groups.

Market perspective analysis revealed the CIS losing potential, with a slight increase for Russia and a large increase (more than 5% of average growth in 2008-2012) of the EU. As products, concentration on tops, but also within groups, it is characteristic for national agri-food export.

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## FISH PRODUCTION WORLDWIDE

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### **Abstract**

*Fishing is one of the oldest occupations, which over the years has gone through several stages. In the economic terms the increase in intensive industrial system of the fish is advantageous because the specific energy consumption is low, given that they not need to maintain body temperature at high temperatures. Having regard to demographic trends in continue increasing, and the tendency of decrease fisheries leads to increased the production of aquaculture fish by order to ensure enough quantity and quality. The purpose of this paper is to highlight the evolution of fish production worldwide and in particular to show the evolution of production of fish from fisheries and aquaculture. To highlight the evolution global fish production given two ways to get fish respectively from aquaculture and fisheries, that have used data from FAOSTAT for 2007-2012. Also we can see that approximately 90% of the fish production is fished in the sea and only 10% in the territorial waters. The fish production in Africa had an ascending trend in the period under review. Analyzing fish production the share of total world continents is noted that Asia has a share of 68% in 2007 and increase to 73% in 2012.*

**Key words:** Europe, fish, world

### **INTRODUCTION**

Fish is an important source of protein, feed raw material for the manufacture and production of medicinal products.

Fishing is one of the oldest occupations, which over the years has gone through several stages. He started fishing with his hand, and afterwards are used baskets, traps of all kinds, harpoons and nets.

In the Middle Ages, with the development of better preservation techniques like: drying, smoking, and salting and improved transportation, commercial fishing began shifting from local, small-scale activities to commercial, large-scale enterprises. [3]

Origin of fish farming in Europe dates back to Roman times and is closely related to the spread of Christianity, such the monastic communities have an important role in the development of fish farming.

A major role in the development of fish farming has had SL Jacobi, who in 1763 first discovered and he applied artificial insemination to trout and VP Vraskij which in 1860 put into operation first station of

incubation the spawns of salmonids in Russia. [2]

From a nutritional perspective, fish is a food easily digestible, nutritious and superior digestive qualities, given the high content of amino acids, vitamin A and D, and low content of extractive substances [5].

In the economic terms the increase in intensive industrial system of the fish is advantageous because the specific energy consumption is low, given that they not need to maintain body temperature at high temperatures. The specific consumption of feed is low, and the rate of reproduction is high.

Given the rapid growth of the world population that began in 1950 by reducing mortality in less developed regions and continued at a fast pace, reaching in 2011 the global 7 billion people [7] and that will not stop here, the studies say that by 2050 the population will increase by 2.3 billion respectively with 33%, which will double the requirements for food. [1]

Having regard to demographic trends in continue increasing, and the tendency of

decrease fisheries leads to increased the production of aquaculture fish by order to ensure enough quantity and quality.

Although fishing in the natural waters can not meet the needs of the economy, because has a small yield per hectare [4], practicing aquaculture contribute both to increase production and to sustainable development. Aquaculture has the potential to become a sustainable practice that can supplement capture fisheries and significantly contribute to feeding the world's growing population.[6] Fisheries and aquaculture contribute to the complex development of agriculture by increasing meat additional resources.

Given the importance of fish purpose of this paper is to highlight the evolution of global fish production, production from fisheries and aquaculture.

## MATERIALS AND METHODS

To highlight the evolution of global fish production given two ways to get it, aquaculture and fisheries that have used data from the Food and Agriculture Organization of the United Nations for 2007-2012. Research methods applied were the comparison method and calculation time share. Share a resource is the percentage that represents the value of the resource in the total resources of the same type.

## RESULTS AND DISCUSSIONS

Marine waters in which is practiced fishing world are the Indian Ocean, Pacific Ocean, Atlantic Ocean, Antarctica, the Atlantic Ocean which ensures an area of 360,900,000 km<sup>2</sup> and adjacent seas that Arctic Sea, Mediterranean and Black Sea.[8]

Internal waters in which is practiced fishing world are the internal waters of Africa, North America, South America, Asia, Europe, Oceania and Antarctica.

It can be noted as Figure 1 that the largest share is held by the Pacific Ocean with 47%, followed by 27% Atlantic Ocean, Indian Ocean with 17% and Antarctic Ocean with

9%. So Pacific Ocean provides the largest area for fishing.

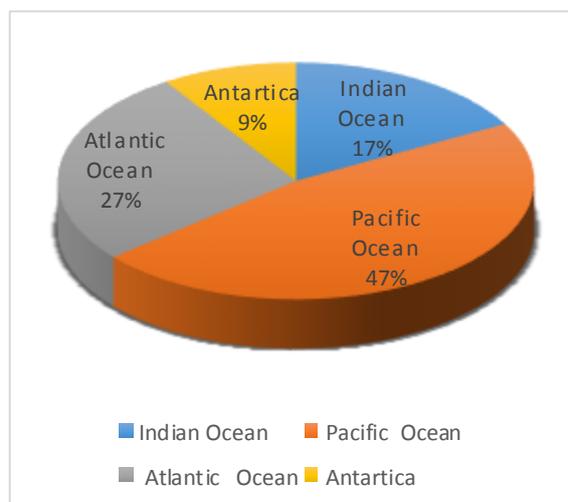


Fig.1.The share of surface ocean

Table 1. Fish production fisheries and aquaculture worldwide (million tonnes)

Specification		2007	2008	2009	2010	2011	2012
fishing	in internal waters	10,1	10,3	10,5	11,3	11,1	11,6
	maritime	80,7	79,9	79,6	77,8	82,6	79,7
	Total	90,8	90,1	90,1	89,1	93,7	91,3
aquaculture	freshwater	29,9	32,4	34,3	36,8	38,7	41,9
	maritime	20	20,5	21,4	22,3	23,3	24,7
	Total	49,9	52,9	55,7	59,0	62,0	66,6

Source: The State of World Fisheries and Aquaculture, Opportunities and challenges

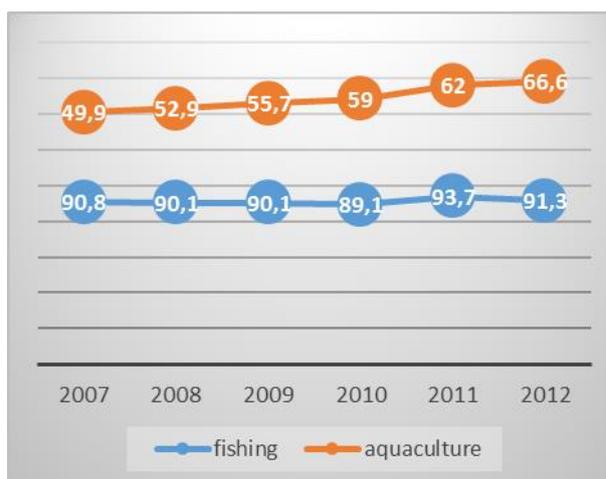


Fig. 2. The evolution of global fish production fisheries and aquaculture

Analyzing the evolution of production of fish from fishing it is found a descendant trend in the period 2007-2010, followed by an increase of 5.1% in 2011 compared to 2010 and 2012

compared with 2011 is a decrease of 2.6%. Also we can see that approximately 90% of the fish production is fished in the sea and only 10% in the territorial waters, according to Table 1 and Fig. 2.

It can be observed that the production of fish from aquaculture represents half compared to fisheries production. But it observed that from freshwater aquaculture production is higher than the from sea, according to Table 1.

Though the production of fish from inland fisheries increased, they are still low, given that inland waters are used for navigation, irrigation, municipal use, hydroelectric power generation.

In addition to fish production, inland aquatic ecosystems provide other ecosystem services such as hydrological cycle regulation, by building flood control dams, supporting coastal communities, and recreational services.

Owing to these multiple uses of inland waters, is considered to represent important sources for those uses and national development programs are given less importance.

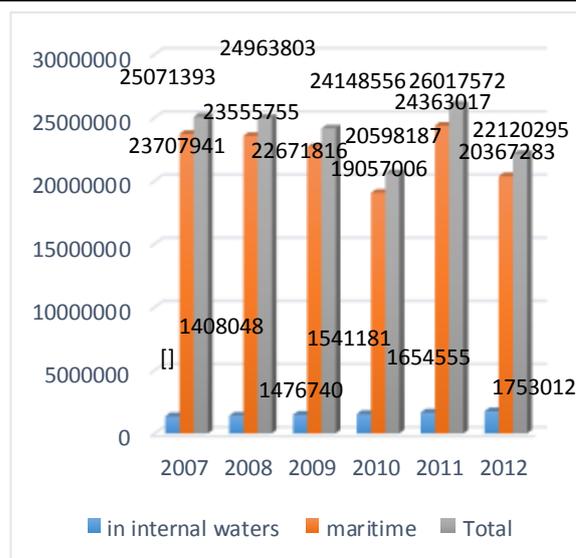


Fig. 4. The fishing fish production in America

The total production of fish in America has a downtrend during 2007-2010, followed by an increase in 2011 and a further drop in 2012. Also it can be seen that the production of fish in inland waters is very low compared to marine fish production waters, as show in Fig. 4.

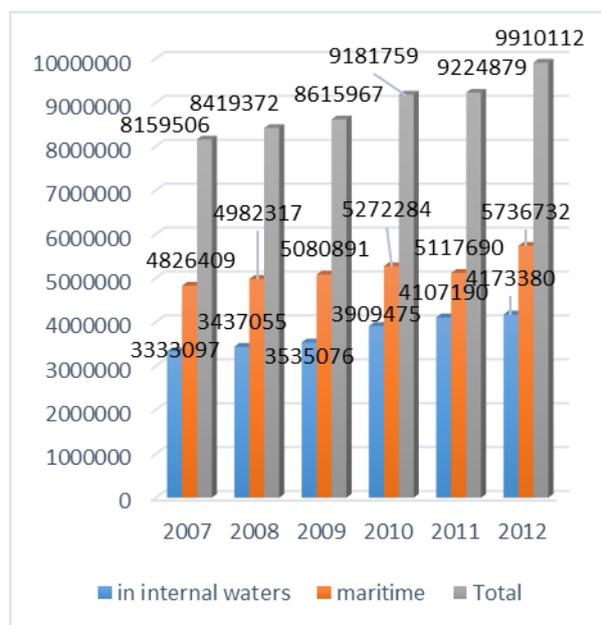


Fig.3. The fishing fish production in Africa

It can be observed in Fig.3 that fish production in Africa had an ascending trend in the period under review, and inland fish production is lower compared to that from marine waters.

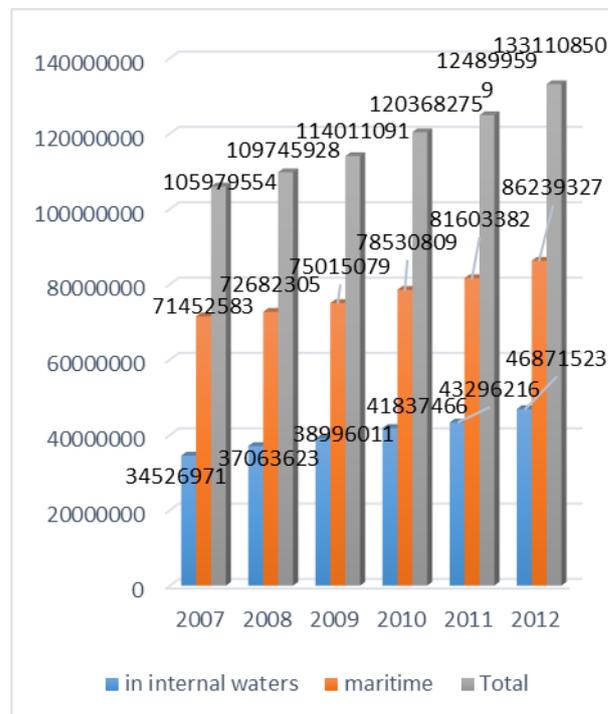


Fig.5. The fishing fish production in Asia

It can be observed in Fig.5, that in Asia the total fish production has registered an ascending trend during the period analyzed

and inland waters fish production is lower compared to that from marine waters.

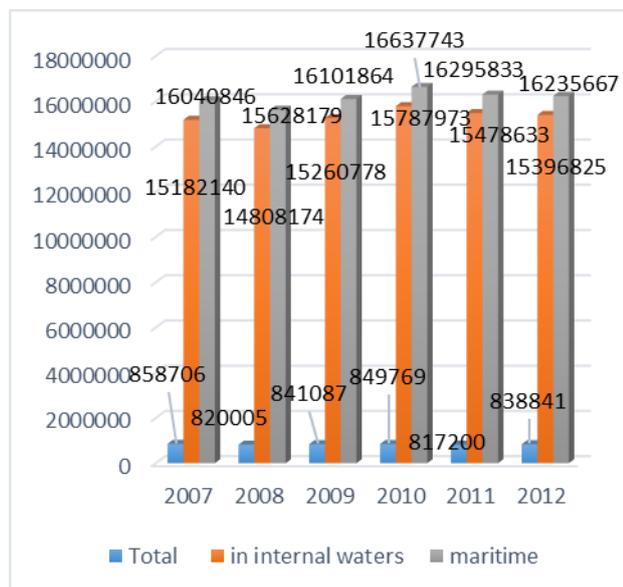


Fig. 6. The fishing fish production in Europe

In Europe the total fish production has registered an ascending trend in the period analyzed, and inland waters fish production is much lower compared to that from marine waters, as show in table 6.

So world production of fish from fishing continuously increased during the analyzed period 2007-2012.

Table 2. The share of fish production fisheries continents of the world total

Specification	2007	2008	2009	2010	2011	2012
Africa	5,20	5,26	5,24	5,46	5,19	5,42
America	15,9	15,5	14,7	12,2	14,6	12,1
Asia	67,5	68,5	69,4	71,5	70,2	72,8
Europe	10,2	9,76	9,80	9,89	9,16	8,8
Oceania	1,00	0,9	0,8	0,8	0,8	0,8

Source: own calculations based on data <http://www.fao.org/fishery/statistics/global-production/en>

Analyzing fish production the share of total world continents is noted that Asia has a share of 68% in 2007 and increase to 73% in 2012. In second place it is America with a share which decreased from 16% in 2007 to 12% in 2012. Europe follows with a share which is

down from 10% in 2007 to 9% in 2012, according to Table 2.

## CONCLUSIONS

Worldwide fishing fish production in aquaculture production is far superior. And production fished in seas and oceans is about 90% compared to inland waters. Due to the multiple uses of inland waters, is considered to represent important sources for those uses and national development programs are given less importance.

Global fish production in Asia is the most significant, with a total a share of about 67%.

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## THE APPLICATION OF THE CROSS COMPLIANCE IN DIRECT PAYMENTS TO FARMERS

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### Abstract

*This paper is a summary of the study on the optimization of cross compliance in direct payments to farmers in Romania by assessing the situation on the enforcement of cross compliance schemes and measures to support farmers during 2007-2013 and find the best implementation model for the next period. This has been used data and information from IACS database, audit reports and statistical reports on cross, managed by APIA. The analysis shows the existence of a large number of standards for good agricultural and environmental condition (GAEC) and the statutory management requirements (SMR) in continuous revision, difficult to understand by land surveyors and farmers have to comply. This led to a large number of nonconformities and sanctions to reduce payments to certain standards/requirements (approx. 23,029 cases of non-compliance, i.e. 25.86% of the farmers control and penalties totaling approx. 1,412,690 € for period analyzed), with a negative impact on the use of EU funds for agriculture. In response to the matters referred propose simplification of cross compliance, reducing the number of standards and mandatory requirements for farmers (from 13 standards GAEC and 18 requirements SMR currently to 7 standards GAEC and 13 requirements SMR in the new implementation) an effective system of management and control, and an action plan on informing farmers on cross compliance.*

**Key words:** requirements, cross compliance, non-compliance, inspection bodies, standards

### INTRODUCTION

Cross compliance is a key component of the Common Agricultural Policy (CAP) that provides the link between payments to farmers and environmental compliance, public health, animal and plant health, animal welfare and maintaining the land in good agricultural condition [1], [2].

Cross compliance rules aimed at farming the farmer and land areas that it manages and applies to the entire agricultural area of the farm, including land that is not eligible for payment and are not used in production [5].

Any farmer applying direct area payments, agri-environment payments, LFA support scheme and other support measures from EU funds and national budget must respect cross compliance rules. Failure results in the exclusion of the payment or payments in relation to the extent, severity, persistence, repetition and deliberate nature of failure [5].

Moreover, allocating all payments of the European financial package for direct payments to farmers for 2014-2020 will continue to be linked to compliance with the rules of cross compliance in accordance with

the regulations [11].

In this context, this research work aimed to study the optimization of cross compliance in direct payments to farmers in Romania by assessing the situation on the enforcement of cross compliance schemes and measures to support farmers during 2007-2013 and find the best implementation model for the next period.

### MATERIALS AND METHODS

Identifying standards and requirements for each subject area cross compliance was based on analysis of European regulation on the financing, management and monitoring of the common agricultural policy and the national legislation [7], [9].

For a good documentation on the application of cross compliance rules and measures in support schemes for farmers, and other materials, the following methods were used in this study:

- Querying the database of the Integrated Administration and Control System (IACS), managed by the Agency for Payments and Intervention in Agriculture (APIA) regarding the application of direct payments in 2007-

2013 (number of claims, the demand for payment eligibility control, control surfaces, non-compliance and penalties);

- Analysis of documents reporting to the European Commission on the application of cross compliance rules on direct payments to farmers in 2007-2013 (control sample, non-compliances and sanctions reduction/exclusion of payment).

## RESULTS AND DISCUSSIONS

This section presents the application of cross compliance rules on direct payments to farmers, the results of eligibility for direct payments, monitoring compliance and cross compliance penalties for the period 2007-2013, and a model for implementation of cross compliance rules period 2015-2020.

Table 1. Good agricultural and environmental conditions (GAEC) [4]

Objectives	Minimum standards
Preventing soil erosion	GAEC 1 – Minimum coverage of arable land in winter ( $\geq 20\%$ of the arable farm) GAEC 2 - Work on arable land with a slope greater than 12% contour is GAEC 3 - Maintaining existing terraces on farmland on 1 January 2007
Maintaining soil organic matter	GAEC 4 - Rotation crops (sunflower not grown at the same site for more than 2 consecutive years) GAEC 5 - Ban on burning stubble and crop residues on arable land
Maintain soil structure	GAEC 6 - Prohibition on performing the work of plowing under excessive soil moisture
Ensure a minimum level of maintenance of land	GAEC 7 – Ensure a minimum level of maintenance of permanent grassland (pasture $\geq 0,3$ LU/ha and/or at least one mowing per year) GAEC 8 - Ban on permanent grassland vegetation burning GAEC 9 - Ban on felling lonely and/or groups of trees on agricultural land GAEC 10 - Removal of unwanted vegetation on agricultural land
Protection and management of water	GAEC 11 - Compliance with laws on the use of water for irrigation in agriculture GAEC 12 - Is prohibited to apply of fertilizers and plant protection strips protect the surface water, which is the minimum width of 1 m on land with a slope of up to 12% and 3 m on land with a slope greater 12% GAEC 13 - Is prohibited groundwater pollution by direct discharge or by downloading the field of products containing hazardous substances used in agriculture*)
Maintaining permanent grassland area	Maintain permanent grassland area at national level existing on 1 January 2007. The requirement is fulfilled by keeping the ratio of land under permanent grassland area and total agricultural area declared by farmers in 2007

\*) GAEC 13 will apply from 1 January 2014

In Tables 1 and 2 are shown the cross compliance rules applicable to schemes and support measures for farmers, as follows:

- Good agricultural and environmental conditions (GAEC), including the obligation to maintain permanent grassland area nationally (Table 1);
- The statutory management requirements (SMR) on the environment, public health, animal and plant health (Table 2).

Table 2. Statutory management requirements (SMR)[5]

Areas	Objectives SMR *)
Environment	SMR 1 - Conservation of wild birds
	SMR 2 (becomes GAEC 13 in Table 1)
	SMR 3 - Soil protection - use of sewage sludge
	SMR 4 - Protection of waters against pollution caused by nitrates from agricultural sources
	SMR 5 - Conservation of natural habitats and of wild fauna and flora
Public health, animal health and plant health	SMR 6 - Identification and registration of pigs
	SMR 7 - Identification of bovine animals
	SMR 8 - Identification of sheep and goats
	SMR 9 - The use of plant protection products
	SMR 10 - Prohibition of use of substances having a hormonal or thyrostatic, beta-agonists
	SMR 11 - Food safety requirements
	SMR 12 - Prevention, control and eradication of transmissible spongiform encephalopathies
	SMR 13 - Setting Community measures for the control of foot and mouth disease
	SMR 14 - Measures to combat certain animal diseases, particularly swine vesicular disease
	SMR 15 – Control/eradication of bluetongue
	Animal welfare
SMR 17 - Standards for the protection of pigs	
SMR 18 - Farm animal protection	

\*) For each SMR are set mandatory requirements for farmers in accordance with the law. Requirements are implemented gradually, based on an implementation schedule, as follows: SMR 1-8 apply in 2012, SMR 9-15 shall apply from 2014 and SMR 16 to 18 shall apply from the year 2016 [7].

### Application of direct payments in 2007-2013 (control eligibility)

Table 3 presents the results of control eligibility for direct payments, checking of claims, determination of areas for which they were requested direct payments (SAPS PNDC) and penalties. Data analysis shows that the payment application 7.800.417 (applicants) with an area of 9.684.116 ha declared (annual average) and demand the payment of approx. 6.018.442.135 € were sanctions in the amount of 372.122.889 € as a result of checking areas declared by the farmers.

Table 3. Situation applying direct area payments in 2007-2013

Year of payment	Number of requests (thousands)	Declared area (thousands ha)	The amount of request (thousands €)	Sanctions payment (thousands €)
2007	1.241,7	9.703,9	609.521,8	147.552,2
2008	1.130,2	9.389,8	703.081,7	104.101,3
2009	1.118,3	9.720,8	741.385,1	38.431,1
2010	1.090,4	9.701,7	734.828,1	33.542,0
2011	1.083,5	9.741,4	889.300,7	12.868,1
2012	1.072,2	9.855,3	1.063.675,8	15.609,2
2013	1.040,3	9.942,4	1.235.631,3	20.096,5
Total	7.800,4	9.684,1	6.018.442,1	372.122,8

Source: Statistical reports - IACS database, APIA

**Controls on cross compliance in 2007-2013**

Table 4 presents the results of control of compliance by national rules of cross compliance farmers direct payments area.

Data analysis shows that the total number of farmers who have applied payments area (7.800.410) were selected for on-site a number of 89.064 farmers (1,14%). Add to this the 645.404 SAPS controls and other controls, in which were found some nonconformities on cross compliance.

Following field inspections were found a number of 23.029 cases of non-compliance (25,86% of the farmers control), of which 4.178 minor deviations unsanctioned (4,69%) and 18.839 penalty payment reduction (21,17% ).

Table 4. Compliance control 2007-2013

Year of payment	Applicants	Farmers control		Non-compliances	
	number	number	%	number	%
2007	1.241.751	17.379	1.40	3542	20,38
2008	1.096.214	12.110	1.10	5896	48,69
2009	1.109.875	10.556	0.95	1581	14,98
2010	1.089.149	11.098	1.02	946	8,52
2011	1.086.792	11.615	1.07	1874	16,13
2012	1.072.267	10.732	1.00	2806	26,15
2013	1.104.369	15.574	0.95	6384	40,99
Total	7.800.417	89.064	1.14	23029	25,12

Source: Statistical reports - IACS database, APIA

Table 5 Non-compliances and sanctions 2007-2013

Year of payment	Non-compliances				
	Total number	minor deviations		sanctions	
		number	%	number	%
2007	3.542	0	0	3.542	20.38
2008	5.896	4.077	33.67	1.819	15.02
2009	1.581	54	0.51	1.512	14.32
2010	946	0	0	946	8.52
2011	1.874	8	0.07	1.870	16.10
2012	2.806	27	0.25	2.779	25.89
2013	6.384	12	0.11	6.371	60.77
Total	23.029	4.178	4.69	18.839	21.17

Source: Statistical reports - IACS database, APIA

Table 5 presents the minor deviations (without penalty) and penalties in relation to the lack of conformity.

Sanctions to reduce payments were set according to the type and causes of failure behind it, according to the procedures in force, as follows:

- 18.648 cases of negligent failure in one area (80,98% of total departures), of which 6.425 farmers penalized by 1%, 1.847 farmers penalized by 3% and 10.376 farmers penalized by 5% of payment entitlements;
- 29 cases of non-compliance by the negligence of the farmers in several areas, sanctioned by 1-5% of payment rights (0,13%);
- 115 cases of repeated non-compliance of farmers negligence, sanctioned by 3-15% of payment rights (0,50% of total deviations);
- 63 cases of non-compliance intentional, farmers sanctioned to more than 15% of payment rights (0,27% of total deviations).

Regarding developments in the non-compliances and sanctions in the period under review is a slight decrease in their in 2009-2010, compared to baseline (2008), followed by their visible growth until 2013 (fig. 1)

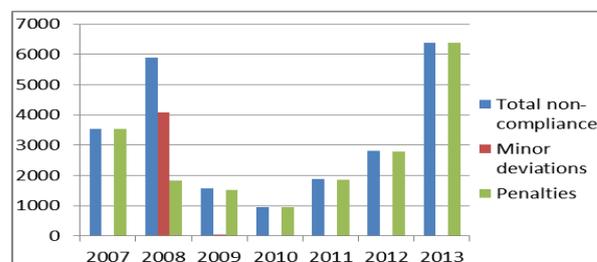


Fig. 1. Developments of non-compliances and sanctions in 2007-2013

Table 6 presents the situation nonconformities categories of rules on cross compliance. There is an increased rate of non-compliance for GAEC (71,37% of total non-compliances) versus 28,34% for SMR.

Table 6. Situation nonconformities categories of standards and requirements

Specification	Total period 2007-2013			
	Farmers control	Non-compliances	% of control	% of non-compliance
GAEC	83.973	16.436	19.57	71,37
SMR	26.306	6.526	24.81	28,34
CM	12.150	67	0.55	0,29
Total rules	89.064	23.029	25.86	-

Significant deviations were recorded for the following standards and requirements: 8.169 deviations for GAEC 1 (10,16%), 4.027 deviations GAEC 2 (7,84%), 2.200 deviations GAEC 10 (2,67%), 1.292 deviations GAEC 7 (2,60%), 2.465 deviations for SMR 4 (11,62%), 1.620 deviations SMR 7 (6,16%), 1.367 deviations SMR 6 (5,20%) and 804 cases deviation for RMS 8 (3,06%). Percentage deviations for each standard is determined by comparing them to control the number of farmers.

**The rate for cross compliance**

The rate reduction payments under cross compliance for the period, is 1.412.690 €, of which 999.975 € for a total of 13.384 farmers were penalized for direct payments (0,14% of the payment applications controlled or 71% of the total amount of penalties) and 412.715 € for 5.467 farmers penalized if support measures for agri-environment and LFA (0,06% of the payment claims under control and 29% of the total amount of penalties).

The rate applied to farmers, the categories of cross compliance standards and requirements are as follows: 1.008.237 € (12.266 farmers) for non-GAEC, 400.356 € (6.526 farmers) for non-SMR and 4.097 € (59 farmers) for non-CM.

**Maintaining permanent grassland area nationally**

Obligation to maintain permanent grassland area at national level meet by maintaining the ratio of permanent grassland and land area for total agricultural area declared by farmers on 1 January 2007 (reference ratio) [4]. The ratio of permanent grassland area and total agricultural area declared by farmers is determined annually and compared with the reference value ratio.

In Table 7 is shown the situation of land area ratio of permanent grassland (SPP) and the total agricultural area (village) declared by farmers in 2007-2013.

From the analysis we find a decrease by 1.85 units (8,50%) of the reference value ratio during 2007-2010, followed by its increase by 2.28 units (11,30%) in 2011-2013. Where reference reduction ratio reaches 10%, the

competent authority shall establish measures to maintain and/or reestablishment of permanent grassland areas at individual level [8].

Table 7. Situation report permanent grassland

Year of payment	Agricultural area (ha)	Grassland area (ha)	Report grassland (%)	Deviation (+/- %)
2007	9.411.557	2.029.603	21,57	100
2008	9.394.140	2.011.191	21,41	-0,74
2009	9.706.945	2.030.704	20,92	-3,11
2010	9.631.098	1.899.414	19,72	-8,50
2011	9.769.906	2.389.817	24,45	+13,35
2012	9.894.771	2.359.620	23,84	+10,52
2013	9.980.397	2.395.944	24,00	+11,31

Source: Statistical reports - IACS database, APIA

The 8,50% reduction of the reference ratio recorded in 2010 was a warning to the competent authority of a possible breach of the duty of maintaining permanent grassland area. In these circumstances, the competent authority has adopted legal measures to maintain permanent grassland area nationwide.

In Fig. 2 is shown the evolution of the annual report on permanent grassland, calculated by APIA period, compared to the reference ratio.

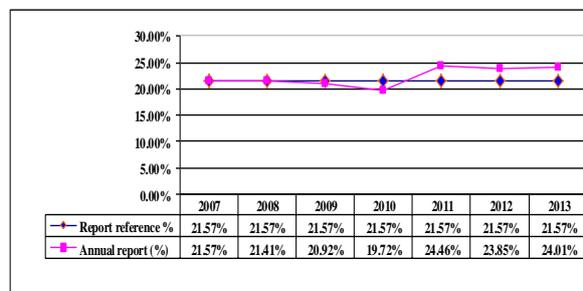


Fig. 2 Evolution of permanent grassland in 2007-2013

**Management and control of cross compliance**

Management schemes and support measures for farmers, and control eligibility, cross compliance and modulation payment is made through the integrated administration and control system (IACS), managed by APIA.

Some elements of management and control system, such as IACS database, the database of the national system for the identification and registration of animals (SNIA), the national register of holdings (RNE) or register

farmers are not compatible and do not work unit, which creates difficulties in managing support schemes and default control payment eligibility and conditionality.

Monitoring of compliance by farmers to cross compliance rules (administrative and field) is conducted by APIA and the National Sanitary Veterinary and Food Safety Authority (NSVFSA), as a specialized body control, control activities are coordinated by APIA, under a delegation agreement concluded between the two authorities [5].

However, APIA face great difficulties in working with NSVFSA and control system applied in the present, does not ensure effective control on cross compliance rules.

Currently, cross compliance control sample is approx. 1,14% of the farmers who applied for payment under each support schemes and is included in the sample to control eligibility. Selection of the control sample is performed by risk analysis and random under the procedures manual prepared by the APIA.

For control efficiency of the control sample is recommended to increase to over 3%, and to reduce administrative costs is advisable to take into account the indicators of control of existing monitoring systems in the field.

Finding nonconformities, determining and applying sanctions is based on procedures developed by APIA under legislation [6], [8]. Audits carried out on cross compliance recommends increasing penalties to reduce payments above the minimum thresh old of 1% under EU law, which currently Romanian authorities apply it excessively.

### Model of implementation of cross compliance rules during 2015-2020

Cross compliance rules applicable to schemes and support measures to farmers in the period 2015-2020 (Table 8) covers the following areas [9]:

- Environment, climate change and good agricultural land;
- Public health, animal and plant health;
- Animal welfare.

The new implementation brings some improvements to the system of cross compliance and eliminates some of the

problems in this area, as mentioned below Table 8.

Table 8. Cross compliance rules applicable to the period from 2015-2020 [9]

Specific objectives	Requirements and standards *)
<b>Domain: Environment, climate change, good agricultural land</b>	
Water	SMR 1 - Protection of waters against pollution caused by nitrates from agricultural sources
	GAEC 1 - Establish / maintain buffer zones along watercourses
	GAEC 2 - The procedures for obtaining authorizations for the use of water for irrigation in agriculture
	GAEC 3 - Protection of groundwater against pollution caused by hazardous substances used in agriculture (prohibition of direct discharges to groundwater and discharge on the ground)
Sol and carbon stock	GAEC 4 - Minimum soil cover
	GAEC 5 Minimum land management reflecting site-specific conditions to limit erosion
	GAEC 6 - Maintaining the level of soil organic matter, including arable stubble burn ban, except for phytosanitary reasons
Biodiversity	SMR 2 - Conservation of wild birds
	SMR 3 - Conservation of natural habitats and of wild fauna and flora
Landscape, minimum maintenance	GAEC 7 - Retention of landscape features (hedges, ponds, ditches, trees isolated or in groups, field margins and terraces) with measures to avoid invasive species and pests
<b>Domain: Public, animal and plant health</b>	
Food safety	SMR 4 - Principles and requirements of food law and procedures in matters of food safety
	SMR 5 - Prohibition of use of certain substances having a hormonal or thyrostatic and $\beta$ -agonist substances
Identification and registration of animals	SMR 6 - Identification and registration of pigs
	SMR 7 - Identification and registration of bovine animals
	SMR 8 - Identification and registration of sheep and goats
Animal diseases	SMR 9 - Prevention, control and eradication of certain transmissible spongiform encephalopathies
Plant protection	SMR 10 - Marketing and use of plant protection products
<b>Domain: Animal welfare</b>	
Animal welfare	SMR 11 - Minimum standards for the protection of calves
	SMR 12 - Minimum standards for the protection of pigs
	SMR 13 - Farm animal protection
Maintaining permanent grassland	The requirement is fulfilled by keeping the ratio of land under permanent grassland area and total agricultural area declared by farmers in 2007

\*) For each SMR are set mandatory requirements for farmers in accordance with the legislation in force (European regulations/directives/national legislation).

The main problemes arising from the implementaion of cross compliance system and the measures to eliminate them are the following ones:

- reducing the number of standards and requirements by eliminating those who do not

meet the purpose for which it was introduced, based on a cost-benefit analysis;

- to review and define standards on specific areas to cover several objectives of the CAP, but not lead to increased administrative costs and unnecessary expenses for farmers;
- requirements will be applied in relation to the size and type of farm, except farmers participating in the payment scheme for small farmers and small scale farms where the risk is low;
- using existing monitoring and control systems in the area, involving several specialized bodies in order to enhance feasibility of controls and elimination decisions/sanctions erroneous;
- using risk analysis systems and information on the level of compliance in order to reduce the control sample and the number of farm inspections.

The new implementation is considering the establishment of an agricultural advisory system for farmers to provide information, instruction and advising them on cross compliance.

Also, field inspection will ensure a minimum level of advice to farmers, thus providing some guidelines on compliance with conditionality.

## CONCLUSIONS

The main causes that led to failure by farmers to cross compliance obligations and sanctions to reduce payments are:

- large number of GAEC standards and requirements applicable SMR support schemes for farmers and their ongoing review, even during a campaign payments;
- inadequate information to farmers on cross compliance obligations, the lack of a functional FAS;
- low rate controls on land (approx. 1% of applicants) and low level of penalties (1-5% of the payment entitlements) for breaches of standards / requirements;
- a negative perception of farmers towards conditionality payment system and even neglect some of the farmers.

Currently, informing farmers about cross

compliance rules is realized by APIA, which has jurisdiction in the matter and Agricultural Chambers, who are unable to meet the need for information and advice in this area [10].

Reducing the number of standards and mandatory requirements (from 13 standards GAEC and 18 requirements SMR, currently, 7 standards GAEC and 13 requirements SMR in the new implementation), their formulation in an explicit manner, the involvement of the competent authorities control activities, and appropriate information to farmers (farm advisory system), the basic elements for optimization the cross compliance system. Also, even if the obligation to maintain permanent grassland area at national level is met, so far, it must designate an authority responsible for supervising the statistical point of view of those areas that report, as appropriate, the competent authority significant reduction in the risk of permanent grassland area.

The implementation of cross compliance can lead to the achievement of at least two important objectives of the CAP, and development of sustainable agriculture and increasing the credibility of the CAP in relation to the expectations of the community in general [3].

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[7]Regulation (EC) no. 73/2009 laying down common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers (...), OJ L 30, 2009, p.16

[8]Regulation (EC) no. 1122/2009 laying down detailed rules for implementing Regulation (EC) no. 73/2009 as regards cross compliance, modulation and the integrated administration and control in direct support schemes for farmers (...), OJ L 316, 2009, p. 65

[9]Regulation (EU) no. 1306/2013 the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy (...), OJ L 347, 2013, p. 549

[10][http://www.apia.org.ro/files/pages\\_files/guide\\_for\\_eco\\_cond\\_may\\_2014\\_19\\_pdf](http://www.apia.org.ro/files/pages_files/guide_for_eco_cond_may_2014_19_pdf)

[11][http://europa.eu/rapid/press\\_release\\_MEMO\\_11-685\\_ro.htm](http://europa.eu/rapid/press_release_MEMO_11-685_ro.htm)



## LITHUANIAN CONSUMERS' ATTITUDES AND PURCHASING BEHAVIOUR TOWARDS DOMESTIC LIVESTOCK PRODUCTS

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### *Abstract*

*This study aimed to identify and analyze Lithuanian consumers' attitudes and purchasing behaviour towards domestic livestock products. In order to get necessary information, Lithuanian residents were interviewed. A multi-stage stratified random sampling was used to select the respondents. This study draws on a survey of 1009 respondents. The analysis of collected data was performed using the methods of mathematical statistics. The results suggest that the vast majority of Lithuanian consumers regularly buy domestic livestock products. Among this group of respondents, the top reasons for purchasing are freshness, good taste and favourable prices. Only a small share of Lithuanian consumers rarely or never buys domestic livestock products. Among this group of respondents, the top reasons for not purchasing are unfavourable prices, short shelf-life and insufficient range of products. Domestic livestock products buyers tend to be older, higher educated and have higher level of income than non-buyers.*

**Key words:** attitudes, purchasing behaviour, domestic livestock products, Lithuania

### INTRODUCTION

Due the globalization, the food market is affected by import of food products. Recently the import of livestock products is constantly increasing in Lithuania. In 2013, compared to 2011, the value of imported dairy products, eggs and milk grew by 23% and the value of imported meat and sub-products rose by 46% [1, 2]. The distribution of imported livestock products had some impact on Lithuanian consumer preferences and purchasing behaviour. During the period of 2011–2013 the shares of some Lithuanian livestock product categories sold on the domestic market decreased, i.e. for dairy products from 86 to 82% and for eggs from 85 to 83%. Though the share of Lithuanian meat products sold on the domestic market remained the same (56%) [1, 6]. Due these changes on the domestic market, there is a need to analyze consumers' attitudes and purchasing behaviour towards domestic livestock products. The Lithuanian preferences neither for domestic food products nor for livestock products have not yet been examined. Studies on consumers' attitudes and perceptions towards domestic and foreign

food products have been carried out in different countries. The researchers from UK summarizes the outcome of a nationally representative consumer survey conducted to examine consumers' attitudes and behaviour towards and willingness to pay for local and national foods compared to imported alternatives. The results indicated that attitudes towards local food purchase were generally positive, with most respondents believing them to be tastier and fresher [5].

The study in Serbia determined the consumer perception of Serbian agricultural and food products and especially perception of home-made products. The main finding was that the most important advantages of domestic agricultural and food products were quality, tradition in the production, domestic origin of products, favourable price and safety. The greatest weaknesses of domestic agricultural and food products were poor marketing, changeable and not the highest quality, and inadequate package [7].

The research in Slovakia revealed that the image of Slovakia among the young students was very positive and the preference for domestic food products was dominant. Students preferred Slovak food products

because of their flavour and freshness [3].

The study in Romania examined the consumer preferences for different categories of domestic and imported food products. It was found that the majority of respondents said they prefer domestic products from Romanian manufacturers. Taste, freshness and being natural were the strengths of Romanian products. The most important weaknesses were small hygienic control, unsafe ingredients used, uncertain shelf-life and unattractive package [4].

## MATERIALS AND METHODS

The aim of this paper is to identify and analyze Lithuanian consumers' attitudes and purchasing behaviour towards domestic livestock products. In order to achieve this aim and collect data, a survey method was used. In total, 1009 Lithuanian residents aged 18 year and over were interviewed across the country. The results of such size sample have an error of no more than plus/minus 3%. A multi-stage stratified random sampling was used to select the respondents. All respondents were screened to be consumers of livestock products.

The survey was carried out from August to September in 2014 by Lithuanian-British market research and public opinion company "Baltic Surveys Ltd." Respondents were interviewed face-to face in their homes, using a standardized questionnaire. The questionnaire included questions on factors influencing the purchase decisions of livestock products, frequency of purchasing domestic livestock products, main motives and barriers to purchasing domestic livestock products. Additional questions were designed to determine socio-demographic characteristics of respondents (i.e. gender, age, personal income, educational level and main occupation).

The statistical package for social science (SPSS) was employed for processing and analyzing of collected data. Out of 1009 survey respondents, women accounted for 55.1% and men 44.9% of the sample group. The distribution of respondents by age was as follows: 20.5% were between the ages of 18-

29 years, 34.1% were between the ages of 30-49 years and 45.4% were 50 years old and over. While 21.6% of respondents indicated a monthly income of less than 1500 LTL (1 EUR = 3.4528 LTL), 24.1% reported their monthly income was within the range of 1501-2500 LTL and 26.2% claimed a monthly income of more than 2500 LTL. The other respondents (28.1%) did not reveal their income. As concerns educational level, 45.0% of respondents had higher education, 44.3% had secondary education and 10.7% had incomplete secondary education. Regarding main occupation, 25.9% of respondents were in a white-collar occupation, 28.7% were in a blue-collar occupation and 45.4% were non-workers (students, retired individuals, unemployed people and housekeepers).

According to frequency of purchasing domestic livestock products, respondents were divided into two groups: domestic livestock products buyers, i.e. those who always, often and sometimes buy domestic livestock products, and non-buyers, i.e. those who rarely and never buy domestic livestock products. The significant differences between domestic livestock products buyers and non-buyers were determined using a Chi-square test. A p value of less than 0.05 ( $p < 0.05$ ) was considered to indicate a statistically significant difference. In order to make comparisons between all pairs of groups, post hoc tests were conducted.

## RESULTS AND DISCUSSIONS

The first part of the analysis focuses on the factors influencing the purchase decisions of livestock products. All respondents were asked to rank the importance (on a scale of 1 to 5 with 1 as very unimportant and 5 as very important) of ten attributes in selecting livestock products that they purchase. The main intention of asking this question was to find out whether Lithuanian customers consider domestic origin as an important factor when choosing livestock products. Table 1 presents the mean scores of all attributes.

Freshness was the top ranked attribute with

mean score of 4.66. 94% of respondents said that freshness was very important or important for their choice of livestock products.

Table 1. Importance of livestock products attributes ranked by mean score

Attribute	Mean score
Freshness	4.66
Taste	4.52
Price	4.46
Healthiness	4.22
Lithuanian origin	4.16
Appearance	4.12
Organic	3.83
Environmental impact	3.50
Animal welfare	3.44
Brand	3.06

Other top ranked attributes included taste, price and healthiness. Lithuanian origin came in the fifth place with mean score of 4.16. 77% of respondents said that Lithuanian origin was very important or important for their choice of livestock products.

The second part of analysis focuses on the purchasing behaviour towards domestic livestock products and socio-demographic characteristics that distinguish between domestic livestock buyers and non-buyers. All respondents were asked to indicate how frequently they purchase domestic livestock products. A simple 5-point scale (with response categories, such as always, often, sometimes, rarely or never) was used, but allowing a “Don’t know” category. As survey results show, the vast majority of respondents were domestic livestock products buyers (88.2%): 19.3% reported always buying domestic livestock products, 60.0% indicated often buying and 8.9% reported sometimes buying. Only a small share of respondents was non-buyers (7.6%): 6.1% reported rarely buying domestic livestock products and 1.5% of respondents indicated never buying domestic livestock products. 4.2% of respondents replied “Don’t know”. Figure 1 shows the frequency of purchasing domestic livestock products by socio-demographic characteristics.

In the socio-demographic characteristics, four of five characteristics indicated significant differences between domestic livestock buyers and non-buyers (Table 2). Specifically,

there were significant differences between the two groups for age, income, educational level and main occupation.

Domestic livestock products buyers tended to be middle-aged and non-buyers tended to be young. Respondents with the highest income and higher education were more likely to buy domestic livestock products. Conversely, respondents with the lowest income and incomplete secondary education were least likely to buy these products. Domestic livestock products buyers were more likely to be in a white-collar occupation and non-buyers were more likely to be non-workers.

Table 2. Socio-demographic characteristics of domestic livestock products buyers and non-buyers

Socio-demographic characteristics	Respondents (n)	Buyers, %	Non-buyers, %	p-value	$\chi^2$
Gender					
Women	544	92.8	7.2	0.301	1.07
Men	423	91.0	9.0		
Age group					
18-29	188	88.8	11.2	0.032*	6.86
30-49	335	94.9	5.1		
>50	444	91.2	8.8		
Income					
<1500 LTL	210	87.6	12.4	0.002*	12.18
1501-2500 LTL	237	92.8	7.2		
>2500 LTL	259	96.1	4.9		
Educational level					
Incomplete secondary	97	83.5	16.5	0.003*	11.78
Secondary	426	92.0	8.0		
Higher	444	93.9	6.1		
Main occupation					
White-collar workers	255	96.9	3.1	0.000*	16.08
Blue-collar workers	278	93.2	6.8		
Non-workers	434	88.5	11.5		

Notes: All n did not add up to total number of respondents because of missing data.

\*Statistically:  $p < 0.05$  (Chi-square test).

In terms of age, the highest percentage of domestic livestock products buyers was found in respondents between the ages of 30-49 years (94.9%).

This percentage was significantly greater than that found in respondents between the ages of 18-29 years (88.8%) ( $p = 0.010$ ), as well as than that found in respondents 50 years old and over (91.2%) ( $p = 0.047$ ).

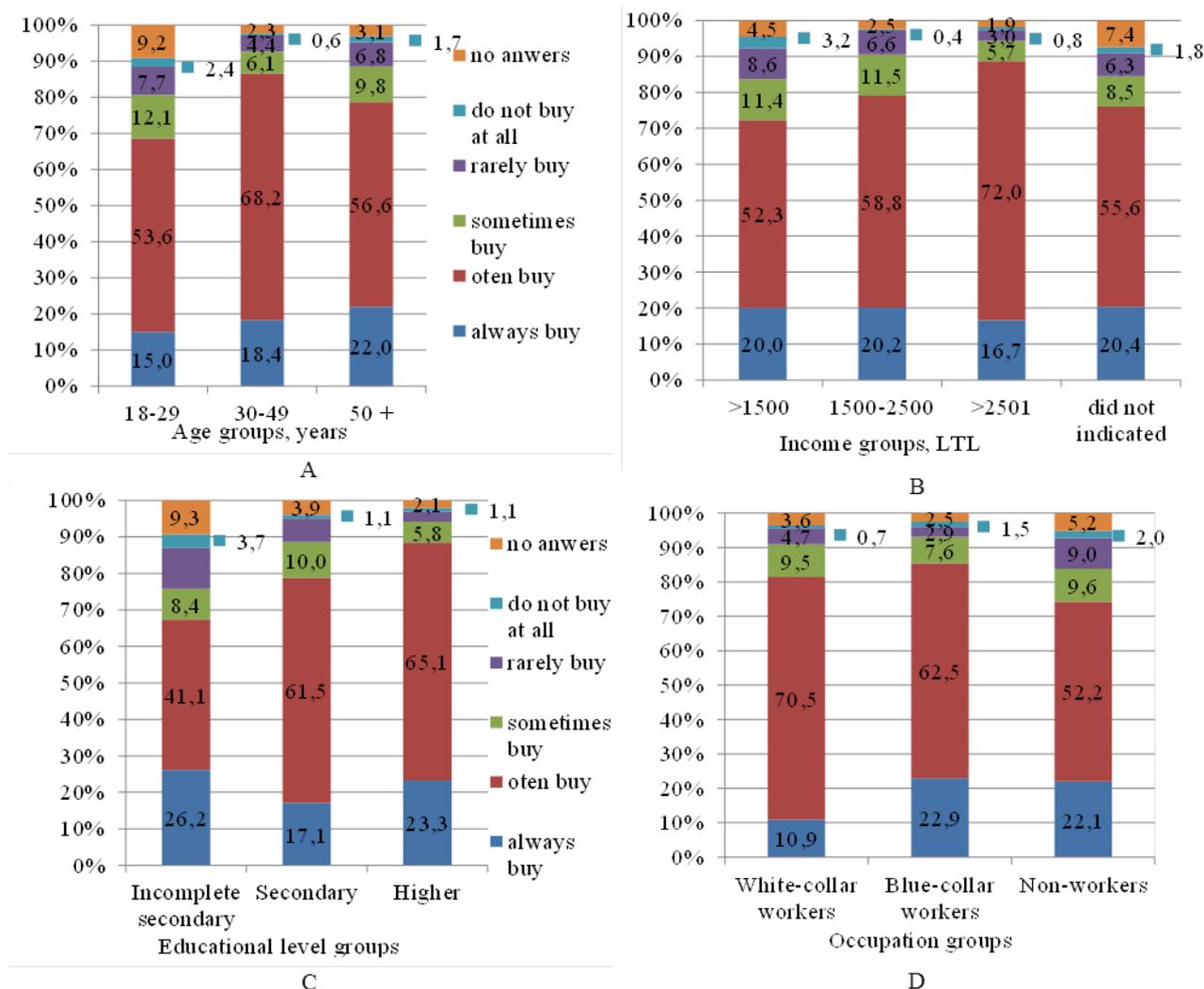


Fig.1. Frequency of purchasing domestic livestock products by: A – age of respondents; B – monthly income; C – educational level; D – occupation (all respondents)

Significantly more respondents with the highest income (96.1%) bought domestic livestock products as compared to respondents with the lowest income (87.6%) ( $p = 0.01$ ). There was no statistically significant difference in the percentage of respondents with income of more than 2500 LTL and respondents with income of 1501-2500 LTL (92.8%) ( $p = 0.104$ ) who bought domestic livestock products. The percentage of domestic livestock products buyers was slightly higher for respondents with higher education (93.9%) than respondents with secondary education (92.0%), the difference was not statistically significant ( $p = 0.273$ ). Significantly more respondents with higher and secondary education bought domestic

livestock products as compared to respondents with incomplete secondary education (83.5%) ( $p < 0.000$  and  $p = 0.010$ , respectively). In terms of main occupation, the highest percentage of domestic livestock buyers was found in white-collar workers (96.9%). This percentage was not significantly greater than that found in blue-collar workers (93.2%) ( $p = 0.052$ ). Significantly more white-collar workers and blue-collar workers bought domestic livestock products as compared to non-workers (88.5%) ( $p < 0.000$  and  $p = 0.039$ , respectively). The domestic livestock products buyers were asked what influenced them to make this purchase. Among this group of respondents, the most important reason for purchasing

domestic livestock products was freshness (a reason for 75% of buyers) (Fig. 2). This factor was more often mentioned by women, the respondents of 30-49 years old, the consumers with the highest income (more than 2500 LTL) and higher education and the persons in a blue-collar occupation. Further reasons for purchasing domestic livestock products were good taste (55%) and favourable prices (49%). Good taste as a motive to purchasing domestic livestock products was more often declared by women, the respondents of 18-29 years old, the consumers with the highest income (more than 2500 LTL) and secondary education and the persons in a white-collar occupation. Favourable prices as a motive to purchasing domestic livestock products was more often indicated by men, the respondents of 30-49 years old, the consumers with the lowest income (less than 1500 LTL) and incomplete secondary education and the persons in a blue-collar occupation.

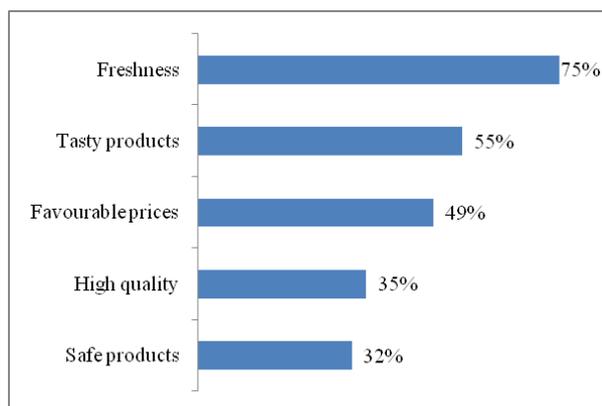


Fig.2. Main reasons for purchasing domestic livestock products

The non-buyers were asked why they did not purchase domestic livestock products. Among this group of respondents, predictably, the most important reason for not purchasing domestic livestock products was unfavourable prices (a reason for 55% of non-buyers) (Fig. 3). This factor was more often mentioned by men, the oldest respondents (age group of 50 years old and over), the customers with the lowest income (less than 1500 LTL) and secondary education and non-workers. Further reasons for not purchasing domestic livestock products were short shelf-life (15%) and

insufficient range of products (15%). Short shelf-life as a barrier to purchasing domestic livestock products was more often declared by men, the respondents of 30-49 years old, the customers with the lowest income (less than 1500 LTL) and secondary education and the persons in a white-collar occupation. Insufficient range of products as a barrier to purchasing domestic livestock products was more often indicated by men, the young respondents (age group of 18-29 years old), the consumers with the highest personal income (more than 2500 LTL) and secondary education and the persons in a white-collar occupation.

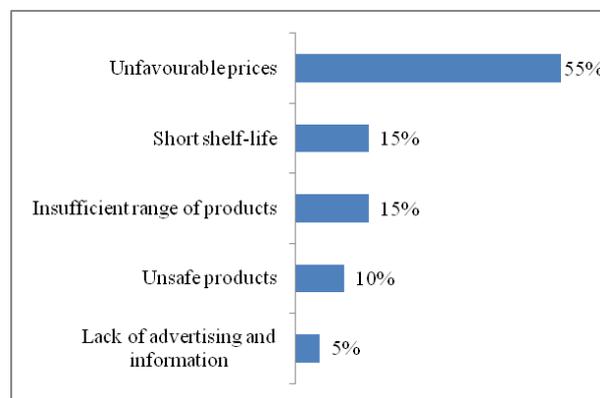


Fig.3. Main reasons for not purchasing domestic livestock products

## CONCLUSIONS

This study aimed to identify and analyzing Lithuanian consumers' attitudes and purchasing behaviour towards domestic livestock products. The survey results suggest that for consumers, the most important factor influencing the purchase decisions of livestock products was freshness. Although Lithuanian origin was not top ranked attribute, 77% of respondents pointed out that this attribute was very important or important when buying livestock products.

The vast majority of Lithuanian consumers (88.2%) regularly purchase domestic livestock products. The buyers were more likely to be middle-aged, had a higher level of income and higher education and were in a white-collar occupation. Only a small share (7.6%) of consumers rarely or never purchases domestic

livestock products. The non-buyers were more likely to be young, had a lower level of income and incomplete secondary education and were non-workers.

For buyers, the main motives to purchasing domestic livestock products were freshness, good taste and favourable prices. For non-buyers, the main barriers to purchasing domestic livestock products were unfavourable prices, short shelf-life and insufficient range of products.

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## ANALYSIS OF INFLUENCE OF FINANCIAL SOCIAL LEARNING OPPORTUNITIES ON LOAN REPAYMENT BEHAVIOUR OF COOPERATOR BORROWERS IN ABIA STATE, NIGERIA

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### *Abstract*

*This study on analysis of influence of financial social learning opportunities on loan repayment behavior of cooperator borrowers was carried out in Abia State, Nigeria. It was the objectives of the study to relate social learning financial opportunities in cooperative societies and member borrowers budgeting and timely repayment of loans; and determine demographic, social learning and financial factors that influenced loan repayment by cooperator borrowers. Two-stage random sampling technique was used in selecting first, two of the three agricultural zones; and second two registered farmers' multi-purpose agricultural cooperative societies. This was followed by purposive selection from registers of the chosen cooperative societies sixty cooperators who currently were repaying loans borrowed. Descriptive and inferential statistical techniques were used in analyzing the gathered cross sectional data. Results suggest important relationships between financial social learning opportunities in cooperative societies and borrowers' budgeting and timely loan repayment behaviours. Attendance to meetings, discussions with fellow cooperators and meaningful observation on financial behaviour of members of cooperative societies had significant positive influences on conduct and performance loan beneficiaries. The number of times beneficiaries attended meeting since after loan(s) were received; number of times they discussed loan matters with members before loan(s) were received; and number of times they discussed loan repayment strategies with other cooperators after loans were received had positive influences on loan repayment behaviour of cooperator borrowers. Cooperator(s) should participate in all union activities to truly belong and reap the benefits of being a member.*

*Key words:* cooperative societies, opportunities, social learning, working cash

### INTRODUCTION

Cooperative societies are voluntary socioeconomic business units that mutually learn in their groups. Evidences have existed where cooperative societies have promoted socialization and have improved learning and behaviours [11]. Group learning provides opportunities through discussions, demonstrations, and observations. [7] referred to these social learning opportunities as 'acquired behavioural dispositions' that are hinged on direct trial-and-error experiences. Social learning opportunities are provided by circumstances that involve perception, observation, modelling and evaluation [6]. Farmer socialization is that social process by which norms, attitudes, motivation and farming behaviours are transmitted from specific sources called socialization agents to the learner (farmer) [8, 13]. Multipurpose

farmer cooperative societies are one such socialization agent to farmers for effective execution of their business. As people in economic occupation or business, farmers are investors. Investor financial socialization behaviour can be assessed by considering dimensions such as budgeting and timely loan repayment [3, 1, 2]. In Abia State, Nigeria there are learning opportunities provided by cooperative societies to their members in the recent past as they have educated farmer cooperators on latest managerial skills, technologies and profitable investment opportunities. The department of cooperatives has also conducted a series of ten seminars/workshops for cooperators within and outside the state [5]. Social learning financial opportunities arise during management meetings, interactive discussions amongst cooperators, financing lectures by invited resource persons, and observation of

innovative investments of others and shared financial management strategies during informal forum [18, 15].

Social learning theories are important and have been applied in investigating financial behaviours of formal learners (college students) [12], and have contributed in task of tackling formal social progress challenges (personal rights, access to higher education, personal freedom and choice, equity and inclusion) and in designing of social progress model [17]. These are all formal learning situations and opportunities with marked levels of strong state controls. There have rarely been attempts to investigate the influence of social learning financial opportunities on loan repayment behaviour of informal learners operating under mutual trust and internal cohesion such as the case with investment-targeting members of cooperative societies. The amount of loan taken and the current working cash of a small-scale entrepreneur may to a great extent influence propensity of timely repayments of short term loans when finance is properly planned and investors restrict spending to budgets [16]. Working cash often is the liquid aspect of working capital required for daily operational activities of an enterprise. Sequel to fulfilling this need of investigating influence of social learning opportunities on financial behaviours of informal learners, this study therefore has its specific objectives to: (i) relate social learning financial opportunities in cooperative societies to working cash and amount of loan repaid by cooperator borrowers; and (ii) determine demographic, social learning and financial factors that influenced loan repayment by cooperator borrowers.

## MATERIALS AND METHODS

This study was carried out in Abia State, Nigeria. Abia is one of the five southeastern States of Nigeria, with its administrative headquarters in Umuahia. Geographically, Abia state is located between latitudes  $07^{\circ} 00'$  N and  $08^{\circ} 10'$  North of the Equator and Longitudes  $04^{\circ} 45'$  E and  $06^{\circ} 17'$  East of the Greenwich Meridian. The state hosts a

population of 2,833,999 made up of 1,434,193 males and 1,399,806 females [10] in seventeen (17) local Government Areas (LGAs). It is a typical agricultural area in delineated three agricultural zones of Aba, Umuahia and Ohafia. Notable tree crops grown in the state are oil palm, Cashew, Cocoa, and Rubber. Food crops cultivated among others include cassava, yam, maize, plantain, banana, melon, cowpea, and rice. Livestock reared include cattle, sheep, goats, pigs, poultry and rabbits.

Two-stage random sampling technique was used in selecting first, two of the three agricultural zones. The selected were Umuahia and Aba agricultural zones. Second, two multipurpose cooperative societies were randomly chosen from each of the selected agricultural zones. This gave four Multipurpose Cooperative Societies (MPCS) chosen. The chosen MPCS were from Umuahia Zone (Oganihu Cassava farmers MPCS, Itu Olokoro, and Ulonna South Micro irrigation MPCS Aforugiri); and from Aba zone were ( Progressive Farmers MPCS Umuara Isiala Okpu, and Solace Farmers MPCS Mgboko Umuete). Then purposively, sixty cooperators who were repaying loans from registers of the chosen cooperative societies were selected and interviewed with a semi-structured questionnaire. Data collected included demographic information on age, gender, level of formal education, and marital status. Financial data included amount of borrowed fund, working cash, amount of loan repaid, and information on promptness of loan repayment. Descriptive and inferential statistical techniques were used in analyzing the gathered cross sectional data. Descriptively, means, standard deviations, frequencies and percentages were computed on relevant variables. Financial social learning opportunities were based on the following three dimensions: (i) attendance to cooperative meetings/seminars/workshops (ii) discussions with fellow cooperators, and (iii) observing investment and loan repayment timing of fellow cooperators. Indices of financial social learning opportunities were computed with number of times each learning

opportunity was enjoyed by the beneficiary. The indices on observations made by respondents on investment and loan repayment activities of colleagues were computed based on data gathered on questions based on a 5-point Likert scale on which the most frequently observed activity scored 5.0 and the least scored 1.0. Inferentially, the Ordinary Least Square (OLS) multiple regression model tried on Linear, Semi-logarithmic, double logarithmic, and exponential functional forms was used to analyze factors that influenced loan repayment by cooperator borrowers. Loan repayment model was expressed implicitly and defined as follows:

$$Y=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, e_i)$$

Where:

Y= Amount of loan repaid (₦'000);

X1= Number of times attended cooperative meetings/seminar/workshop before taking the loan;

X2= Number of times attended cooperative meetings/seminars/workshops since taken the loan;

X3=Number of times discussed loan matters with cooperative member(s) before taking the loan;

X4= Number of times discussed loan repayment strategies with cooperative members;

X5= Gender of borrower (female=1; male=2);

X5= Marital status (married and living with spouse =1; Single –divorced, widowed, widower, spinster, bachelor =2);

X6=Household size (Number);

X7=Years of formal Education;

X8= Working cash (cash at hand + cash savings at bank or anywhere) (₦'000);

X9= Manages cooperative loan with written budget (yes =1; No=2);

X10=Observed other cooperators invest and repay their loans (yes=1; No=2);

$e_i$ = Error term.

## RESULTS AND DISCUSSIONS

This section showcases description of cooperators who borrowed from their

cooperative societies in Abia state, Nigeria. Table 1.0 describes financial behaviours/characteristics and socio-economic characteristics of cooperative loan beneficiaries in the study area.

### *Financial Behaviours and Socio-Economic Characteristics of Cooperators*

Table 1.0 showed that half (50.0%) of the loan beneficiaries received at most one hundred thousand naira (₦100, 000.00). This was a confirmation of fact that these farmers are of smallholder status and were on the average able to repay sixty-two thousand naira (₦62, 000.00) to the lending cooperative societies. In terms of financial behaviour, a good proportion of the loan beneficiaries (63.3%) practiced some form budgeting in implementing the use of their loans and quite a very good proportion (87.4%) keenly observed their colleagues used and repaid their loans and despite these behaviours only slightly more than half of them (52.7%) promptly paid back their loans as it fell due. These phenomena are not on grounds of unwillingness to pay back but possibly due to slow rate and low volume of incomes generated. This was evident on observed low volume of working cash that prevailed among them. The table showed that cumulatively more than half of them (56.6%) had at most a working cash of fifty thousand naira (₦50,000.00). Low working capital as an asset in a business suggests poor cash flows from enterprises in which such loans were invested. Working cash as an essential part of working capital shows business liquidity and permits an entrepreneur take advantage of those business opportunities which help generate additional income [4].

Demographically, majority (85.0%) of the loan beneficiaries were married with 65.0% of them being females. More females borrowing from informal loan sources were expected because women in the study area have restricted access to formal credit [9].

The mean household size of these loan beneficiaries was six persons all of who were literate with a mean of 11 years of formal education.

Table 1. Description of Socio-Economic Characteristics of Cooperative loan Beneficiaries in Abia State, Nigeria 2013 (n=60).

Variable	Frequency	Percentage (%)	Mean	Std. Deviation
<b>Financial Characteristics</b>				
<b>Loan Received (N'000):</b>				
< 50	9	15.0	46.2	38.1
50-100	30	50.0		
101-150	15	25.0		
151 and above	6	10.0		
<b>Loan Repaid (N'000):</b>				
< 50	14	23.3	62.0	41.2
50-80	36	60.0		
81-110	10	16.7		
<b>Working Cash (N'000):</b>				
< 30	8	13.3	50.0	36.0
30-50	26	43.3		
51-70	15	25.0		
71 and above	11	18.4		
<b>Financial Behaviour:</b>				
• <b>Budgeting:</b>				
Yes	38	63.3		
No	22	36.7		
• <b>Prompt repayment of loan(s):</b>				
Yes	29	47.3		
No	31	52.7		
• <b>Observed others managed their loan(s):</b>				
Yes		87.4		
No		12.6		
<b>Demographics</b>				
• <b>Marital Status:</b>				
Single (as in model)	9	15.0		
Married (as in model)	41	85.0		
• <b>Gender:</b>				
Male	27	45.0		
Female	33	65.0		
• <b>Household Size:</b>				
1-4	16	26.7	6.2	4.2
5-9	33	65.0		
> 9	11	18.3		
• <b>Years of formal Education:</b>				
1 - 6	13	21.7	11.7	9.1
7-12	36	60.0		
> 12	11	18.3		

Note: Categorical/discrete variables are reported in frequencies and percentages; Continuous variables are also reported in same measures plus standard deviations. (1 US\$ = ₦156.00)

High literacy level suggests great potential of loan beneficiaries taking advantage of social learning opportunities in the cooperative societies.

**Social Learning Financial Opportunities in Cooperative Societies and Member borrowers Financial Behaviours**

Table 2.0 revealed that farmers, who attended meetings for relatively a larger number of times before and after taking the cooperative society’s loan, were more involved in budgeting and prompt repayment of their loans. Also, farmer borrowers who made more frequent observations on financial behaviours of their colleagues did practiced budgeting and made prompt repayments of their loans than those who did not. However, there was no significant difference on loan repayment behaviour between farmer borrowers who had relatively fewer numbers of discussions with their colleagues and those who did not. Attendance to meetings, discussions with fellow cooperators and meaningful observation on financial behaviour of members of cooperative societies had significant positive influences on conduct and performance loan beneficiaries in the area.

**Social Learning Financial Opportunities in Cooperative Societies as Co-determinants of Cooperator’s Loan Repayment Performance**

Table 3.0 showed OLS estimates of factors that influenced loan repayment of cooperator

borrowers in Abia State, Nigeria. Four tried functional forms fitted the data well as their F-ratios and coefficients of multiple determinations (R-Squares) were all highly significant (P<0.01). However, on basis of conformation of signs of the coefficients to *a priori* expectations, and number of variables that were significant at critical alpha levels of probabilities, the semi-logarithmic functional form was chosen as lead equation. Using the semi-logarithmic functional form as lead equation therefore, ten variables significantly influenced repayment of loans by cooperative member borrowers to the lending unions. Within dimensions of social learning opportunities, three variables very highly (p<0.01) determined their loan repayments. These were number of times attended meeting since after loan(s) were received; number of times discussed loan matters with members before loan(s) were received; and number of times discussed loan repayment strategies with other cooperators after loans were received. All three factors had positive influences on loan repayment behaviour of cooperator borrowers. Other moderately significant (p<0.05) factors that influenced beneficiaries loan repayments were number of times meetings were attended before loan(s) were received; gender (with being a woman assured of better loan repayment). However, household size and working cash had negative moderate influences on loan repayments conforming to earlier findings [14].

Table 2. Mean (and SD) of Social Learning Financial Opportunities in Cooperative Societies by Budgeting, and Prompt Repayment of Member Borrowers’ in Abia Sate, Nigeria 2013.

Financial Social learning Opportunities	Total Mean (SD)	Budgeting Mean (SD)		Prompt Repayment Mean (SD)	
		Yes	No	Yes	No
Number of times attended cooperative meetings/seminars/workshops before loan(s)	9 (2.11)	9(2.32)	6(2.10) <sup>a</sup>	8(2.11)	7(2.41) <sup>b</sup>
Number of times discussions held with fellow cooperators before loan(s)	7 (1.81)	7(1.51)	7(1.81) <sup>a</sup>	7(1.71)	7(1.72)
Number of times attended cooperative meetings/seminars/workshops since after loan(s)	7 (0.71)	8(2.45)	8(2.59) <sup>a</sup>	8(2.31)	9(2.72) <sup>b</sup>
Number of times discussions held with fellow cooperators since after loan(s)	4(0.32)	7(2.04)	8(2.19) <sup>a</sup>	5(2.32)	5(2.32)
*Observed investment and loan repayment activities of fellow cooperators	3.36 (1.10)	3.45(1.03)	3.37(1.01) <sup>a</sup>	3.44(1.05)	3.27(0.98) <sup>b</sup>

Statistical differences were tested with t-ratios. \*Used a 5-point Likert Scale with higher values indicating more observed responses.

a= differences between Yes and No responses for budgeting response are statistically significant (p<0.01)

b= differences between Yes and No responses for prompt repayment response are statistically significant (p<0.01)

Practicing of budgeting also moderately helped them to repay these loans. Observation of financial activities of colleagues also had

positive influence but least influenced loan repayment by cooperators.

Table 3. OLS Estimates of Multiple Regression Models of Variables Influencing Loan Repayment by Cooperators in Abia State Nigeria, 2013.

Variable	Functional Forms			
	Linear	+Semi-log	Double-log	Exponential
Constant	1976*** (6.32)	87.123*** (4.71)	14.452*** (21.63)	12.132*** (10.53)
Times attended meeting before loan(s)	1.566*** (3.47)	31113** (2.14)	-0.1546** (-2.64)	0.00065** (2.47)
Times attended meeting since after loan(s)	-27346 (-0.43)	1723.7*** (18.74)	0.6642*** (9.47)	0.1064 (0.41)
Times discussed loan matters with members Before loan(s)	-19.641* (-1.72)	2967.6*** (3.36)	-0.0967** (-2.85)	0.00567* (1.64)
Times discussed loan repayment strategies with other cooperators	-19.841* (-1.83)	2777.6*** (3.762)	296.76** (2.96)	-19.641* (-1.72)
Gender of borrower	15.422* (1.97)	12.422** (2.97)	11.126* (1.99)	18.412* (1.97)
Marital Status of borrower	10.114 (1.16)	11.175 (1.27)	12.192 (1.15)	10.123 (1.27)
Household size	-17243* (-1.84)	-132.43** (-2.80)	-154.42* (-1.99)	-1924.3* (-1.94)
Years of formal education	747.34 (0741)	14267.6** (2.76)	1527.6* (1.96)	843.44 (0.954)
Working Cash	-170.76 (-0.453)	-076.79** (-2.853)	-199.46* (-1.853)	-280.71 (-0.213)
Practiced Budgeting	0.0934** (2.91)	0.0967** (2.85)	0.0972** (2.93)	0.0981** (2.84)
Observe financial activities of others	18.614* (1.93)	19.362* (1.99)	18.591* (1.92)	18.616* (1.94)
R <sup>2</sup>	0.6781	0.7342	0.6974	0.6708
Adjusted R <sup>2</sup>	0.5993	0.6211	0.5627	0.6631
F-Ratio	48.04	121.11	79.64	56.06

+ = Lead equation; Figures in parentheses are t-ratios; \* significant at 10.0%; \*\* significant at 5.0%; \*\*\* significant at 1.0% alpha level of probabilities; Dependent Variable = Amount of loan repaid (₦'000). (1 US\$ = ₦156.00).

## CONCLUSIONS

The following conclusions are made based on this study:

-Social learning opportunities in cooperative societies included attendance to meetings, attendance to trainings/seminars/workshops, discussions with members and observations made on financial and production behaviours of other cooperators.

-In terms of financial behaviour, a good proportion of the loan beneficiaries (63.3%) practiced some form budgeting in implementation of their use of loans and quite a very good proportion (87.4%) keenly observed their colleagues used and repaid their loans;

-Despite these behaviours only slightly more than half of them (52.7%) promptly paid back their loans as it fell due. This suggested that borrowers from informal sources made frantic efforts to repay their loans;

-Farmer borrowers who made more frequent observations on financial behaviours of their colleagues practiced budgeting and made prompt repayments of their loans compared to those who did not.

-There was no significant difference on loan repayment behaviour between farmer borrowers who had relatively fewer numbers of discussions with their colleagues and those who did not. Attendance to meetings, discussions with fellow cooperators and meaningful observation on financial behaviour of members of cooperative

societies had significant positive influences on conduct and performance loan beneficiaries;

-Within dimensions of social learning opportunities, three variables very highly ( $p < 0.01$ ) determined loan repayment by cooperative loan beneficiaries. These were number of times attended meeting since after loan(s) were received; number of times discussed loan matters with members before loan(s) were received; and number of times discussed loan repayment strategies with other cooperators after loans were received. All three factors had positive influences on loan repayment behaviour of cooperator borrowers. Other moderately significant ( $p < 0.05$ ) factors that influenced beneficiaries loan repayments were number of times meetings were attended before loan(s) were received; gender (with being a woman assured better loan repayment). However, household size and working cash had negative moderate influences on loan repayments; Observation of financial activities of colleagues also had positive influence but least influenced loan repayment by cooperators;

-On basis of the above, we recommend that cooperator(s) should participate in all union activities to truly belong and reap all the benefits of being a member.

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## EFFECT OF NUTRITION ON CHEMICAL CHARACTERISTICS OF ORANGE FRUITS

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### *Abstract*

*The aim of this study was to determine the chemical characterization of orange fruits using applications of nutrition minerals and growth substance during at private farm in wadi el-netron , ELbehari governorate, Egypt during in December2011. The results showed during maturity time increasing the total soluble solid (TSS), pH, percentage of liquid, (TSS/acidity)and carotenoids while chlorophyll a, chlorophyll b and acidity were decreased. With one application of nutrition minerals and with growth substance were the lowest value of chlorophyll, a (chl,a) and chlorophyll, b (chl,b) as follow 0.42 and 0.45 (mg/100g) while with control management were the highest value to total soluble solid (Tss) and carotenoids (car.) as follow 10.07(Brix,%) and 15.77 (mg/100g). The pattern of changes was clearly observed from the absorption spectra of the green and orange When orange is fully ripe, chlorophyll would be greatly reduced or may disappear completely and carotenoids becomes the dominant pigment in the fruit surface.*

*Key words:* acidity and carotenoids, growth substance, orange fruits, total soluble solids

### INTRODUCTION

Citrus industry is an important component the Egyptian National income. Citrus cultivated area in Egypt reached nearly 382027 feddan in 2006, while area in due production reached 341718 feddan producing about 3211709 tons of citrus fruits. Harvested orange area in Egypt are 101421 (Ha) and the production are 2577720 tones [5]. It is well-known that the orange is one of the most abundant sources of vitamin C, however, it also contains considerable amounts of sugar, carotenoids, flavonoids, essential oil and some minerals. Among citrus fruits, there is currently a growing interest for blood orange, a natural variety of Citrus sinensis, with crimson, blood-coloured flesh owing to the presence of anthocyanins, highly recommended to reduce the risk of heart disease, some types of cancer, and low-density lipoprotein (LDL) cholesterol accumulation. Color grading is an important process for the agriculture industry especially in food processing, fruit and vegetable grading. The color of products is often used to determine quality and price. Consumers have

developed distinct correlations between color and the overall quality of a specific product. Industries use machine vision technology to grade the products based on their surface colors for maintaining quality and price of products.

The percentage of acid was determined based on citric acid by titration of a juice aliquot to pH 8.3, with the aid of a pH meter. These percentages were also used to calculate the soluble solids to acid ratio. In California, the ratio of percentage soluble solids to percentage acid is one of the standards used to determine the legal maturity of oranges; a ratio of 8 to 1 or greater is considered mature [2]. The fruit 'Hamlin' orange trees were taken as a sample two weeks before harvest. The fruit juice quality analyses including: juice content, brix, acid, brix/acid ratio, and amount of solids per unit fresh weight of the fruits which acid (%) decreased, brix and soluble solids in juice (kg /100 kg fruit) increased with ripening [1]. Fruit quality is an important factor affecting its market value, transportation and storage requirements. Fruit quality indices consist of internal quality, such

as soluble solids content (SSC) and total acidity (TA), and external quality, such as size and weight. As a result, there are many types of fruit sorters based on size or weight of the fruit [8]. The fruit physical properties of 'Grand Naine' banana plants significantly increased as a result of using Effective Micro-organisms (EM1) as a biofertilizer. The treatment which received (40 kg P<sub>2</sub>O<sub>5</sub>+ EM1) gave the highest value on all treatments during both seasons. Pulp TSS%, acidity%, TSS/acid ratio, starch%, total sugars%, N%, P%, and K% of 'GrandNaine' ripe fruits increased by adding EM1 [4]. Several physicochemical characteristics (ash, acidity, crude fat, crude fiber, sugars, moisture, ascorbic acid and soluble solids) and concentration of macro elements (Ca, Mg, Na, K) and trace elements (Al, Cd, Cr, Cu, Fe, Mn, Pb, Zn) were measured in harvested mature, green pineapple (*Ananas comosus* L.) fruits during their off vine, open air, room temperature storage-ripening period of eight days. The results showed that the Mbezi pineapple fruits had high moisture content (68 – 89%), moderate titratable acidity (0.80 – 1.50%), low crude fat content (0.12%), low crude fibre amounts (0.40%), low ash content (0.20%), high reducing sugars (14.2 – 22.8%), high total sugars (15.2 – 30.0%), high total soluble solids (15.7 – 29.3%) and high ascorbic acid content (7.9 – 33.4%) [9]. During maturity time the carotenoids increased from 4.80 to 15.77 mg/100g, while chlorophyll a&b decreased from 1.92 to 0.72, from 3.01 to 1.18 mg/100g, respectively. The results showing in Fig.IV.3 the relationships between different maturity time and total soluble solid (Tss), pH, acidity, percentage of liquid, and (TSS/acidity), during maturity time increasing the total soluble solid (TSS), pH, percentage of liquid and (TSS/acidity) increased from 8.20 to 10.06 (Brix,%), from 2.84 to 3.07 from 41.54 to 49.83 % and from 6.7 to 9.00 respectively while decreased acidity from 1.25 to 1.07 % [6]. The maximum value of percentage of liquid and Tss/acidity by using two application of nutrition minerals and with growth substance were 51.15 % and 12.13 while chlorophyll a decreased to 0.42

mg/100g [10].

The physical and chemical parameters of fruits are important indicators of their maturation and internal and external quality, decisive factors for accomplishment of market demands that have encouraged a lot of researches under different conditions overseas. The main objective of this study was to study the effect of nutrition minerals and growth substance on orange ripening.

## MATERIALS AND METHODS

This experiment were at private farm in wadi el-netron, ELbehari governorate, Egypt during winter 2011 to study the effect of fertilization on some chemical properties while maturity period.

### - Valencia orange fruits.

The samples were harvested by hand and selected randomized. All samples were individually numbered.

Table1. Some chemical characteristics of orange fruit *Valencia*

Parameter	Value
TSS	9.06-10.07 (Brix, %)
Liquid	48.22-51.15 (%)
pH	2.99 - 3.18
Acidity	0.92- 1.15
Tss/acidity	8.21-12.13
Carotenoids	9.54-15.78 (mg/100g)
chlorophyll a	0.42-0.83 (mg/100g)
chlorophyll b	0.45-1.13 (mg/100g)

### -Treatments were:

A: Without nutrition minerals + without growth substance (control)

B: Without nutrition minerals + with growth substance.

C: With one application of nutrition minerals + without growth substance

D: With one application of nutrition minerals + with growth substance

### -The chemical properties

-TSS was estimated from a single digital refractometer reading taken from the

combined juice extracted from the orange with range of 0~32% Brix to measure sugar concentration.

- *pH value* in the orange juice measured by ph meter with accuracy of 0.01

-*Acidity* was determined in orange juice by using 0.1 M NaOH standard solution, on the juices [7].

-*spectrophotometer*: has arrange 390 to 900 nm, it used for measuring the absorption at wave length 470,645and 662, chlorophyll and carotenoids content of crude extracts in different plants were determined following the method of [11] with slight modification as follows:

About 0.1 g of dried plant extract was mixed with 1.5ml of 85% acetone in dark brown test tube and let the mixture to stand for 15hrs at room temperature.

The mixture was then filtered on cotton cloth and the clear filtrate was completed to 5ml by 85% acetone solution.

Extinction was measured spectrophotometrically in 1 cm cell at wave length of 470, 645 and 662 nm versus 85% acetone solution as blank at each wave length. The amounts of carotenoids were calculated according to the following equations [3]:

$$\text{Chl ,a} = 11.75 A_{662} - 2.35 A_{645}$$

$$\text{Chl ,b} = 18.61 A_{645} - 3.96 A_{662}$$

$$\text{Carx+c} = ((1000 A_{470} - 2.27 \text{Chl, a} - 81.4 \text{Chl, b}) / 227)$$

## RESULTS AND DISCUSSIONS

There are differences between the use of fertilizer and pesticides during fruit formation and included changes in sugar, amino acid and organic acid composition. Maturity of orange is a combination of processes, including the breakdown of chlorophyll and build-up of carotenes.

Changes in the pattern of the absorption spectra were observed for the orange sample with different ripeness stages.

The results in fig. 2 showing that acidity decreased in treatments A, B, C and D from 1.25, 1.47, 1.34 and 1.45 % to 1.08, 1.15, 1.01 and 1.14 % during maturity period.

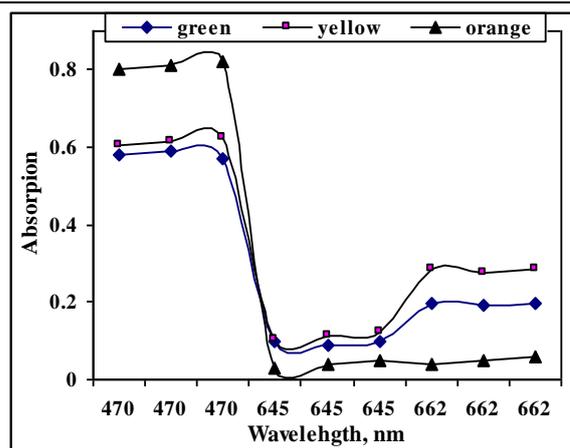


Fig.1. Relationship between wavelength and absorption spectra of three oranges with green, yellow and orange colors.

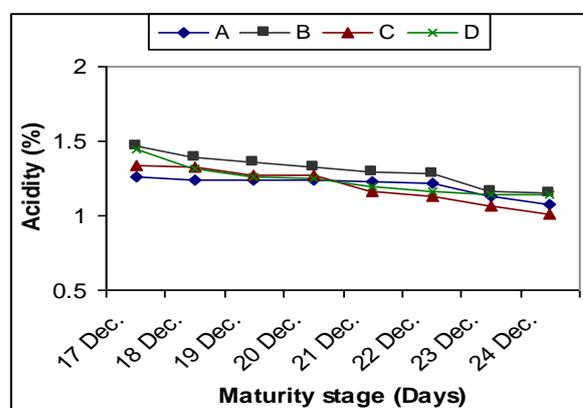


Fig. 2. Effect of nutrition minerals and growth substance on acidity during maturity stage

The results in fig. 3 showing that liquid percentage increased in treatments A, B, C and D from 41.45, 42.72, 40.06 and 41.95 % to 49.83, 50.86, 48.75 and 50.66 % during maturity period.

The results in fig. 4 showing that pH increased in treatments A, B, C and D from 2.84, 2.83, 2.72 and 2.89 to 3.08, 2.99, 3.18 and 3.11 during maturity period.

The results in fig. 5 showing that total soluble solid (TSS) increased in treatments A, B, C and D from 8.27, 8.87, 8.87 and 8.87 (Brix, %) to 10.07, 9.93, 9.80 and 9.73 (Brix, %) during maturity period.

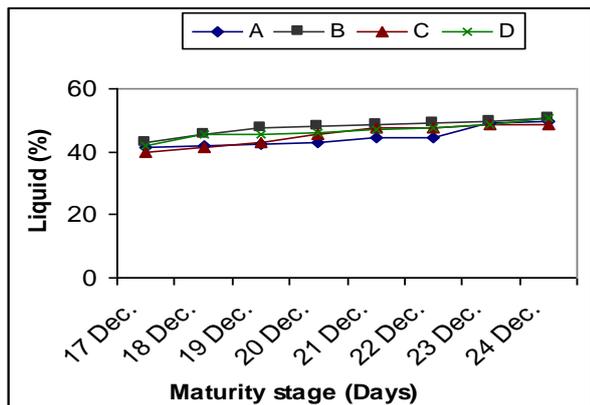


Fig. 3. Effect of nutrition minerals and growth substance on percentage of liquid during maturity stage

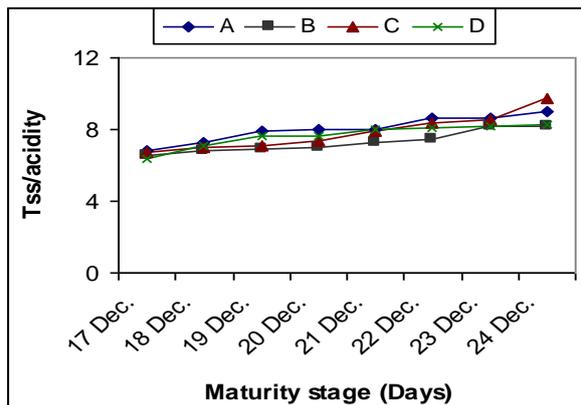


Fig. 6. Effect of nutrition minerals and growth substance on (TSS/acidity) during maturity stage

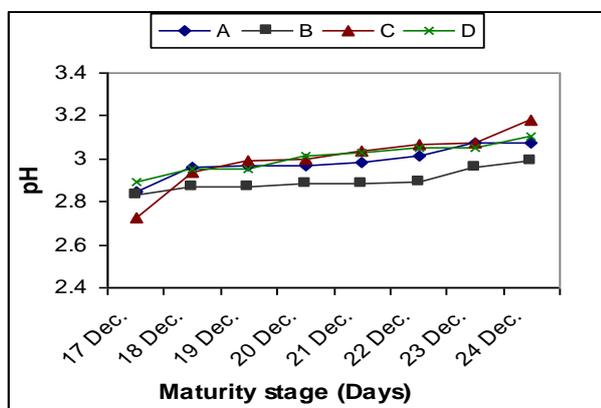


Fig. 4. Effect of nutrition minerals and growth substance on pH during maturity stage

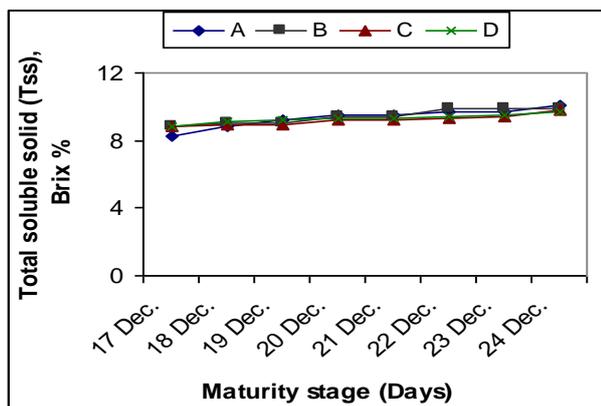


Fig. 5. Effect of nutrition minerals and growth substance on total soluble solid (TSS) during maturity stage

The results in fig. 6 showing that TSS/acidity increased in treatments A, B, C and D from 6.78, 6.53, 6.73 and 6.40 to 9.00, 8.22, 9.75 and 8.31 during maturity period.

The results in fig. 7 showing that carotenoids (car.) increased in treatments A, B, C and D from 4.81, 7.04, 7.26 and 6.70 (mg/100g) to 15.78, 11.27, 10.14 and 10.35 (mg/100g) during maturity period.

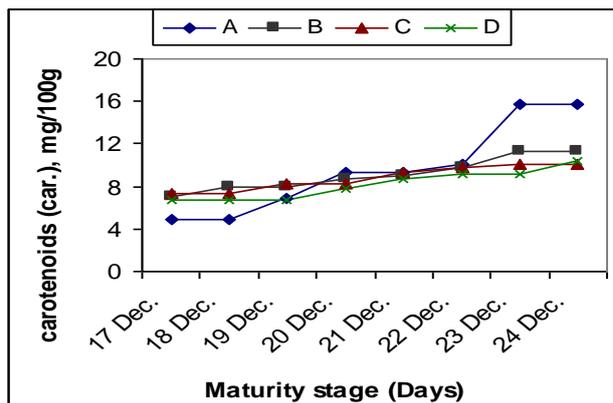


Fig. 7. Effect of nutrition minerals and growth substance on carotenoids concentration during maturity stage

The results in fig. 8 showing that chlorophyll a (chl, a) decreased in treatments A, B, C and D from 1.93, 2.84, 2.58 and 2.08 (mg/100g) to 0.72, 0.53, 0.83 and 0.42 (mg/100g) during maturity period.

The results in fig. 9 showing that chlorophyll b (chl, b) decreased in treatments A, B, C and D from 3.02, 3.91, 3.91 and 3.00 (mg/100g) to 1.18, 0.80, 0.76 and 0.45 (mg/100g) during maturity period.

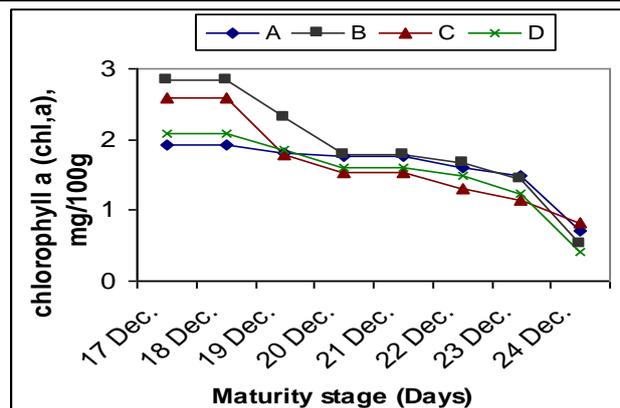


Fig. 8. Effect of nutrition minerals and growth substance on chlorophyll, a concentration during maturity stage

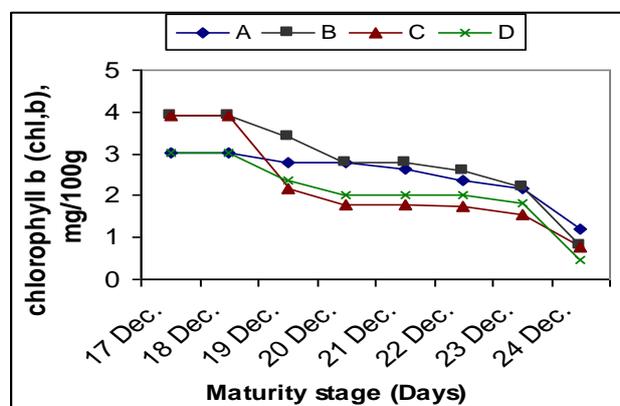


Fig. 9. Effect of nutrition minerals and growth substance on chlorophyll, b concentration during maturity stage

## CONCLUSIONS

Without nutrition minerals and without growth substance (control) were the highest value to total soluble solid (TSS) and carotenoids (car.) as follow 10.07(Brix,%) and 15.77 (mg/100g).

Without nutrition minerals and with growth substance was the highest value of liquid percentage as follow 50.86%.

With one application of nutrition minerals and without growth substance were the lowest value of acidity as follow 1.01% and the highest value of pH and Tss/acidity as follow 3.18 and 9.75.

With one application of nutrition minerals and with growth substance were the lowest value of chlorophyll,a (chl,a) and chlorophyll,b (chl,b) as follow 0.42 and 0.45 (mg/100g)

The orange sample with the green color would contain a large amount of chlorophyll a and chlorophyll b it had a strong absorption peak at 662 and 645 nm, respectively as orange fruit ripeness from the green stage to the orange stage.

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## EFFECT OF USING NUTRITION MINERALS AND GROWTH SUBSTANCE ON PHYSICAL PROPERTIES OF ORANGE FRUITS

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### Abstract

*This work was carried to investigate the characterization of orange fruits under using applications of nutrition minerals and one application of growth substance on physical properties of orange fruits at private farm in wadi el-netron, ELbehari governorate, Egypt during winter 2011to predict maturity stage of orange fruits . The physical properties including aspect ratio(AR), Area of flat surface(Af), Area of transverse surface (At), Arithmetic diameter (Da), Density ( $\rho$ ), Geometric diameter (Dg), surface area (Sa), sphericity, Volume (V) and weight and the results revealed that, the high increasing percentage of orange fruits were considered as follows 9.24, 17.08, 22.65, 9.70, 27.16, 9.70, 20.45, 6.38, 24.07 and 28.84 %*

*Key words:* orange, nutrition minerals and maturity stage, physical properties

### INTRODUCTION

Orange is an important horticultural produce around the world amounting to millions of tons per annum and is projected to grow by as much as 64 million by 2010.

Although citrus occupies the greatest planted area among all grown fruit area in Egypt, the exportation of fresh citrus fruits to foreign markets is still limited. Therefore, any effort direction towards maintaining fruit quality and reducing postharvest losses is important for increasing the National income.

Citrus fruits and juices generally serve as primary sources of human daily requirement of vitamin C, their demand for and acceptance depending mainly on their nutritional value, flavour, aroma and then on colour, texture and cloudiness.

The physical parameters of fruits are important indicators of their maturation and internal and external quality, decisive factors for accomplishment of market demands that have encouraged a lot of researches under different conditions overseas.

Physical properties data are important in analysis of the behavior of the product to perform various post harvest operations. Generally, grading of fruits is done based on

characteristics like, size, shape, mass, color, soundness, maturity etc. The information on size of the fruits is essential for uniformity and packing in standard cartons or boxes. Properties such as bulk density, true density and porosity are useful in storage, transport and separation systems [10]. Physical characteristics of agricultural products are the most important parameters in determining the proper standards of design of grading, conveying, processing, and packaging systems. The major physical properties of citrus fruits are shape, size, density, porosity, volume, and mass of fruits [1]. The physical characteristics included mass, volume, dimensions and projected areas perpendicular to major diameters. Maximum, mean, minimum values, standard deviation, coefficient of variation, bulk density ( $\rho$ ), geometric mean diameter (Dg), and percent sphericity of all of the parameters. They stated that the objective of study is to determine the most suitable model for predicting kiwi fruit mass by its geometrical attributes. This information can be used in the design and development of sizing mechanisms [4]. Density can be a marker of suitability for certain processes. The density of peas correlate well with tenderness and sweetness,

while the solids content of potatoes, which determines suitability for manufacture of crisps and dried products, relates to density. Sorting on the basis of density can be achieved using flotation in brine at different concentrations [2]. Size and shape are important physical attributes of foods that are used in screening, grading, and quality control of foods. The dimensions can be measured using a micrometer or caliper. The micrometer is a simple instrument used to measure distances between surfaces. Most micrometers have a frame, anvil, spindle, sleeve, thimble, and ratchet stop. Micrometer used to measure the outside diameters, inside diameters, the distance between parallel surfaces, and the depth of holes. They also added that, shape is also important in heat and mass transfer calculations, screening solids to separate foreign materials, grading of fruits and vegetables, and evaluating the quality of food materials. The shape of a food material is usually expressed in terms of its sphericity and aspect ratio [8]. An image processing based technique was developed to measure volume and mass of citrus fruits such as lemons, limes, oranges, and tangerines. The technique uses two cameras to give perpendicular views of the fruit coefficient of determination ( $R^2$ ) for lemon, lime, orange, and tangerine were 0.962, 0.970, 0.985, and 0.959, respectively. The characterization results for various citrus fruits showed that the volume and mass are highly correlated [6]. The fruit physical properties of ‘Grand Naine’ banana plants significantly increased as a result of using Effective Micro-organisms (EM1) as a biofertilizer. The treatment which received (40 kg P<sub>2</sub>O<sub>5</sub>+ EM1) gave the highest value on all treatments during both seasons. Pulp TSS%, acidity%, TSS/acid ratio, starch%, total sugars%, N%, P%, and K% of ‘GrandNaine’ ripe fruits increased by adding EM1 [3]. Projected area (cm<sup>2</sup>) of orange (Valencia) in the horizontal orientation and vertical orientation (mean ± standard deviation) were 35.68±7.52 , 34.46 and Length (mm)69.79±7.85 and indicated that the high  $R^2$  values may be adequate for designing and developing a specific sizing

system for oranges based on their masses and volumes, and for estimating the surface area and geometric mean diameter of the orange cultivars and mutants. $R^2$  value showing the relationship between mass and surface area was 0.9669,  $R^2$  value showing the relationship between volume and surface area was 0.9722,  $R^2$  value showing the relationship between mass and volume was 0.9862, $R^2$  value showing the relationship between Geometric mean diameter and volume was 0.9 64 and  $R^2$  value showing the relationship between Geometric mean diameter and mass was 0.9616 [9]. The maximum value of orange fruits (Valencia) length was 75.04 mm, while the minimum value was 70.06 mm. The maximum value of width was 79.54 mm, while the minimum value was 74.66 mm. The maximum value of thickness was 78.87 mm, while the minimum value was 74.56mm. The maximum value of arithmetic diameter was 77.82 mm, while the minimum value was 74.27 mm [7].

## MATERIALS AND METHODS

An experiment was carried out in a private farm at wadi elnetron, ELbehari governorate, Egypt from 13 November 2011 to 24 December 2011, to detect orange fruits maturity of Valencia orange fruits under using some applications of nutrition minerals and growth substance. Also to study the effect of the physical properties on orange fruits maturity

Materials

### - Valencia orange fruits.

Orange sample varieties were obtained from the field at different maturity stages.

Table 1. Some physiochemical characteristics of orange fruit Valencia

Parameter	Value
Mass	175.71 - 271.40 (gm)
Volume	206.68 – 300.44 (mm <sup>3</sup> )
Surface area	162.2 – 202.6 (mm <sup>2</sup> )
Geometric mean diameter	70.76 – 80.90 (mm)

The samples were harvested by hand and

selected randomized. All samples were individually numbered.

### Instruments

#### -Digital vernire caliper

A digital vernire caliper was used for measuring the dimensions of orange fruits to determine Physical properties with accuracy of 0.01mm.

#### -Electrical digital scale

An Electrical digital balance was accuracy up to .0001 gm was used for measuring the mass of orange fruits.

### Treatments were:

Experiments were carried out to evaluate the effect of using three applications of nutrition minerals which containing (N,P,K) by using (10 cm<sup>3</sup>/5L) and one application of growth substance on maturity of orange fruits under using through 8 different treatments as follows:

A: Without nutrition minerals + without growth substance (control)

B: Without nutrition minerals + with growth substance.

C: With one application of nutrition minerals + without growth substance

D: With one application of nutrition minerals + with growth substance

E: With two application of nutrition minerals + without growth substance

L: With two applications of nutrition minerals + with growth substance

M: With three application of nutrition minerals + without growth substance

S: With three application of nutrition minerals + with growth substance

### Measurements

Different physical of orange fruits were determined after the applications of nutrition minerals and one application of growth substance. The following properties were measured and/or determined and the mean dimensions of orange fruits:

Such as length (L), thickness (T) and the width (W) mm, of the fruits as a digital vernire caliper and the means values of different measurement were used for calculating of Physical properties.

The following equations were applied for calculation of geometric diameter (Dg) in

mm, arithmetic diameter (Da) in mm, volume in mm<sup>3</sup> (V), area of flat surface (Af) in mm<sup>2</sup> and area of transverse surface (At) in mm<sup>2</sup> of an individual orange fruits in millimeters, density in (gm/cm<sup>3</sup>) and surface area with mm<sup>2</sup> [11].

- Geometric diameter (Dg) = (LWT)<sup>1/3</sup>

- Arithmetic diameter (Da) = (L+W+T)/3

- Volume =  $\Pi/6(LWT)$

- Area of flat surface (Af) =  $\Pi/4(LW)$

- Area of transverse surface (At) =  $\Pi/4(WT)$

- Sphericity: can be defined by different ways. According to the most commonly used definition, sphericity is the ratio of solid volume to the volume of a sphere that has a diameter equal to the major diameter of the object so that it can circumscribe the solid sample. For a spherical particle of diameter, sphericity can be calculated as follows, [5]:

$$sphericity = \frac{(LWT)^{1/3}}{L}$$

$$aspect\ ratio(A.R) = \frac{W}{L} * 100$$

- The aspect ratio (AR) used to express the shape of a fruit.

for each fruit

- Density:  $\rho = m/v$

Where:

$\rho$  = volume mass of product in gm.cm<sup>-3</sup>.

m= Mass of sample in gm.

v = Volume occupied by the sample in cm<sup>3</sup>.

-Surface area: Sa =  $\Pi (Dg)^2$

Where:

Sa = surface area;

Dg = Geometric mean diameter

## RESULTS AND DISCUSSIONS

In maturity period for orange fruits the weight increase and also the dimensions.

At different ripening stages the color of orange varies from nature green, yellow, to intense orange color.

The results obtained from measuring orange samples showed that, the maximum value of fruit length was 79.45 mm, while the minimum value was 69.10 mm. The maximum value of width was 81.32 mm, while the minimum value was 70.81 mm. The maximum value of thickness was 79.67 mm, while the minimum value was 70.67mm. The maximum value of arithmetic diameter was 78.35 mm, while the minimum value was 70.15 mm. The maximum value of geometric diameter was 78.52 mm, while the minimum value was 70.15 mm as shown in Fig. 1.

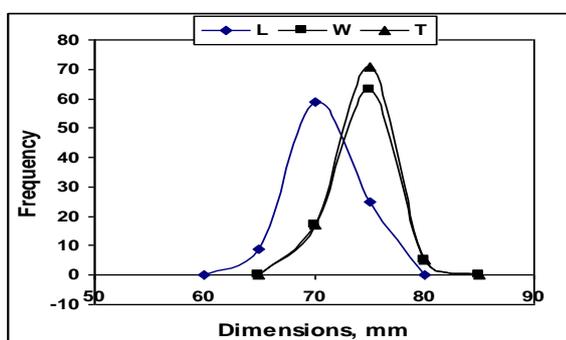


Fig. 1. Some physical properties of orange fruit

The results in fig. 2 showing that the maximum and the minimum value of increasing percentage of aspect ratio (AR) were consequently 9.24 and 5.23% in treatments (M: With three application of nutrition minerals + without growth substance) and (C: With one application of nutrition minerals + without growth substance) while the high value of increasing percentage of Area of flat surface (Af) were consequently 20.46 and 17.08 % in treatments (L: With two applications of nutrition minerals + with growth substance) and (B: Without nutrition minerals + with growth substance) and the low value of increasing percentage were consequently 8.69 and 6.30 % in treatments (B: Without nutrition minerals + with growth substance) and (M: With three application of nutrition minerals + without growth substance).

The results in fig. 3 showing that the maximum and the minimum value of increasing percentage of area of transverse surface (At) and were consequently 22.56 and

8.13 % in treatments (L: With two applications of nutrition minerals + with growth substance) and (A: Without nutrition minerals + without growth substance (control)) while the high value of increasing percentage of arithmetic diameter (Da) were consequently 9.70 and 5.82 % in treatments (M: With three application of nutrition minerals + without growth substance) and (E: With two application of nutrition minerals + without growth substance) and the low value of increasing percentage were consequently 1.39 and 1.34 % in treatments (C: With one application of nutrition minerals + without growth substance) and (A: Without nutrition minerals + without growth substance (control)).

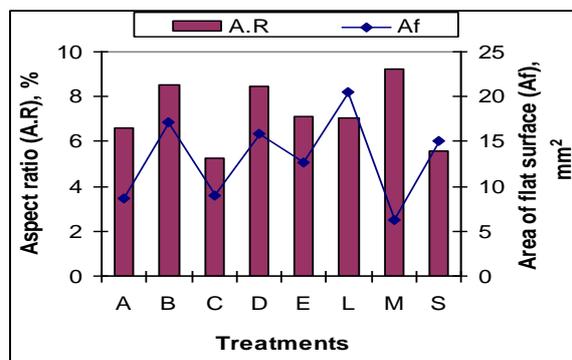


Fig. 2. Effect of nutrition minerals and growth substance on aspect ratio (AR) and Area of flat surface (Af) during maturity stage

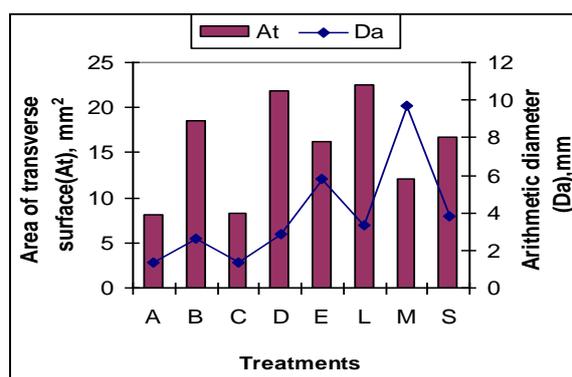


Fig. 3. Effect of nutrition minerals and growth substance on area of transverse surface (At) and arithmetic diameter (Da) during maturity stage

The results in fig. 4 showing that the maximum and the minimum value of increasing percentage of density ( $\rho$ ) were consequently 27.16 and 4.66 % in treatments

(A: Without nutrition minerals + without growth substance (control)) and (M: With three application of nutrition minerals + without growth substance) while the high value of increasing percentage of geometric diameter (Dg) were consequently 9.70 and 8.72 % in treatments (L: With two applications of nutrition minerals + with growth substance) and (D: With one application of nutrition minerals + with growth substance) and the low value of increasing percentage were consequently 4.12 and 3.77 % in treatments (A: Without nutrition minerals + without growth substance (control)) and (M: With three application of nutrition minerals + without growth substance).

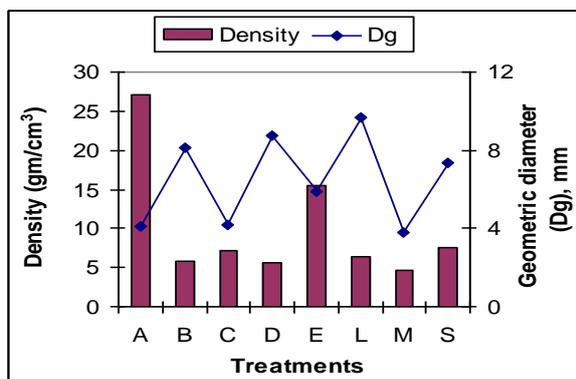


Fig. 4. Effect of nutrition minerals and growth substance on density ( $\rho$ ) and geometric diameter (Dg) during maturity stage

The results in fig. 5 showing that the maximum and the minimum value of increasing percentage of surface area (Sa) were consequently 20.45 and 7.63 % in treatments (L: With two applications of nutrition minerals + with growth substance) and (M: With three application of nutrition) while the high value of increasing percentage of sphericity were consequently 6.38 and 5.86 % in treatments (M: With three application of nutrition minerals + without growth substance) and (D: With one application of nutrition minerals + with growth substance) and the low value of increasing percentage were consequently 3.41 and 3.05 % in treatments (C: With one application of nutrition minerals + without growth

substance) and (S: With three application of nutrition minerals + with growth substance).

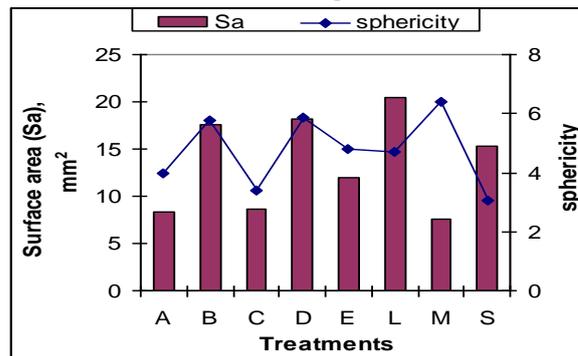


Fig. 5. Effect of nutrition minerals and growth substance on surface area (Sa) and sphericity during maturity stage

The results in fig. 6 showing that the maximum and the minimum value of increasing percentage of Volume (V) were consequently 32.41 and 11.61% in treatments (L: With two applications of nutrition minerals + with growth substance) and (M: With three application of nutrition minerals + without growth substance) while the high value of increasing percentage of weight were consequently 28.84 and 28.45 % in treatments (L: With two applications of nutrition minerals + with growth substance) and (B: Without nutrition minerals + with growth substance) and the low value of increasing percentage were consequently 14.60 and 13.37 % in treatments (E: With two application of nutrition minerals + without growth substance) and (M: With three application of nutrition minerals + without growth substance).

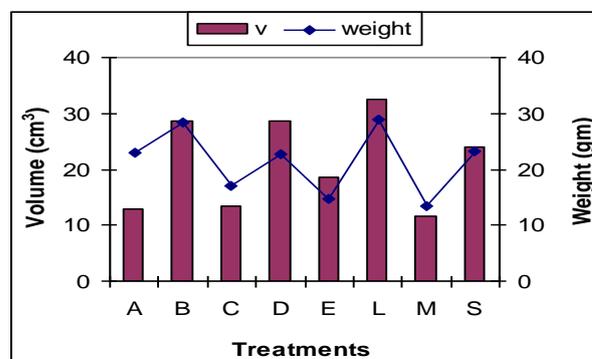


Fig. 6. Effect of nutrition minerals and growth substance on Volume (V) and weight during maturity stage

## CONCLUSIONS

In this work using two applications of nutrition minerals and with growth substance caused high percentage value of Area of flat surface (Af), Area of transverse surface (At), Geometric diameter (Dg), surface area (Sa), Volume (V) and weight were as follow 20.46, 22.56, 9.70, 20.45, 32.41 and 28.84% and by using three application of nutrition minerals and without growth substance caused high percentage value of aspect ratio (AR), Arithmetic diameter (Da) and sphericity were as follow 9.24, 9.70 and 6.38%.

While without using nutrition minerals and without growth substance caused high percentage value of density ( $\rho$ ) was 27.16%.

The maximum value of fruit length was 79.45 mm, while the minimum value was 69.10 mm. The maximum value of width was 81.32 mm, while the minimum value was 70.81 mm. The maximum value of thickness was 79.67 mm, while the minimum value was 70.67mm.

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## PIG CARCASS CLASSIFICATION IN ROMANIA: A DISSECTION TRIAL FOR THE APPROVAL OF THE “FAT-O-MEAT’ER” AND OF THE “OPTIGRADE-PRO”EQUIPMENT

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### Abstract

*The objective of this study was to obtain new regression formulas for optical equipment Fat-O-Meat’er and OptiGrade-PRO in pig carcass classification in Romania. The estimation of lean mean content in pig carcasses by means of SEUROP system and following fair payment based on the weight and composition of the carcass pigs in the main objective of classification. Dissection of four main cuts (shoulder, loin, ham, belly) of pig carcasses (n = 145) were performed. The measurement of backfat and muscle depths using probes were taken from the carcasses within 45 min. after slaughter of pigs. Lean meat content estimated using different methods and determined from dissections was equal (56,3 %). There were calculated new regression formulas using the multiplied regression analysis. Correct regression formulas for classification equipments have a big importance. The requirements on accuracy of regression formulas are laid out in the Commission Regulation No 3127 / 94 and means of dissection according to the method by Walstra and Merkus (1996)*

**Key words:** pig carcass classification, dissections, grading, lean meat, standard presentation

### INTRODUCTION

In Romania, the Carcass Classification System for pig, bovine and ovine carcasses was established in 2004, by Government Decision; the functioning of the system is ensured by:

- The Carcass Classification Commission;
- Classification Agencies;
- Classifiers;
- Inspectors.

The Carcass Classification Commission manages and administers the classification system and ensures its application. Pig carcass classification is done in slaughter plants by independent classifiers or by employees of classification agencies. The carcass Classification Commission, under very strict conditions, the licenses of the classifiers and

the authorizations of the classification agencies, after they have been approved by Order of the Minister of Agriculture and Rural Development.

The classification activity in the slaughterhouses is controlled by 10 regional inspectors for classification of pig, bovine and ovine animals, coordinated by a chief inspector who has been nominated by Order of the Minister of Agriculture and Rural Development.

In Romania, pig carcass classification started in March 2006, using the optical probes Fat-O-Meat’er and OptiGrade-PRO and the ZP method applied with the ruler, which were authorized as a consequence of the two dissection trials, according to the technical norms in force.

The first dissection trial took place in 2003 at ROMSUINTEST Peris, for the approval of the Fat-O-Meat'er and of the ZP method, and the second one in 2005, at PRIMACOM Targu-Mures, for the approval of the OptiGrade-PRO.

Pig Carcass Classification is compulsory in Romania in all slaughterhouses, regardless of their size. [4]

Thus, slaughterhouses that slaughtered over 200 pig / week on an yearly average in the previous year must classify with an optical probe, either Fat-O-Meat'er, or OptiGrade-PRO. Slaughterhouses that slaughtered less than 200 pigs / week on a yearly average in the previous year may apply the ZP method.

In the first eight months of 2007, the Carcass Classification Commission recorded in its database complete data for 1,213,647 individual carcasses, regarding classification and prices.

These carcasses were classified into 125 slaughterhouses by 90 licensed classifiers.

A number of 33 classification agencies and 24 independent classifiers sent the data weekly to the Carcass Classification Commission.

The majority of the carcasses (78 %) were classified with the optical probes (Table 1).

Table 1. Carcasses classified between January 1<sup>st</sup> and August 31<sup>st</sup>, according to the method and equipment used

Method	Equipment	Number of carcasses	% of total carcasses
Optical Probe	Fat-o-meat'er	545,205	44,92 %
	OptiGrade-PRO	402,219	33,14 %
ZP	-	266,223	21,94 %
TOTAL		1,213,647	100,00 %

The Romanian Pig Meat Association estimates that approximately 2,5 million pigs bred in specialized farms will be slaughtered in 2007 in slaughterhouses, which are obliged to classify.

The data stored in the first eight months of 2007 in the data base of the Carcass Classification Commission indicate an average lean meat percentage of 54,86 and a standard deviation of 3,92.

The mean weight of the hot carcass was of 80,27 kg and a standard deviation of 10,75 kg.

## MATERIALS AND METHODS

The dissection trial was carried out in May-June 2007.

The selection of the carcasses was done by CCC, supervised by personnel from the Danish Meat Research Institute (DMRI), on the slaughter lines in Diana and Aldis.

The selection of the carcasses was done in principle at random.[3] However, the representability has been checked by measuring the thickness on the backfat. The distribution of the national population was split into 4 classes according to fat thickness on the back, measured with the ruler on the left half carcass, on the midline between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib and the sample has been selected according to this (Table 2). The selected carcasses, well split into halves, weighing within the limits of the technical norms (50 – 120 kg), were put on a separate line where they were measured, on the left carcass side, at 7 cm from the split line, between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib, with the Fat-o-meat'er and with the OptiGrade-PRO. The measurements were carried by four experienced classifiers according to a plan, specifying the rotation with respect to classifiers and instruments.

Table 2. Distribution of carcasses according to backfat thickness class

Backfat thickness (mm)	≤ 16 mm	17 – 21 mm	22 – 26 mm	≥ 27 mm	Total
	20 %	30 %	30 %	20 %	
Total	29	44	43	29	145

Carcasses were presented according to the EU standard presentation, with head and feet, without tongue, bristles, hooves, genital organs, flare fat, kidneys and diaphragm.[4] The carcasses from the dissection sample cover the variation of the national hot carcass weight between the 1 and 97 % percentiles (Fig 1.) and the mean hot carcass weight was 79,9 kg close to mean of the national population, see above.

The distribution of sexes was in total equal in the sample (72 females and 73 castrated males).

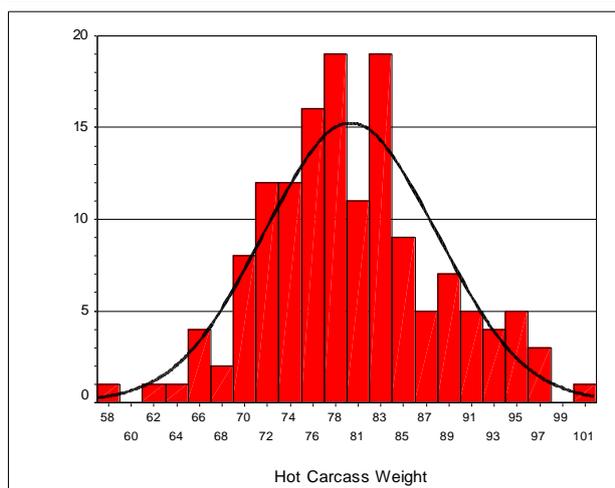


Fig 1. Histogram of the distribution of the hot carcass weight (trial)

The intention was to obtain a sample representing as many large producers as possible in order to cover the national biological variation. It succeeded in selecting 145 carcasses from 14 farms (Table 3.) situated in different regions of Romania.

Table 3. The distribution of the carcasses by suppliers and genders [1]

SUPPLIER		SEX		Total
		Fe-males	Castred males	
1	Count	1	4	5
	% within SUPPLIER	20.0 %	80.0 %	100.0%
	% within SEX	1.4 %	5.5 %	3.4 %
	% of Total	0.7 %	2.8 %	3.4 %
2	Count	6	15	21
	% within SUPPLIER	28.6 %	71.4 %	100.0%
	% within SEX	8.3 %	20.5 %	14.5 %
	% of Total	4.1 %	10.3 %	14.5 %
3	Count	3	3	6
	% within SUPPLIER	50.0 %	50.0 %	100.0%
	% within SEX	4.2 %	4.1 %	4.1 %
	% of Total	2.1 %	2.1 %	4.1 %
4	Count	3	3	6
	% within SUPPLIER	50.0 %	50.0 %	100.0%
	% within SEX	4.2 %	4.1 %	4.1 %
	% of Total	2.1 %	2.1 %	4.1 %
5	Count	7	8	15
	% within SUPPLIER	46.7 %	53.3 %	100.0%
	% within SEX	9.7 %	11.0 %	10.3 %
	% of Total	4.8 %	5.5 %	10.3 %
6	Count	7	5	12
	% within	58.3 %	41.7 %	100.0%

7	SUPPLIER			
	% within SEX	9.7 %	6.8 %	8.3 %
	% of Total	4.8 %	3.4 %	8.3 %
	Count	5	1	6
8	% within SUPPLIER	83.3 %	16.7 %	100.0%
	% within SEX	6.9 %	1.4 %	4.1 %
	% of Total	3.4 %	0.7 %	4.1 %
	Count	3	7	10
9	% within SUPPLIER	30.0 %	70.0 %	100.0%
	% within SEX	4.2 %	9.6 %	6.9 %
	% of Total	2.1 %	4.8 %	6.9 %
	Count	7	7	14
10	% within SUPPLIER	50.0 %	50.0 %	100.0%
	% within SEX	9.7 %	9.6 %	9.7 %
	% of Total	4.8 %	4.8 %	9.7 %
	Count	10	2	12
11	% within SUPPLIER	83.3 %	16.7 %	100.0%
	% within SEX	13.9 %	2.7 %	8.3 %
	% of Total	6.9 %	1.4 %	8.3 %
	Count	1	5	6
12	% within SUPPLIER	16.7 %	83.3 %	100.0%
	% within SEX	1.4 %	6.8 %	4.1 %
	% of Total	0.7 %	3.4 %	4.1 %
	Count	11	2	13
13	% within SUPPLIER	84.6 %	15.4 %	100.0%
	% within SEX	15.3 %	2.7 %	9.0 %
	% of Total	7.6 %	1.4 %	9.0 %
	Count	1	5	6
14	% within SUPPLIER	16.7 %	83.3 %	100.0%
	% within SEX	1.4 %	6.8 %	4.1 %
	% of Total	0.7 %	3.4 %	4.1 %
	Count	7	6	13
Total	% within SUPPLIER	53.8 %	46.2 %	100.0%
	% within SEX	9.7 %	8.2 %	9.0 %
	% of Total	4.8 %	4.1 %	9.0 %
	Count	72	73	145
Total	% within SUPPLIER	49.7 %	50.3 %	100.0%
	% within SEX	100 %	100 %	100.0%
	% of Total	49.7 %	50.3 %	100.0%

Dissection was carried out at ALDIS slaughterhouse, in a separate room, within 24 – 48 hours from slaughter, under perfect chilling conditions (temperature under 10<sup>0</sup>). The jointing of the carcass was done by the same experienced butcher according to the EU reference method for the dissection (Walstra and Merkus, 1996) [3]. The dissection of the four main parts of the carcasses was done by

10 butchers. The dissection was supervised during the entire period by an expert from DMRI (Århus University). The data were recorded by staff from the Carcass Classification Commission. The descriptive statistics of the dissected carcasses are presented in Table 4.

Table 4. Descriptive statistics of the dissected carcasses (n=145) [5]

Trait	Average	Standard deviation	Minimum	Maximum
Hot carcass weight, kg	79.90	7.77	58.60	100.7
Cold half carcass, kg	39.30	3.87	28.50	50.40
Dissected lean meat, % ("old" reference)	54.36	5.53	37.23	65.51
Dissected lean meat, % (2006 reference)	56.30	5.30	38.61	66.89
X1 FOM, mm	18.00	4.71	10.00	32.00
X2 FOM, mm	53.30	8.09	37.00	74.00
X1 OGP, mm	16.50	4.95	9.40	30.80
X2 OGP, mm	52.00	9.88	32.10	82.20

## RESULTS AND DISCUSSIONS

The calculation of the lean meat percentage in the carcass was carried out according to Commission Regulation (EEC) 2967 / 85 (modified by (EC) 3127 / 94 and (EC) 1197 / 2006), which established detailed rules for the application of the community grid for pig carcass classification. [5, 6] In order to make comparisons, the lean meat percentage was also calculated according to the "old" reference (Commission Regulation (EC) 3127 / 94). [6]

The old reference is almost perfectly "explained" by the new reference. The lean meat percentage is characterized by a slight asymmetry of the value distribution, which is considered to be a normal distribution (Fig 2.).

The root mean squared error of prediction (RMSEP) was calculated by a "cross-validation" technique, the "leave one out" method, on all data (n = 145), for both equipment. The root mean squared error (RMSE) and the coefficient of determination (R<sup>2</sup>) are also presented. No carcasses were removed from the sample in order to calculate the prediction formulas with which the equipment will be calibrated.

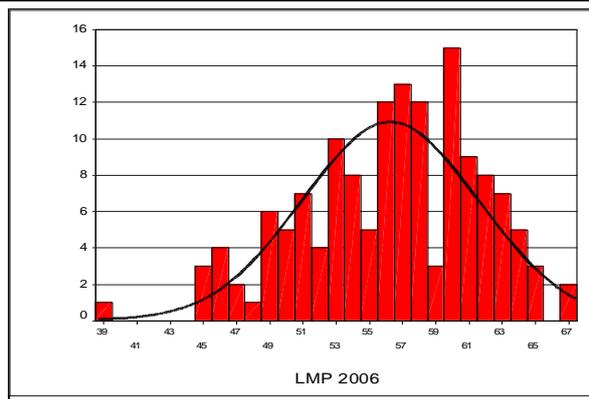


Fig 2. Histogram of the distribution of the dissected lean meat % ( 2006 reference )

The method of linear regression has been applied to calculate the prediction formula for the two optical probes, by use of the statistic application SPSS 10.0 under Windows.[2] The calculations have been carried out by the experts of the Carcass Classification Commission supervised by experts from the Danish Meat Research Institute.

The measurements with the two optical probes, the lean meat percentages obtained with the "new" and "old" reference and the lean meat percentage predictions are presented in tables 5 and 6.

Table 5. Number, trial number, sex (F = female, C = castrated male), hot carcass weight (kg), measured fat thickness (X<sub>1</sub>, mm) and muscle thickness (X<sub>2</sub>, mm) with FOM and OGP (n = 145)

N <sup>o</sup>	Trial N <sup>o</sup>	Sex	Hot carcass weight	FOM		OGP	
				X <sub>1</sub>	X <sub>2</sub>	X <sub>1</sub>	X <sub>2</sub>
1	2	C	77.0	16	63	15.6	63.1
2	4	C	82.0	20	59	16.9	54.4
3	5	F	77.0	14	64	13.2	63.1
4	6	C	82.0	17	61	15.0	56.7
5	7	C	77.0	16	52	11.9	50.6
6	10	C	74.0	16	63	14.0	61.0
7	11	F	74.0	12	60	9.9	50.6
8	12	C	77.0	12	64	9.5	61.2
9	13	C	79.0	13	65	12.5	60.0
10	14	F	83.0	16	58	13.4	44.4
11	15	F	97.4	23	58	20.8	59.8
12	16	F	95.2	24	58	20.6	67.8
13	17	F	65.2	15	52	10.9	57.7

14	18	F	78.5	12	55	9.4	56.3	58	82	F	72.8	15	54	13.8	53.2
15	20	F	76.6	12	52	10.3	51.6	59	83	C	77.0	13	55	10.7	54.4
16	21	F	73.8	14	51	12.5	49.9	60	84	C	76.0	17	61	13.4	60.4
17	22	F	80.0	20	58	21.8	47.1	61	85	C	67.8	12	49	11.7	49.1
18	23	C	70.8	17	47	14.0	42.9	62	87	F	86.6	14	58	12.3	62.5
19	24	C	74.6	16	56	19.7	45.0	63	88	F	84.4	18	57	17.9	58.6
20	27	F	73.0	14	52	11.7	45.4	64	89	C	88.2	13	54	10.9	51.6
21	30	C	83.0	14	55	13.6	48.7	65	90	F	63.0	14	47	12.1	50.5
22	33	C	82.5	16	67	14.8	58.4	66	92	C	81.0	21	55	21.0	56.5
23	34	C	84.0	22	58	22.4	42.1	67	93	C	94.0	25	54	24.5	52.4
24	35	F	72.8	10	53	10.1	49.9	68	94	F	70.0	11	50	10.3	47.9
25	36	F	86.0	14	63	12.5	53.8	69	95	F	70.2	17	41	15.0	49.9
26	37	F	80.0	12	53	10.1	54.9	70	96	F	72.5	16	48	15.0	47.3
27	38	F	90.5	17	45	13.4	59.8	71	97	F	74.7	23	49	21.6	48.3
28	39	C	83.5	21	45	16.9	53.0	72	99	C	58.6	14	37	12.7	35.1
29	40	C	90.0	20	46	19.9	45.8	73	101	F	91.0	18	63	15.4	58.6
30	41	F	92.8	26	47	23.4	53.8	74	102	C	97.1	17	57	15.6	56.9
31	42	C	88.9	17	48	13.4	60.0	75	103	F	78.4	17	59	13.4	53.4
32	46	F	80.4	15	57	13.4	58.4	76	105	C	89.1	19	58	16.9	53.6
33	48	F	81.0	14	48	13.1	54.7	77	108	F	71.3	20	43	19.9	32.1
34	50	F	76.6	18	46	15.6	47.5	78	109	C	77.4	25	41	23.4	35.3
35	51	C	89.1	29	45	29.4	41.7	79	110	F	73.0	17	38	17.5	32.3
36	53	C	78.0	16	42	16.4	41.3	80	111	C	100.7	29	44	28.2	37.2
37	54	C	81.4	29	42	28.6	36.0	81	112	F	77.2	21	41	23.6	33.9
38	55	F	74.5	24	48	21.6	50.5	82	113	F	86.0	29	46	27.5	42.3
39	57	F	88.7	15	74	15.4	71.7	83	114	F	76.6	21	37	20.1	34.5
40	58	F	83.9	17	66	15.2	69.4	84	116	C	70.5	17	38	14.4	32.9
41	59	F	82.8	14	63	12.7	61.4	85	117	F	87.3	16	65	13.1	68.6
42	60	F	76.0	17	52	15.4	57.5	86	118	F	74.2	12	62	10.3	63.1
43	61	F	75.7	11	58	9.5	60.6	87	119	F	84.2	18	49	16.2	47.9
44	62	C	69.2	20	57	20.3	57.7	88	120	F	92.1	15	66	12.3	63.1
45	63	F	78.7	15	52	11.9	53.2	89	121	C	97.5	13	58	11.7	62.5
46	65	C	82.5	15	64	13.1	67.0	90	122	F	76.1	14	53	12.1	56.3
47	66	F	73.0	17	48	15.4	51.6	91	123	C	93.7	23	58	20.1	60.4
48	67	F	70.5	13	60	11.1	58.4	92	124	F	94.0	24	64	22.2	67.0
49	68	C	71.4	14	53	13.2	48.3	93	125	F	82.3	13	66	10.5	62.5
50	70	C	82.6	19	64	16.4	53.2	94	144	C	76.2	19	45	18.3	44.6
51	71	C	83.4	17	51	16.6	57.9	95	146	C	70.5	13	62	11.7	56.9
52	73	F	83.0	16	63	20.5	66.2	96	147	C	72.1	12	63	11.9	56.9
53	74	C	88.7	22	63	18.5	71.7	97	148	C	73.0	18	59	16.4	54.9
54	76	C	73.8	20	53	18.9	54.2	98	149	C	78.3	17	66	15.2	61.8
55	77	C	94.0	17	58	15.0	54.0	99	150	C	63.6	15	59	14.0	44.6
56	78	F	77.0	17	53	14.8	56.1	100	151	C	73.8	18	41	17.5	39.9
57	79	C	81.0	18	51	19.9	39.7	101	152	C	84.0	23	55	18.7	50.6

102	153	F	79.2	17	48	14.2	48.7
103	154	C	71.0	20	47	18.3	46.0
104	155	C	72.0	15	53	13.8	50.6
105	156	C	84.5	19	46	16.2	48.5
106	157	C	81.7	17	44	15.4	40.9
107	158	F	75.3	32	38	30.6	38.8
108	159	C	79.2	15	55	12.7	48.3
109	160	F	80.8	22	58	22.2	41.7
110	161	F	88.4	20	54	19.5	52.4
111	162	F	81.8	31	45	30.8	34.7
112	163	F	85.8	22	58	19.1	51.8
113	164	C	79.4	23	54	20.3	41.1
114	165	F	78.0	17	62	15.6	66.4
115	167	F	71.4	13	56	10.9	60.6
116	169	F	84.1	15	64	13.1	60.0
117	171	F	89.8	15	57	11.9	55.3
118	177	C	80.3	28	53	24.7	48.5
119	179	C	71.9	24	44	24.4	42.5
120	181	C	78.0	26	48	25.1	44.6
121	183	C	83.3	25	37	20.8	34.1
122	184	F	78.6	32	45	29.6	35.5
123	186	C	66.3	21	37	20.5	37.4
124	189	F	78.3	18	53	17.5	50.5
125	190	F	94.2	23	51	26.1	47.7
126	192	F	67.0	12	51	9.4	51.0
127	193	C	79.4	24	52	22.4	50.1
128	194	F	78.7	12	59	10.9	82.2
129	195	F	84.9	13	59	11.9	71.5
130	197	F	84.8	17	63	16.4	71.1
131	198	C	79.1	21	61	17.9	63.1
132	203	C	82.8	13	55	11.9	52.0
133	205	C	77.9	16	57	13.4	51.0
134	207	C	90.0	17	64	16.0	58.8
135	208	C	80.8	16	62	14.4	59.0
136	209	C	92.2	20	50	18.3	43.8
137	210	F	73.4	17	40	16.6	38.6
138	211	F	78.5	22	38	22.8	33.3
139	213	C	73.6	14	43	12.7	40.5
140	214	F	81.8	21	44	20.1	48.3
141	215	C	81.5	21	53	18.9	47.3
142	216	C	77.8	16	38	13.8	70.5
143	217	C	65.4	20	42	17.1	36.6
144	218	C	82.7	19	54	19.7	53.6
145	221	c	83.2	27	51	23.6	46.0

Table 6. Number, trial number, dissected lean meat percentage according to the “old” reference (“old” LMP) and the actual reference (LMP 2006) and predicted lean meat percentage with the equipments Fat-O Meat’er and OptiGrade-PRO (n = 145)

N°	Trial N°	“old” LMP	LMP 2006	LMP FOM	LMP OGP
1	2	56.95	58.00	59.92	58.73
2	4	51.74	53.24	55.86	56.41
3	5	58.90	61.73	61.72	60.56
4	6	58.30	59.43	58.66	58.20
5	7	53.21	55.58	57.70	59.75
6	10	55.53	57.26	59.94	59.67
7	11	59.01	61.32	62.57	61.24
8	12	60.75	63.95	63.34	63.15
9	13	58.04	59.81	62.81	60.67
10	14	61.12	63.04	58.85	57.47
11	15	53.82	55.93	53.12	54.13
12	16	56.39	57.83	52.21	55.44
13	17	59.79	62.74	58.45	61.53
14	18	62.84	64.43	61.49	62.46
15	20	61.39	63.76	60.88	61.02
16	21	58.56	61.60	59.07	59.08
17	22	51.42	53.33	55.65	51.44
18	23	52.93	56.68	55.85	56.89
19	24	51.82	53.48	58.53	52.77
20	27	56.71	59.56	59.31	59.04
21	30	52.19	55.53	59.97	58.11
22	33	53.99	54.05	60.88	58.67
23	34	48.75	49.68	54.08	50.25
24	35	60.89	63.07	62.76	60.93
25	36	56.24	58.47	61.58	59.72
26	37	61.48	63.44	61.09	61.71
27	38	53.16	57.21	55.43	59.96
28	39	51.78	54.76	52.16	56.18
29	40	53.23	55.60	53.18	52.71
30	41	47.58	49.24	48.50	51.30
31	42	52.32	55.69	56.06	60.01
32	46	57.26	60.88	59.49	59.70
33	48	57.53	60.04	58.48	59.37
34	50	52.07	54.87	54.84	56.36
35	51	46.52	49.34	45.50	44.48
36	53	48.86	53.15	55.74	54.80
37	54	41.68	44.64	45.10	44.49
38	55	50.57	52.90	50.31	52.13
39	57	59.46	59.78	63.09	60.20
40	58	62.07	63.21	59.59	59.89
41	59	63.44	64.24	61.47	60.66
42	60	61.61	62.35	56.82	57.98
43	61	64.40	66.64	62.88	63.00
44	62	54.15	56.03	55.42	54.21
45	63	56.44	58.07	58.50	60.11
46	65	59.52	60.14	60.92	61.28
47	66	53.93	56.80	56.05	57.12
48	67	60.98	63.39	61.71	61.47
49	68	54.48	56.96	59.54	58.35
50	70	54.32	57.42	57.65	56.58
51	71	52.45	54.25	56.68	57.18
52	73	58.65	61.59	59.86	55.13
53	74	54.84	56.05	54.97	57.87
54	76	52.97	55.02	54.62	54.80
55	77	55.17	57.32	58.08	57.80
56	78	56.77	59.56	57.05	58.26
57	79	48.56	50.06	55.89	51.85
58	82	56.97	57.88	58.91	58.62
59	83	57.72	60.50	60.73	61.21
60	84	58.40	60.66	58.65	60.01
61	85	59.59	61.78	60.30	59.57
62	87	60.06	62.34	60.49	61.17

63	88	54.67	58.06	57.05	56.22
64	89	58.23	61.84	60.51	60.59
65	90	57.70	59.54	58.28	59.52
66	92	52.25	53.43	54.22	53.52
67	93	49.35	51.06	50.74	50.15
68	94	60.29	61.70	61.34	60.49
69	95	52.87	55.57	54.63	57.19
70	96	51.52	54.43	56.91	56.80
71	97	49.66	51.35	51.37	51.81
72	99	53.14	55.93	56.32	56.74
73	101	57.28	59.92	58.23	58.17
74	102	58.70	59.74	57.85	57.76
75	103	57.37	60.70	58.25	58.93
76	105	55.15	57.30	56.43	56.25
77	108	46.52	50.64	52.65	50.66
78	109	45.46	49.18	48.10	48.40
79	110	53.32	55.91	53.98	52.41
80	111	43.27	44.90	45.50	44.99
81	112	45.11	47.36	51.49	48.08
82	113	42.72	45.98	45.87	46.32
83	114	46.57	51.46	50.56	50.85
84	116	50.51	55.31	54.00	55.04
85	117	65.51	64.90	60.19	61.41
86	118	65.40	66.89	62.86	62.75
87	119	53.12	55.39	55.45	55.94
88	120	65.22	63.65	61.25	61.24
89	121	63.46	64.54	61.28	61.61
90	122	58.41	60.26	59.50	60.40
91	123	53.00	53.29	53.18	54.85
92	124	54.45	54.38	53.53	54.18
93	125	65.49	65.24	62.88	62.54
94	144	47.31	51.65	53.86	53.83
95	146	60.37	62.55	62.13	60.78
96	147	57.70	59.83	63.23	60.66
97	148	56.51	57.09	57.46	56.85
98	149	61.25	60.66	59.65	58.81
99	150	57.13	59.06	59.91	57.11
100	151	50.44	54.12	53.83	53.70
101	152	53.90	56.82	52.50	54.39
102	153	56.45	58.26	56.03	57.60
103	154	54.89	57.09	53.37	53.99
104	155	57.61	59.85	58.68	58.20
105	156	50.83	52.20	54.05	56.06
106	157	49.84	52.55	55.31	55.55
107	158	45.33	46.46	41.46	43.16
108	159	55.23	56.75	59.12	58.75
109	160	50.46	53.51	54.00	50.27
110	161	53.93	56.32	54.81	54.04
111	162	37.23	38.61	44.39	42.87
112	163	51.42	52.66	54.02	54.29
113	164	46.86	49.04	52.43	51.76
114	165	57.01	59.24	58.87	59.22
115	167	58.76	61.09	60.93	62.00
116	169	57.07	57.94	60.96	60.22
117	171	60.45	60.82	59.49	60.40
118	177	44.75	46.32	48.18	49.51
119	179	44.38	45.31	49.65	48.83
120	181	47.39	48.74	48.72	48.52
121	183	48.10	49.62	47.24	50.28
122	184	45.96	46.66	42.98	43.46
123	186	44.85	46.28	50.75	51.10
124	189	54.25	54.30	56.26	55.33
125	190	50.87	52.77	51.76	48.06
126	192	58.64	60.40	60.75	61.73
127	193	49.53	51.35	51.16	51.46
128	194	59.90	61.15	62.37	65.60
129	195	56.66	57.86	61.59	63.05
130	197	59.66	58.39	59.09	59.35
131	198	57.48	56.86	55.38	56.93
132	203	58.66	60.00	60.74	59.90
133	205	56.52	57.99	58.69	58.59

134	207	54.75	55.66	59.35	57.78
135	208	57.48	57.66	59.72	59.04
136	209	49.78	50.83	54.05	53.72
137	210	51.01	53.60	54.48	54.22
138	211	46.82	50.82	49.95	48.51
139	213	57.94	59.54	57.43	57.46
140	214	46.42	50.00	52.03	53.00
141	215	49.47	49.81	53.85	53.78
142	216	49.45	51.76	55.00	61.56
143	217	47.17	48.39	52.49	53.66
144	218	51.75	52.01	55.66	54.11
145	221	46.26	48.57	48.51	49.93

**1. Fat-O-Meat'er (FOM)**

N = 145

R<sup>2</sup> = 0.78288

RMSE = 2.48840

Y = 60.26989 – 0.81506 \* X<sub>1</sub> + 0.20097 \* X<sub>2</sub>

**RMSEP = 2.51938 ~ 2.5**

Y = predicted lean meat percentage

X<sub>1</sub> = thickness of fat, including rind, in millimeters, measured at 7 cm from the midline, between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib

X<sub>2</sub> = thickness of the muscles in millimeters, measured at 7 cm from the midline, between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib.

**2. OptiGrade-PRO**

N = 145

R<sup>2</sup> = 0.79425

RMSE = 2.42238

Y = 61.21920 – 0.77665 \* X<sub>1</sub> + 0.15239 \* X<sub>2</sub>

**RMSEP = 2.45933 ~ 2.5**

Y = predicted lean meat percentage

X<sub>1</sub> = thickness of fat, including rind, in millimeters, measured at 7 cm from the midline, between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib

X<sub>2</sub> = thickness of the muscles in millimeters, measured at 7 cm from the midline, between the 3<sup>rd</sup> and the 4<sup>th</sup> last rib.

Graphs illustrating lean meat percentage predictions with FOM and OGP (n = 145) are presented below.[6]

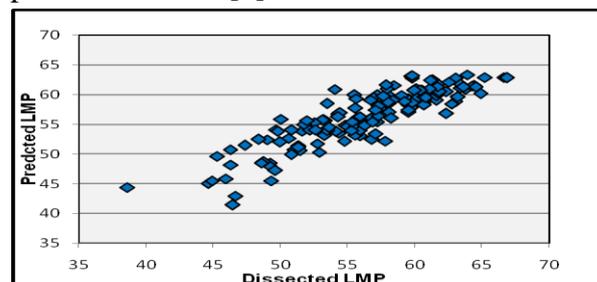


Fig 3. Predicted versus dissected lean meat percentage (LMP) for FOM

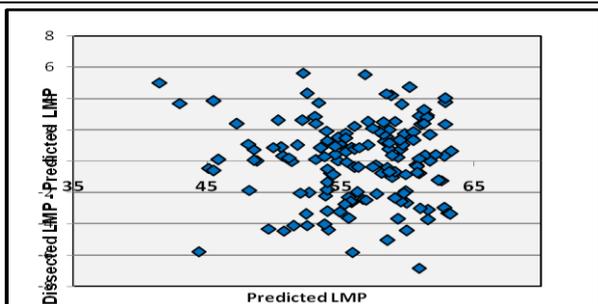


Fig 4. Residuals versus predicted lean meat percentage (LMP) for FOM

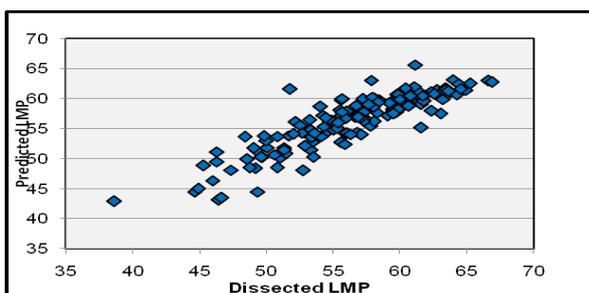


Fig 5. Predicted versus dissected lean meat percentage (LMP) for OGP

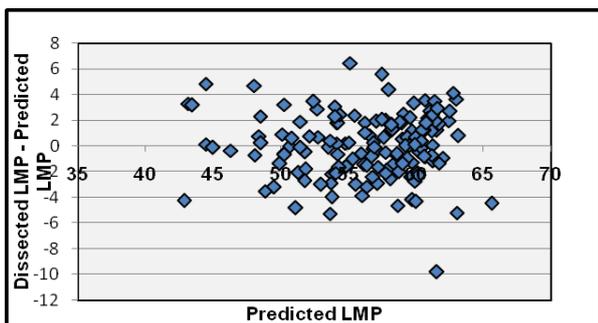


Fig 6. Residuals versus predicted lean meat percentage (LMP) for OGP

## CONCLUSIONS

Romanian authorities applied for the authorization of the Fat-O-Meat'er and OptiGrade-PRO, on the basis of the results presented. The predictions formulas were applied to pig carcasses weighing between 50 and 120 kg hot weight.

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## SUSTAINABLE DEVELOPMENT OF NATIONAL AGRICULTURE

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### Abstract

*Agriculture today is a strategic point of a country's economy, providing food based on population, development of internal and external trade and manufacturing industries by supplying raw materials. For Romania, this branch is a strong point both in terms climatic (temperate, balanced relief, soil quality) and at the same time is also a way of national development and convergence of rural areas to their full potential untapped. With strong reforms, well implemented, a specific legislative framework which aims to protecting private property, Romania could reduce the low efficiency and can have a sustainable agriculture. The paper aimed to present the advantages of consuming organic products, and, on the other hand, the advantages of a country in terms of organic farming. European agriculture is a competitive, market-oriented, but also protecting the environment model.*

**Key words:** competitiveness, ecological consumption, sustainable development, Common Agricultural Policy

### INTRODUCTION

Agricultural policy is a set of principles, means and methods of action by which the overall objectives of state for agriculture [7], is a component of the economic policy of the state and is a way by which the state intervenes in agriculture.

CAP is one of the first common policies of the European Union, also one of the most complex and expensive.

Need to establish a common agricultural policy is the fact that exports of agricultural products in the European Union are marginal compared to competitor countries, especially with the US, productivity was low and within countries there is an agricultural structure where there were many small farms and a large number of people who work in agriculture [12].

"Although there were large differences between Member States in terms of level of development and production systems have the advantage of complementarily agriculture, especially from France, which have surplus grain and Germany, poor food, Italy Mediterranean products have comparative advantages Belgium and the Netherlands had

livestock sectors benefiting from traffic and the port of Rotterdam, Luxembourg also have high demand for food" [15]

"The general terms of the CAP have been established by Article 39 of the Treaty of Rome in 1957, and CAP objectives were: improving agricultural productivity by promoting technical progress and by ensuring the development of agricultural production and the optimum utilization of factors of production in especially labor; ensuring a fair standard of living for the agricultural community, in particular by increasing the individual earnings in the agricultural sector; stabilize markets; ensuring a constant supply of food; ensuring supply to consumers at reasonable prices"[1] These objectives were designed to ensure food security, to reduce the output gap between countries, to reduce costs, increase farm productivity, respectively, to strengthen the role of agriculture [8].

### MATERIALS AND METHODS

A critical approach of sustainable development of national agriculture was presented in this study based on the provisions of the new CAP reform for the period 2014-

2020 and opinions of other authors regarding the impact of the measures taken as the CAP objectives to be achieved.

Also, the expected impact of the new CAP reform implementation on the rural economy and space of the European Community was commented in a critical manner.

Competitiveness, deep market orientation and environment protection are the main objectives of the European agriculture.

Organic agriculture is approached as a niche for Romania's involvement and presence on the EU agro-food market.

In this context, the paper aimed to present the advantages of consuming organic products, and, on the other hand, the advantages of a country in terms of organic farming.

## RESULTS AND DISCUSSIONS

### **The concept of Sustainable development and the new CAP reform**

A new CAP reform will have ideas of innovation; enhance competitiveness in agriculture, while taking care of the environment, to combat climate change, to help farmers claiming employment. They say the two pillars, the direct payments and market measures and the second on rural development [6].

The Pillar 1 includes: ensuring food security for the 500 million Europeans while maintaining production capacity throughout the European Union; sustainable production that meets the highest standards of world food security, environmental protection and animal welfare; direct support to represent a complex pay for services they render to society farmers in rural areas (biodiversity preservation, rural landscape conservation, animal welfare). Direct payments under the first pillar, allowing farmers to supply, in addition to their agricultural activities and a range of public benefits, which the company, which currently are not paid by the market; greater market stability for farmers and consumers; maintaining or identifying new market intervention tools to act as a safety net in times of crisis and in order to maintain a competitive EU agriculture in relation to third

countries and in terms of price volatility; identifying a mechanism for Community financial risk management that can be used in deep crisis and be flexible enough to have rapid effects; employment and economic viability in rural areas: more than 30 million people work on farms and more than 40 million find a job within the food chain; simplify cross compliance standards.

Pillar 2 requires to encourage the development of rural non-agricultural economic activities, stimulate land consolidation; Member States are free to decide the distribution of resources between the two pillars of the CAP, support for training in rural areas; support for the development of agriculture and related activities for the development of entrepreneurship in rural areas; subsidiary increase in implementation and modification programs; Payment for scientific research and development of new technologies in agriculture and to mitigate climate change."

With this structure of direct payments and other measures, the CAP supports the farmers in the EU to enhance rural economy using qualitative and competitive agricultural production. This objective is supported because despite the fact that there are other methods for sustainability beyond agricultural rural area, yet in many parts of the farming community has key role.

Agriculture is considered by some economists "backbone of the nation" or "green oil of the nation", as it is an essential factor in both social stability and the maintenance of ecological balance."

To protect people from the negative effects of food "industrialized" and at the same time to protect the environment, you have to go to practice sustainable agriculture, but at the same time, this shift entails the farmers a higher level knowledge.

The concept of sustainable development has become an important point of discussion in terms of environment and development after the publication of the World Commission on Environment and Development (Brundtland Report) [10].

The concept of sustainable development has experienced over the years many definitions, in simple words, this sustainable development can be defined as the ability of a system to evolve, but without diminishing the attributes already accrued and future generations without compromising on meet the needs. It's actually a new approach to the relationship between man and nature to give a balance between them [5].

The environment has begun to bear many changes as man developed, began to civilize and needs diversified and began to improve technology [11]. Human interventions are most harmful to human agglomerations are as large as the human activities are more intense, occurred crisis of non-renewable resources due to deforestation, desertification, etc. "Pollution takes many forms: physical pollution (erosion, compaction, residue concentration); chemical pollution (excess fertilization and other chemical treatments); biological pollution (organic waste); noise; aesthetic pollution (damage to landscape)" [9] In order to have a healthy and natural food safety will be practicing organic agriculture, and this involves several operations: reducing chemical inputs can be excluded as the interventions on soil and recycling. Analysis of sustainable development is an approach to economic, social and ecological triad, the three systems are equally important.

Through its business activities, human resources influenced both by acquisition and through which returned the following processes. A greater concern to meet the needs inexhaustibility relying on resources, people has dropped at some point need to support nature to recover [13]. Experts consider that the system would be the most ecologically complex: ecological system may planetary effects, unlike taking place in certain economic boundaries; this system pre-existed the appearance of man on earth, even including human existence and the destruction of the ecological system destroys its own habitat; all other economic processes taking place within the ecological system because any activity is based on the natural resources of the system (in a proportion greater or lesser

direct or indirect); this system will depend on the evolution of man, if there are products contaminated or irrational exploitation. [3]

Clean Production is an approach about the environment, which is present in all stages of the production cycle and product life and the goal is to prevent risks to humans and the environment, this production is good for the environment and the prevention following companies pollution have several benefits: is realized some cost savings from eliminating wastage of raw materials and energy; improves the efficiency of the company; higher quality of goods produced; certain materials are recovered; to employees may change attitudes (people will need incentives to address the environmental protection in the absence of a commitment made by the management companies, other staff will contribute not expected).

There are certain measures or economic policy through which the state can reduce pollution, these include: pollution charges, the government may establish certain fees or fines for polluting firms, then it will amend its discharges of pollutants. Fines are a way of coercion and not necessarily stimulate the economy. Tradable permits, the state establishes a certain level of pollution for each license issued; subsidies, they take many forms, including grants, loans with a below-market interest rate.

Another policy adopted by the State to encourage a clean environment can be stimulating and privatizations [14]. In case of private property implementation of cleaner production strategies can be easier. Often, government subsidies for the industry boosts electricity or water, waste and so prices may encourage false prices that do not reflect the full cost of these resources [4].

Another aspect of the state could use to reduce pollution is to ask the industrial companies to disclose information on emissions, so in order to keep the image, firms may adopt certain measures.

**Impact on Romania's agriculture development. Organic farming a niche for Romania.**

In Romania there is not a high demand for organic products, but there is a tendency to ascend to the development of this branch of agriculture, so much of the production of organic products is exported. One of the factors that influence this may be the fact that in our country wages are lower than the EU average (organic products are usually more expensive). It is necessary for each of us to realize the benefits of this type of agriculture, primarily from a health perspective, but also protecting the environment, thus supporting the introduction of certain programs in schools information on this lifestyle, to inform children, but and adults about the need for clean production, thus supporting on the one hand, social welfare, but also spur the economy towards sustainable development.

The factor that in Romania recorded a low level of market demand organic products is that these products have a higher price, about 30% higher than processed products manufactured in the industry. This higher cost is because this production requires certain inspections and certificates approved by specialized bodies, on the other hand requires a long time to capitalize production. A decisive factor that depends on investment in Romania is the degree of taxation, people react to market stimuli, this was seen in 2005 when they dropped charges (to work more, invest more, and people consume more and - They investment risks assumed). This expansionary fiscal policy measure that is aimed at reducing taxes and duties may stimulate agricultural activity.

With the increase in taxes, purchasing power will decrease, so will be influenced primarily investors and citizens as consumers pay taxes when buying goods or services, and if these taxes are high, they will not buy as much (high price discourages consumption). At the same time an increase in taxes tends to increase government spending and the state proved a bad governor repeatedly.

The taxes have linked high unemployment rate, and if we look from the perspective of farmers, where incomes are low, a tax reduction could lead to greater beneficial occupancy. Thus one of the measures to be

taken to boost agricultural production is to reduce taxes.

Another variable that directly affect agricultural production is the minimum wage. In Romania this salary increased from 1 July to 900 RON. At first glance, we can say that this growth leads to poverty reduction and provide a decent living for those who receive minimum wage, but at a closer look we find that this is not just beneficial for those who are supposed to be helped (those working in agriculture, students and pupils).

If the salary is not the result of employee skills or following negotiations between employers and employees, other methods can be called coercive, thus raising the minimum wage labor supply and demand changes, investors will be less attracted to invest and employers will be forced to lay off or not to employ.

A salary required and can lead to higher inflation as an increase imposed and not one that resulted in increased productivity can lead to an increase in inflation. Another disadvantage of agriculture following the increase in the minimum wage would be that some less developed areas in terms of infrastructure or proximity to suppliers, the advantage of low wages, but it increased, reaching to become equal with other areas making them a disadvantage. Thus farmers who are willing to work for low wages, no longer be legally employed, such entrepreneurs will be put in a position to employ 'black' or not employ.

From 1 January 2014, the bill was initiated under the Treaty of Accession to the European Union to liberalize foreign land so that people can buy them, so contributing to economic growth because foreign investment would create new jobs work, the possibility of transfers of technology, and thus will stimulate trade and increase competitiveness will lead to a final consumer satisfaction higher.

With this opportunity can be a process of modernization of production factors in Romania regarding agriculture. Romania is attractive in terms of low wages and natural resources. Liberalization combined with lower

taxes and land taxes would be much better effects. Given that the demand for land purchase will be higher, the price may increase, and landlords will benefit so they can invest in other areas.

Subsidies for organic farming are a support coming from the Agricultural Guarantee Fund (EAGF) for animal and vegetable farms practicing a conversion to eco farming.

The question is now whether subsidies are good or bad in terms of agriculture. It can be argued that these sums of money allocated to agriculture assist them to support their production, to innovate, etc., but I think this is harmful because the final market, the product enters the market with a price that does not always reflect needs of the market, some losses or inefficiencies hidden subsidies. Since farmers are accustomed to certain expenses are covered by the state, they are not motivated to be performing. Another minus that we bring to market this aid is that it helps some productions over others, being encouragement discretion, only part of the population is engaged in this type of activity. In the rural economy dominates the high percentage of small farms producing mainly for own consumption, selling products on the market only sometimes obtained. The existence of a large number of small farms to large farms number reveals the structural imbalance that affects agriculture and its competitiveness.

Another problem facing Romania during this period, and not only is the degree of fragmentation of agricultural land (almost 91% of farms are small-sized sub 5ha) and the majority of holdings are held for own consumption. (On the other hand, this is also a factor that helped farmers in times of crisis to face the difficult period she went through Romania). This constrains the achievement of performance, and the Romanian state must take action by relevant agricultural policy, to help merging plotting to develop production capacity.

The division has several negative effects of these include: higher costs through additional consumption of material and time, bad farming systems for small portions of land

because it is not profitable to make large investments in equipment performance. This hampers lots and work of civil servants in determining subsidies because it is difficult to determine portions to be calculated because of these fragmentations, duplication land has a greater possibility.

Most of the agricultural land before 1990 that were collectivized, currently under the possession of several owners, they spreading on small areas, and most owners are old you do not cultivate the land, but not lease it for fear not to be fooled so are left to decay. For these uncultivated lands it was proposed a bill that could fine all owners, either as a farmer or without this quality. From my perspective, this totally violates property rights, not ethical action and thereby encourages maximal state coercive rights on the population.

A benefit brought by merging fields is the development of irrigation systems, and through this process reduce dependence on weather.

## CONCLUSIONS

Romania has many deficiencies as regards its institutional system, taxation, bureaucracy and even the mentality of the population, there is still communist mark on the country's government, however, the country has potential in terms of resources, but these should be exploited given a sustainable development with care for future generations. Organic food industry should be promoted in our country because it has a positive impact on public health, this would lead to further promotion of the offer, and while the price of these products would be reduced and would be acceptable to all. With this policy of sustainable development and environment help to recover, but also has a positive impact on the economy of developing a new branch of agriculture, but to do this and education has an important role and should be supported educational programs aimed training people to a healthy diet.

Currently this production is expected to be carried out by SMEs as large corporations do not aim this diet; they usually rely on large

volumes of production at low prices. Because of this and the population is influenced to consume products "industrialized" cheaper, as mentioned above, information about health insurance and long term care for the environment is the key organic products. There is a chance this as production increases from year to year. Romania's agricultural potential, especially the new trend of organic products. The fact that this country is still underdeveloped compared to EU countries can be an advantage, it would be that you can make new things susceptible evolutionary growth potential, investments would be beneficial, and business is less developed may be attractive to new trends (countries in transition may have a higher economic growth than developed countries).

All these things would be possible if the state does not intervene in the system distortion but would come only to protect private property.

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## STIMULATING THE ATTRACTION OF INVESTMENTS IN THE PROCESSING SECTOR – A NECESSITY IN THE CONTEXT OF EUROPEAN MILK MARKET LIBERALIZATION

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### **Abstract**

*A main challenge for the players on the world dairy market is to efficiently respond to the changes of the local markets characteristics, in the context of an increasingly fierce competition for the raw milk obtained on the farms. From the analysis, it results that the performance of the Romanian milk sector is seriously affected by the excessive fragmentation of supply, which reveals the subsistence and semi-subsistence phenomenon that persists in the milk sector, as the main factor that constrains competitiveness growth. In reference to the volume of investments in the dairy processing sector, it results that this had a slow growth rate in the investigated period, the share in total investments in the food sector ranging from 7.8% (2000) to 16.9% (2011). The investments in agriculture in total investments accounted for 4.9% in the year 2012. In order to adapt to the competition on the European Single Market, the Romanian sector has to receive support through investments, in the conditions in which there is a favourable global conjuncture for the consumption of dairy products, in which their prices are expected to raise on the basis of the increasing demand of the development regions.*

**Key words:** investments, milk market, productivity, farm size

### **INTRODUCTION**

In the context in which the milk market will get liberalized and it will be no longer restricted by production quotas beginning with the year 2015, the competitiveness of milk production and its derivatives will depend not only on price, but also on quality to a very large extent. A good product quality starts with the efficient use of agricultural resources for obtaining the raw products, in concordance with the processing industry requirements, ending up with an appropriate distribution system, which would provide the necessary guarantees so as the high standards of the food products should not be lost in the retail trade system. Thus, quality should become a priority, in all the production, processing and distribution stages of dairy products.

For the primary sector of milk production, the processing industry represents an opportunity for ensuring a reliable outlet market. Yet this sector is not sufficiently developed. In order

to meet the EU quality standards and to facilitate the access to the export markets, it is necessary to attract foreign capital for modernization purposes as well as to boost the domestic investments on the Romanian processing companies [1].

In the context in which the nature of competitiveness in the dairy markets is significantly changing, the market approach strategies also evolve. The strategic alliances, the partnerships with foreign firms and the foreign direct investments provide flexibility to companies at regional level, so as they can cope with the changes on the local markets.

### **MATERIALS AND METHODS**

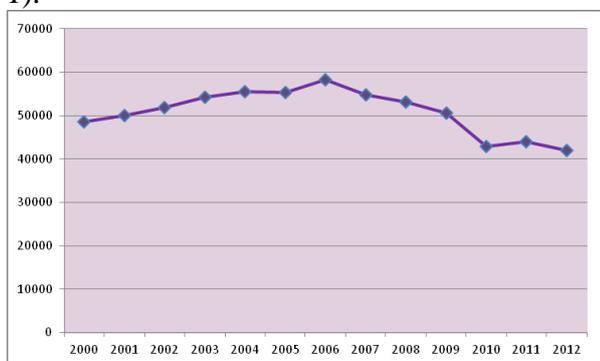
The utilized method was the comparative analysis of a set of indicators specific to the milk sector for the period 2000-2012. The main aspects regarding the milk market in Romania were revealed on the basis of the national data supplied by the National Institute of Statistics, through the official

publication *Romania's Statistical Yearbook* as well as the Tempo-online database.

## RESULTS AND DISCUSSIONS

### The milk supply

The integration into the European Union structures has not brought any revigoration of the milk production sector in Romania; on the contrary, it resulted in a strong decline of production and livestock herds. Thus, milk production on December 31, 2012 totalled 48337 thousand hl (including the consumption of calves), out of which cow milk and buffalo cow milk represented 42036 thousand hl (Fig. 1).

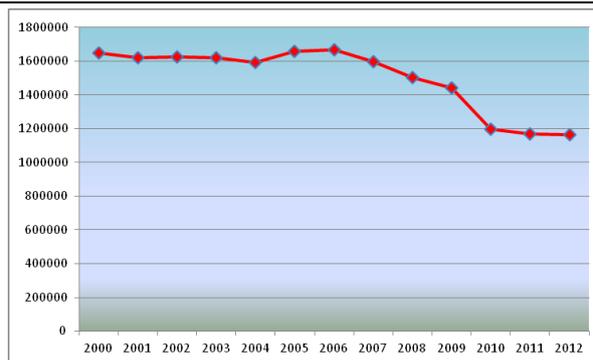


Source: National Institute of Statistics, Tempo online, 2014

Fig. 1. Cow milk and buffalo cow milk evolution in the period 2000-2012 (thousand hl)

Compared to the year 2000, total production decreased by 3293 thousand hl (-6.4%), under the background of the decrease in cow milk and buffalo cow milk production by 6482 thousand hl (-13.4%), simultaneously with the increase of the ewe and goat milk production by 3189 thousand (+102.4%). The increase of ewe and goat milk production is mainly due to the development of the sheep raising sector and mainly of the goat sector. By estimating the economic efficiency indicators of the goat milk, for an average of 350 liters/head, it has been demonstrated that goat raising and exploitation is a profitable activity.

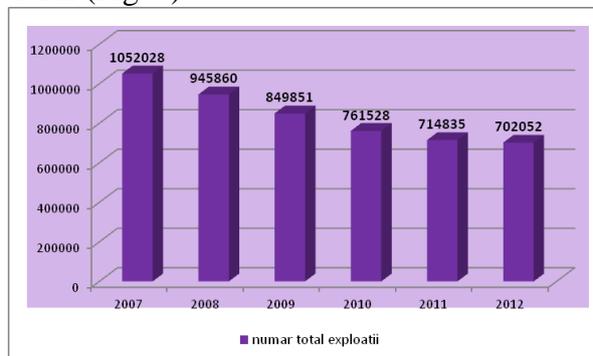
In the period 2000-2012, the number of cows and buffalo cows at national level was down by 486524 heads (-29.5%); this decrease was stronger in the period 2007-2010 (24.9%), and a stabilization of dairy herds followed afterwards (Fig. 2)



Source: National Institute of Statistics, Tempo online, 2014

Fig. 2. Evolution of the number of dairy cows and buffalo cows in period 2000-2012 (heads)

The performance of the milk sector in Romania is also seriously affected by the excessive fragmentation. The dairy farm structure is close related to the economic efficiency, as it is well-known that the higher the farm size and milk yield, the higher the economic efficiency [2]. Thus, at the level of the year 2012, 58 % of the total number of dairy cows was found on very small sized farms of 1-2 heads, number of farms totaling 702052, with an average size of 1.86 heads/farm (Fig. 3).



Source: National Institute of Statistics, Tempo online, 2014

Fig. 3. Evolution of the number of the farms with dairy cows, buffalo cows and heifers (2007-2012)

Out of the total number of farms, only 1717 are considered as professional farms that deliver milk directly to the processing units (farms with over 31 heads).

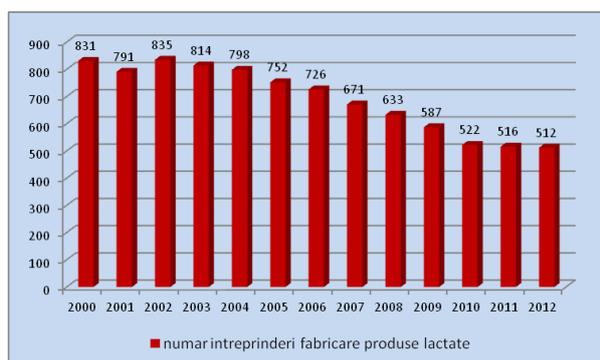
In the period 2007-2012, the total raw milk production collected by the processing units (in the country and from import) decreased by 233107 tons (- 19.4%).

The analysis of the two origin sources, namely milk collected from the country

and from import, reveals, on one hand, that the share of imported raw milk was up from 3.6% in year 2007 to 6.1% in 2012, while the raw milk collected from the country constantly decreased in share, from 96.3% in 2007 to 93.9%. Per total, in the period 2007-2012, the analysis shows a decrease of the raw milk quantity collected from the Romanian farms by 21.5% and the increase of the imported raw milk quantity by 35.1%. This situation is due to the fact that in Romania, the collecting system does not properly operate yet, and the prices offered by the milk collectors are not attractive for producers, so that the latter prefer to sell their production by themselves, through family businesses.

A characteristic of the milk production in Romania (2012) is that only 20% of the milk production is sold to the processing units, 38% is represented by family consumption, 32% is directly delivered on the market, and 10% is the consumption of calves.

According to the data supplied by the National Institute of Statistics, in the year 2012 there were 512 milk processing units, by 38% less than in the year 2000, most of them being small in terms of the number of employees (463 of units with less than 50 employees), practically replicating the structure at primary production level (Fig. 4).



Source: National Institute of Statistics, Tempo online, 2014

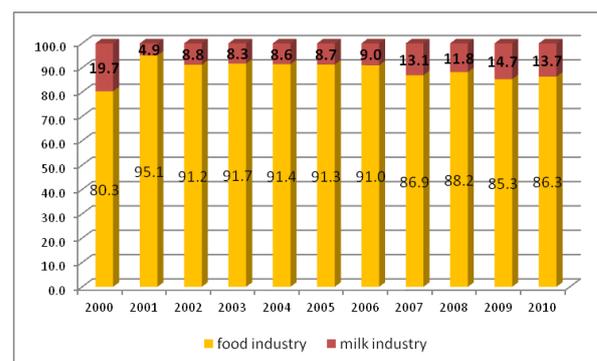
Fig. 4. Evolution of the number of units for dairy products' fabrication

In the period 2000-2012, the dairy production resulting from industrial processing increased in all the assortments, the most spectacular

increase being noticed in fresh dairy products (269.7%), followed by cheeses 130.6%.

### Investments in the milk sector

The analysis of the volume and structure of investments in the milk production and processing sector in the period 2000 – 2011 reveals the aspects mentioned below.(Fig. 5 and Table 1)



Source: National Institute of Statistics, Tempo online, 2014

Fig. 5. The share of the value of investments in the milk sector, in total investments value in the food industry, in the period 2000-2011 (%)

-In the period 2000 – 2011, the investments value in the milk sector was of 760,9 mil. euro, with a peak volume in the year 2007 (149. mil. euro);

-The volume of investments in the milk industry in total investments in the food industry sector, per total investigated period was 11.3%;

Table 1. Evolution of investments in the food industry and in the milk industry (million euro)

Year	Food industry	Milk industry
2000	292.1	57.4
2001	471.0	23.2
2002	389.7	34.3
2003	463.6	38.4
2004	438.3	37.6
2005	597.8	52.0
2006	836.4	75.2
2007	1143.2	149.4
2008	810.7	95.5
2009	444.4	65.4
2010	429.6	58.7
2011	435.5	73.8
<b>Total</b>	<b>6752.3</b>	<b>760.9</b>

Source: “Results and performances of the units in industry and constructions”, 2000-2008, Tempo online, 2014, National Institute of Statistics

-The highest share of investments in the milk sector in total investments in the food industry was in the year 2000 (19.7%);

-In the majority private sector, the share of the investments increased from 84% to 100% in the same reference period.

As we can see from the data in the table presented above, the highest volume of investments in the milk industry was in the year 2007 (the year of Romania's accession to the EU); after that moment, a decreasing trend followed, a revigoration being noticed in the year 2011, as compared to the previous year (+25.7%).

For the about 700000 Romanian farmers, it is estimated that milk quota removal will affect them, mainly in the case of those dairy farmers who own 1-2 cows (86.8%) and, who will not be able to compete with the farmers in the states with a developed milk sector, because the production costs are high, the subsidies lower, this being reflected in the final price. That is why the investments in equipment, in advanced technologies, genetics, to lower the production costs, represent a reliable modality to increase the productivity per animal head and to narrow the productivity gap between Romania and the EU-27 member states.

## CONCLUSIONS

One conclusion can be drawn: the share of investments in milk industry in total food industry in the investigated period (2000-2011), i.e. 11.3%, is still low and capital inflows are necessary in the attraction of new projects for the sector modernization and for performant technologies.

Anyhow, the big large processing companies are developing projects, partially financed from EU funds, which provide financial support to the family farms to produce milk at the level of EU standards.

For the animal husbandry sector, the associative forms could represent a solution for the investment part, in the sense of purchasing milking machines and equipment and milk cooling tanks. In this respect, the Government adopted, in November 2013,

Government's Decision on granting the *de minimis* support for the purchase of milk cooling tanks, which will benefit the agricultural producers, the livestock farmers who own up to 5 dairy cow heads and who are organized into a single associative form for this purpose, established at the level of each commune. This measure is meant to facilitate both the diminution of costs for the small farmers, and the diminution of the non-conform milk quantity. Yet putting this measure into application is constrained by certain aspects, including the fact that the cooling tanks must be purchased for the milk that must go to processing, which eliminates from the very start those farmers who sell the milk on the markets, within the direct sales component. Another problem that must be taken into consideration is the collection of milk from the small farmers in the mountain areas, in the less-favored areas, where there is no infrastructure, and out of this reason the processors cannot get there to collect the milk.

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## COMPARATIVE STUDY ON THE CHOICE OF BUILDING MATERIALS FOR CONSTRUCTING A HOUSE

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### Abstract

*For some, building one's own home can be a unique opportunity in a lifetime. That is why the choice of project, materials and finishings is paramount. Any homeowner wants a comfortable house, which is durable, insulated, easy to maintain, and, why not, built with least costs, but using quality materials. Brick and Autoclaved Aerated Concrete (AAC) are the most common materials on the Romanian market when it comes to building a house. Although these two materials have been on the market for years, most manufacturers still use them because of the advantages presented in time by houses constructed out of them. Brick or AAC homes have a longer life compared to the ones erected with other construction materials and feature increased safety in terms of structural strength. Also, brick or AAC houses have the advantage of much better sound insulation than wood, for example. In our country there are sufficient resources for masonry, depending on the cost invested by the owner, at the same time displaying the characteristic properties that can provide the required safety of the building. Ceramic bricks and blocks produced here have diverse sizes and shapes, being able to meet the demands of any architect and customer.*

**Key words:** brick, monolith casting, autoclaved aerated concrete, masonry, bearing walls

### INTRODUCTION

Besides the traditional and widely used pressed baked clay brick, elements of brick masonry (AAC - autoclaved aerated concrete) are also produced in our country; these blocks are widely used in bulkheads and closing walls for the buildings of reinforced concrete on frame structures [7]; as well as this, AAC is a very good insulator. Simple unreinforced masonry formed of AAC blocks is easy to achieve, thanks to the low weight blocks which is opposed to the high gauge they present. To approximate, an AAC block equates to 10 standard bricks [3].

The armed elements play a very important role in masonry structures as they have to support and counteract the horizontal and vertical forces that occur after a major sudden earthquake. Therefore the pillars, the vertical elements, and the belts, the horizontal ones, are linked together so as to compose a single and unified corpus; they all are concrete elements that transfer the energy coming from the tectonic movement, through the reinforcing steel [9]. There are sufficient

regulations in Romania that can give instructions on positioning the pillars and belts; the strict condition for pillars, as described in the picture above, is that the maximum length of the side of a wall between two reinforced pillars should not exceed 5 meters [2].

### MATERIALS AND METHODS

The disadvantages of a house built of brick / AAC stem from the low thermal comfort, the high construction costs and the lengthy building interval. The cost of the house, without painting and other features or furnishings, is given by the construction materials – 70%, and by the labor used – 30%. Since the price of materials is the main element in global cost, building the house yourself – diy – cannot cause a significant decrease in the final payment.

The masonry can be achieved in several ways, depending on the need for the structure to support without fatigue all the forces capable of generating damage to the structural bearing system. The collapse of any building should

be avoided, so, depending on the gauge of the building there can be a mandatory requirement to place masonry in a certain way; this method contributes to the load bearing capacity that the masonry wall can support. There are various methods of making it and they combine easily; the joints can be placed over along the length or the breadth of the wall.

Link joints are used in the construction of masonry in order to ensure the monolith content of the full brick masonry; it is also necessary to observe the connection among neighboring joints.

Mortar is used as binding material in the construction of masonry walls.

The mortars used in construction are well mixed compositions of binder, water and fine aggregate.

In the preparation of mortars certain additives may be used, such as: plasticizers, pigments, water proof substances, substances for adjusting the setting, hydraulic active substances, etc.

According to binders, ordinary mortars are based on lime, cement, plaster, clay earth; according to their compressive strength mortars can be: M4, M10, M25, M50, M100 (figures indicating minimum compressive strength at 28 days, in daN/cm<sup>2</sup>). For mortar M4, the compressive strength is determined at 90 days and it must be of 49 daN/cm<sup>2</sup>.

A fair design is required so as to avoid the breaking of masonry in any particular plan, especially in the elements that make up the structure of resistance.

## RESULTS AND DISCUSSIONS

### Description of the constructive material

The brick is an artificial construction material, of prism shape, obtained from a mixture of clay, sand and water or of other materials (concrete, blast furnace slag etc.), sun-dried or burned in a furnace. Unburnt bricks are called adobe.

There are two kinds of burnt clay bricks for construction:

➤ filled – due to their massiveness they provide strength to the constructions with load-bearing walls.

➤ hollow – due to the air existing in their gaps, they provide good thermal and acoustic insulation. They are used in non-bearing walls, either exterior or interior [2].

Autoclaved aerated concrete (AAC) is a lightweight precast material, being used in constructions for strengthening the structure and for insulation, as it is fire and mold resistant. AAC is produced in the form of blocks, wall panels, floor and roof panels, as well as lintels [6].

The autoclaved aerated concrete is obtained from a mixture of sand, cement, lime, gypsum, water and a gas generator, which gives the porous structure.

The material is aerated by means of a reaction between the aluminum powder and an acid, and further it is subjected to autoclaving (high temperature, high pressure steam), which cause the release of silica and quartz. The resulting AAC blocks undergo a curing process and then are cut (trimmed) in blocks of different shapes and sizes depending on their subsequent use.

### Characteristics

Construction materials present many features and properties. Some of them are important only for engineers who take them into account in the design and sizing of the various elements of a building, and others should concern all those who want to make the best decision when choosing among various materials. In this case the dilemma is “what to select: brick or AAC?”

*The characteristics for each material are as follows:*

- **The compressive strength  $R_c$ :** it is the tension ( $\sigma_c$ ) to which a material breaks down after being subjected to compression. Compressive strength is determined by standardized trials in authorized testing laboratories and it is stated in the manufacturers “declaration of conformity”.

Higher compressive strength yields higher bearing capacity, therefore smaller wall sections (which use less material), in the case

of selecting a structural system with load-bearing masonry walls [10].

If the structural system of the building is on frames (boards, beams and columns that take all forces that can be exerted on the building) or on concrete structural walls, the compressive strength of the material is irrelevant, since they do not serve a structural purpose, the only load they need to take is their own weight and the one of the finishing to be applied. [1].

- **The bulk density ( $\rho_a$ )** is the ratio between the mass of the porous solid and its apparent volume, which includes pores, cracks and any internal empty spaces. Lower bulk density means a larger volume of empty spaces or pores, hence better thermal insulation [12]. Moreover, the lower the apparent density, the lower the loads on the structural system, which, in its turn, will lead to structural elements with smaller sections and lower reinforcing steel consumption.

It is well known that the seismic force a building bears during an earthquake is commensurate with the mass of that building, so it would be ideal to construct buildings which are as light as possible, while meeting all the standards of safety and comfort.

- **The thermal conductivity ( $\lambda$ )** is the property of materials to transmit via their mass the heat flux produced by the temperature difference between two opposite sides. The thermal conductivity is characterized by the thermal conductivity coefficient ( $\lambda$ ), defined for a homogeneous flat wall, with parallel faces, by thickness ( $d$ ) and surface ( $S$ ), when there is a difference of temperature ( $t_1-t_2$ ) between the opposite faces, by the relation:

$$\lambda = (Q * d) / (S * (t_1 - t_2) * \tau) \quad [2],$$

where ( $\tau$ ) is the time interval for heat propagation. Construction materials with  $\lambda < 0.29$  are conventionally considered as thermal insulators [11].

Thermal insulation properties are also assessed by the **thermal resistance ( $R$ )**, computed by the formula:

$$R = 1/\lambda$$

The lower the thermal conductivity of a material is, the higher the thermal resistance of that material will be, so it insulates better. It means lower heat loss through a high thermal resistance wall, hence energy consumption for heating the building will decrease.

- The reaction to fire is the property of materials to temporarily withstand high temperatures (circa 1000 °C, as they occur in fires), without damage.

Table 1. Material characteristics [11]

Material Characteristics	BRICK	AAC
Compressive strength	17-22 N/mm <sup>2</sup>	1-4 N/mm <sup>2</sup>
Bulk density ( $\rho_a$ )	600-1600 kg/m <sup>3</sup>	500-700 kg/m <sup>3</sup>
Thermal conductivity	>0.18 W/mK	0.13 - 0.19 W/mK
Reaction to fire	According to the manufacturer	According to the manufacturer

(STAS 1963-73. Strength of Materials. Terminology and symbols) [11]

### Uses and dimensions

**Masonry AAC** is used to achieve load-bearing walls for buildings with reduced number of levels (Ground, Ground + 1 Floor), non-load-bearing exterior walls and partitions in tall buildings and civil engineering.

Insulation AAC is used in thermal and sound insulation of concrete panels and slabs used in blocks of flats terraces.

**A new trend** catches up, complementing and enhancing the quality of AAC. The most appreciated material by both manufacturers and customers is Ytong an almost perfect AAC. It provides great thermal comfort by eliminating thermal bridges, with zero dimensional deviations. It is natural (lime, sand) and finishing is easy, requiring a thin layer of adhesive. Ytong walls are almost perfect. It is the most expensive construction material, but the best in terms of quality. Dwellings can be made on frame metal structure, which greatly reduces the construction interval, but the projects are more difficult to design. Precast aerated AAC is a cheaper and time-saving building material.

The use of Ytong A+, AAC-type masonry, brings numerous benefits to those building themselves a house. We will present presented some data on both construction costs when using AAC Ytong A +, as compared to hollow ceramic elements, and on the subsequent requirements to heating the house.

**Saving on construction**

Considering the AAC Ytong A + price by cubic meter, it is more expensive than brick, but the material itself is not everything in building a house. In the case of Ytong A+, the cost of masonry elements is 280 lei per cubic metre, and for ceramic elements with vertical hollow spaces it is of 220 lei. However, for ceramic elements, the mortar consumption is more significant, as it fills the hollow spaces in the elements. In AAC, it is placed in a thin layer. "Using thin layer mortar reduces the thermal bridges to the minimum and the heat loss is significantly lower. When comparing Ytong A+ (35 cm) masonry to effective traditional brick (38 cm), one can see that, even if the initial purchase price per cubic meter is higher for Ytong A +, the final price per square meter of wall made of Ytong A + will be lower than the one the made with effective brick", or so they claim.

Also, one must not overlook the additional costs stemming from the building load (heavier walls cause higher costs in the composition of the resistance structure) or the construction time interval, which also involves additional costs. Furthermore, erecting a Ytong A+ square meter takes half the time. Finally, a Ytong A+ square meter 35 cm thick will cost 120-130 de lei, while the 38 cm brick one will be 150 lei.

**Lower heating costs**

In addition to this, the thermal characteristics of the AAC Ytong A+ are better than the ones of the ceramic elements. Ytong A+ walls do not require thermo-system and maintain a constant temperature, cushioning the variations outside. Such excellent insulation is obtained by means of air, the best thermal insulator there is. In Ytong A+ structure, the solid material is about 30%, and the rest up to 70% is air, retained in millions of closed pores.

Using thin layer mortar reduces the thermal

bridges to the minimum and the heat loss is significantly lower. Ytong A+ has the lowest thermal conductivity, 0.09 W/mK, while the best brick has 0.14 W/mK.

"The total cost of masonry is 4-5% of the global value of the house. So why not choose masonry materials with clear benefits: reduced construction time, thermal comfort, and lower building and maintenance costs?"

**Dimension types for AAC:**

Table 2. Dimension types for ACC [6]

Type	Width (wall thickness) b (cm)	Height h (cm)	Length L (cm)
Masonry block	15	30;35	62
	20	24;30;35	62
	24	20	62
	30	15;20	62
	35	15;20	62
Insulation block	7.5	40	62
	10	40	62
Maximum allowable tolerance	± 1mm	± 1mm	± 1mm

Building a brick or AAC house will cost 130-150 euros per square meter without painting, finishing of furnishing, and it can reach 500-550 euros per square meter when complete.

As well as this, the project of the house will cost 10-25 euros per square meter.

Depending on the speed of obtaining the construction permits, building a house with a surface of 150 square metres can be completed in 3-6 months.

**Brick**

It is used for making exterior load-bearing and non-load-bearing walls, as well as separating walls in buildings, both load-bearing and non-structural. Bricks are of several types: solid bricks; vertical hollow bricks; porous bricks for construction and thermal insulation; plywood for apparent masonry etc. Sizes of brick blocks vary according to the manufacturer. Examples of brick sizes (in mm): 40/290/238; 460/200/238; 120/290/238; 290/140/238; 290/240/138; 290/240/188; 300/240/238; 375/240/238; 375/140/188; 375/140/238; 240/115/138; 250/380/188; 290/240/188; 365/180/188; 365/180/138; 290/240/138; 290/240/138; 290/140/188;

365/115/188 [8].

**Domains for using construction materials – Brick/AAC**

The P100-2006 Seismic Design Code requirement is that the compressive strength should be of minimum 7.5 N/mm<sup>2</sup> in masonry elements for structural walls [13].

In order to be used for structure load-bearing masonry, a brick should have a compressive strength of minimum 7.5 N/mm<sup>2</sup>.

In the case of AAC, only the GBN 50 type is accepted for such use, which withstands compressions of 5 N/mm<sup>2</sup>. However, there are restrictions as to the maximum number of floors in which AAC can be used in construction.

Thus, depending on the seismic zone, the maximum levels allowed for brick or AAC is:

*A. for non-reinforced structural masonry (without pillars)*

Table 3. The maximum AAC allowed for brick in the seismic zones- for non-reinforced structural masonry (without pillars) [13]

	<b>AAC (GBN 50)</b>	<b>Brick</b>
0.08 g	ground floor	ground floor + 2 floors
0.12 g	NA	ground floor + 1 floor
0.16 g	NA	ground floor + 1 floor
0.20 g	NA	ground floor
0.24 g	NA	ground floor
0.28 g	NA	ground floor
0.32 g	NA	ground floor

[13] (Normative P100-2006)

*B. for reinforced structural masonry (confined – with pillars and belts)*

Table 4. The maximum AAC allowed for brick in the seismic zones- for reinforced structural masonry (confined – with pillars and belts) [13]

	<b>AAC (GBN 50)</b>	<b>Brick</b>
0.08 g	ground floor + 1 floor	ground floor + 4 floors
0.12 g	ground floor + 1 floor	ground floor + 4 floors
0.16 g	ground floor + 1 floor	ground floor + 3 floors
0.20 g	ground floor	ground floor + 3 floors
0.24 g	ground floor	ground floor + 2 floors
0.28 g	ground floor	ground floor + 1 floor
0.32 g	ground floor	ground floor + 1 floor

[13] (Normative P100-2006)

Normative P100-2006 further provides that, when using ceramic blocks with compressive strength greater than 10 N/mm<sup>2</sup>, and M10 mortar, the maximum number of floors can be supplemented with another one [13].

As seen from the above tables, brick has a great advantage in that more floors can be built. Also, in areas where unreinforced AAC masonry (GBN 50) is forbidden, brick can be used.

In high risk earthquake areas, reinforced structural masonry constructions (confined - with pillars and belts) are limited in the case of AAC to ground floor at most, while in the same case, using Brikston ceramic blocks, ground floor + 4 floors can be reached.

If the structural system of the building consists of masonry structural walls, AAC can only be used in buildings (ground floor + 1 floor) in areas with the seismic acceleration of the ground up to 0.16g, the sizing of structural elements and the respective wall areas being carried out by the structural engineer. In this case we recommend using brick, which has much higher mechanical strength as compared to AAC.

In the case of using a frame or mixed structure system, the exterior and interior walls do not play a structural role, so they do not bear loads, and the decision on the choice of construction material, brick or AAC may be taken by the beneficiary who pays the costs.

*What masonry is?*

Building is the process by which different blocks are placed one above and / or next to each other to form walls. For this process a binder is generally used, the most common of which being the mortar based on cement and lime.

Masonry is the oldest and most common method of building house walls. Over time, masonry has been used to raise pyramids, Roman aqueducts, bridges, and, even today, with all the diverse methods to achieve structural strength of buildings, it still remains a reliable method.

Masonry blocks.

These are elements that confer resistance to a brick wall. Among the materials used, there are: burnt or unburnt full bricks, hollow bricks

of various sizes and orientations, natural stone, concrete blockets, and adobe. Various attempts have consisted of masonry made with unusual items to say the least, such as empty bottles or tires.

*Technological rules for brickwork masonry:*

- Masonry is implemented in horizontal rows running all over the building;
- Masonry is started from corners or from an empty space such as a doorway or window;
- Interruptions in masonry take the shape of steps whose height must not exceed 1 m;
- Interruptions at lintels heads is prohibited;
- Mortar is not laid on the last row;
- The first and last brick rows are made of bricks laid crosswise;
- Before work, bricks get wet with water;
- Mortar composition is given in the project and its consistency must be determined by the standard cone.

The minimum thickness of load-bearing walls is 1 brick, and, for the exterior, thermal insulation dimensions must be complied with as well.

(One)-brick walls are 25 cm thick for solid bricks, 30 cm thick, respectively, for vertical hollows bricks, and the ones (1 ½) brick are 37.5 cm thick for solid bricks and 45 cm thick for vertical hollows bricks. In what regards thermal insulation, the 37.5 cm thick wall of solid brick is equivalent to the 30 cm thick wall for vertical hollows bricks. The (1/4)-brick walls are used for partitions which do not exceed 3.50 m in height or 5 m in length, and they are made of full bricks exclusively, set on edge and having alternating joints.

#### **The binder, the material connecting the bricks**

Nowadays the most common type is the one based on lime-cement and sand. In the past, the lime-sand mortar had been widely used, and only later cement was added to the composition, due to its better performance and durability. For homes built of adobe, the binder generally used is a paste obtained by mixing yellow earth with water, and, in some cases, lime is added as well.

In performing masonry, particular attention must be paid to wall verticality and flatness. Equally important is the correct placement of

the bricks, so that each row is offset from the previous by exactly half a brick, thus avoiding the situation where two joints overlap vertically.

With the advent of modern bricks (Porothersm type), the masonry made of solid bricks has been slowly abandoned, thus significantly easing the work and increasing the end product performance.

However, it is worth remembering the important role that this kind of material, the solid brick, has had. It is sheer art to design vaults, arches, lintels, etc. using this material. Without going into further details, it should be known that all these items were made combining masonry and carpentry; first, the wooden forms were, then bricks were laid, and, after the mortar hardened, the wooden shapes were removed.

The tools used in the masonry are the trowel, the leveler, the lead thread, the rubber mallet, the masonry hammer, the saw, and the angle grinder with a diamond disc.

After finishing the foundation and before beginning the masonry, a waterproof layer should be placed over the concrete foundation, generally using bitumenised felt board or various membranes. The reason is to prevent water from the foundation to climb the wall, which occurs due to a phenomenon called capillary action.

A wall is always built throughout its length. Specifically, if you have a 20 m straight wall, the building will be done over its entire length, avoiding sections because, although it is more convenient, it can result in a meandering wall. However, there are situations where this can not be prevented. In this case, the first bricks must be placed at the extremities of the wall, throughout its length. Once the first row is laid, the building of segments can continue.

#### **Types of structure systems in buildings**

##### ***The frame structure system***

This structure system is the most widely used and best known / controlled in terms of earthquake behavior. It consists of pillars, beams and reinforced concrete slabs, such elements being designed to take all the loads

that may occur throughout the life of a building.

This type of structure system enables enough flexibility in terms of configuring the interior space of the future house, allowing openings between pillars of about 6.7 meters, or even larger.

The masonry used for this type of structure system will thus play the simple role of closing or subdividing spaces, the loads occurring in service being taken by the concrete frames. When using this type of structure system, first the beams, the pillars and the concrete slabs are made, and then the exterior and interior walls are achieved.

#### ***The structure walls system***

It exists in two versions:

***(i)The structure system with reinforced concrete walls*** is made of reinforced concrete slabs, beams, and reinforced concrete structural walls. These elements take the vertical and lateral loads that may occur throughout the life of the building. In the case of using this type of structure system, as well as in the case of the frame system, both exterior closing walls and interior subdivision ones, made of masonry blocks after the structure is in place, serve as non-structural elements, so take none of the loads exerted on the building.

This system is used in tall buildings where earthquake loads and gravitational forces are very strong and cannot be taken effectively by reinforced concrete frames, or it is used in constructions that require high rigidity.

***(ii)The structure system with load-bearing masonry*** is used quite frequently nowadays. It is made of masonry walls with reinforced concrete seeds at the intersections of walls and additionally where needed, and perimeter belts on top of the spalet masonry. The reinforced concrete belts are poured together with the reinforced concrete slab over the previously made spalet (with pillars).

As about costs, the system is a bit cheaper than the one with reinforced concrete frames, but it has many drawbacks in terms of inside space arrangement. Thus, a home built on this type of structural system is like a box, and requires masonry spalet continuity on the next

floor, identical to those on the ground floor.

A further disadvantage is the surface of the empty spaces in the masonry walls which suffer limitations. A mixed system of reinforced concrete frames and masonry can be used to provide greater freedom in point of interior space configuration. Nevertheless, from structure perspective, this system is viewed as flawed.

A house project based on this solution (load-bearing masonry walls) will result in a space with smaller openings as compared to the solution of reinforced concrete frames, with limitations in the masonry walls gaps that will not allow future interior repartitioning without interventions on the existing structural system.

#### **The mixed system**

It comprises both the structural walls and the reinforced concrete frames. In the case of the mixed structural system of reinforced concrete frames and walls, the exterior and interior masonry walls serve a non-structural purpose. In the case of the mixed system with reinforced concrete frames and masonry walls, the exterior ones play a structural role, so they take vertical and horizontal loads.

#### **Types of walls and their role**

From the viewpoint of the loads they take, walls are divided into 2 categories: **structure walls** that take horizontal and vertical loads as well as bending moments and **non-structure walls** that take only the loads of their own weight and any loads perpendicular to their plane that may appear accidentally.

In the case of structure walls, we are interested in their bearing capacity, implicitly in the mechanical resistances of their constitutive material; depending on it all, the required areas will be sized. Brick is preferred to AAC in this case, as AAC has significantly lower compressive strength.

As for non-structure walls, their load-bearing capacity is irrelevant. Since they are erected after the structure system, they do not they take loads as the structure walls, so the choice between brick and AAC may be influenced by other criteria such as cost of materials, thermal losses (i.e. the thermal insulation that influences the cost of heating the building),

ease of construction and the time frame, sound insulation etc.

Depending on the space they separate, walls are divided into the following categories: *exterior* ones that separate the outside from the inside of the building, and *interior* walls that divide the inhabited space.

The role of external walls is to protect the inside from existing conditions outside the building (e.g. from moisture) as well as to insulate and soundproof the interior space, while the role of the internal walls is limited to sound insulation and space partitioning. Hence, for exterior walls, a material with high thermal resistance is preferable.

#### **Advantages and disadvantages of brick and AAC**

*The advantages of AAC buildings are countless.*

- The first major advantage is the fact that AAC is a natural product (the chemical composition is sand, water, cement (calcined limestone, horizontal technology), lime (calcined limestone, vertical technology).

- The second advantage is the fact that the use of 30 cm thick AAC (wide) does not require thermal insulation (saving at least 12 euro per square meter of insulation), due to the low rate of thermal loss.

- The third advantage is related to labor (fewer blocks to handle and lighter than traditional brick), which means ease of use, because the material can be sanded and cut to size easily with a circular or manual saw.

- Thermal insulation, fire proof properties and earthquake resistance are important characteristics of AAC systems.

- A further advantage of AAC is that it is a light building material with 500-700 kg/m<sup>3</sup> apparent density, which means lower loads on the structure system, which, in its turn, translates into lower reinforcement consumption for reinforcing the smaller concrete segments of the structure elements. Sections of reinforcement required for structural reinforcement are proportional to the loads that these elements should take. It is also well known that the seismic force acting on a building is commensurate to its mass, so the more lightweight construction, the better.

- AAC contains a large number of tiny air pores, resulting in a low density and preventing excess heat transfer which creates optimal comfort with minimum costs for both heating and cooling. It can be used both for external walls (recommended thickness of 30-35 cm) and for the interior.

- AAC blocks do not absorb water in depth and do not change their mechanical and thermal insulation properties in time. In addition to this, thermal conductivity is low in any direction of the masonry block.

- The fact that AAC is up to five times lighter than concrete leads to significant reductions in CO<sub>2</sub> emissions during transport.

- AAC is a non-combustible building material, forming a barrier against the spread of fire, which also provides very good sound insulation.

- The weight of AAC masonry is considerably lower as compared to concrete or brick masonry, which makes it better withstand earthquakes.

- The very convenient quality-price ratio makes AAC an effective solution among building materials.

The downside of AAC is that it has no bearing qualities, so it is not recommended for load-bearing walls in the building.

#### ***The advantages of brick***

If you decide to build a brick house, you should know that the recommended ceramic blocks are "porotherm" type. This type of ceramic blocks is provided with a vertical hollow spaces system, providing better thermal and sound insulation as compared to the solid blocks.

As "porotherm" type ceramic blocks do not provide sufficient structure rigidity as compared to the solid ceramic ones, it is necessary to confine the masonry with belts and concrete little poles so as to meet the standards of strength and stability under the current rules.

Among the advantages of brick we list:

- proficient thermal and acoustic insulation,
- structure stability,
- seismic protection, mechanical strength superior to other materials such as AAC,

which recommends brick for load-bearing walls,

- fire proof
- non-flammable products,
- long lifespan,
- 100% natural products.

**Among the disadvantages of this material we list:**

- greater weight than AAC, hence greater loads to the structure system, the need for larger concrete sections of structure elements and larger amounts of reinforcement to use,
- weaker insulation than AAC, so it needs additional thermal insulation, which means extra costs,
- can not turn on other dimensions because it has a place in mortar
- higher costs than AAC.

## CONCLUSIONS

We can say that it is difficult to make an assessment without knowing all the details of such large jobs. The site location also counts because materials have different prices from one city to another, from one area to another, in our country. The same thing happens with the labor for construction workers whether the house will be done on your own or with a specialized building company. It is interesting to note that a cubic meter of ceramic blocks and one of AAC, similar in size and of best quality, can be purchased at almost similar prices. The decision will be taken by the beneficiary, after considering all factors intrinsic to the problem, and the available financial resources.

In conclusion, it can be seen that most of the criteria by which we can get lower prices refer to the way the building is designed, the correlation of all elements it consists of, and judicious implementation coverage of this thinking in the elements that will assist in contracting the work.

This comprehensive approach is time consuming when balancing as many as possible of the factors listed above. It is basically each one's effort in determining the needs and desires of the family members, and then comparing them to the budget.

This is when the future owners of the house practically reconsider their way of life and lifestyles, the short and long term plans, and the affordable financial effort in realistic calculation. All this is reflected in the housing project.

The true cornerstone of a house cannot be found somewhere in the foundation, but in the cooperation with specialists qualified to carry out the project and, more than that, to guide us in our approach.

A house is a complex of factors that influence each other. Thus, an aspect dealt with superficially involves the burden of an additional cost elsewhere, if not necessarily in another execution phase, maybe in an operational phase or in capitalization.

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## NEW TRENDS OF ACHIEVEMENT OF ECOLOGICAL LIGHTWEIGHT WOODEN MATERIAL

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### Abstract

*The dominant trend both abroad and in our country is phasing out heavy concrete and replace them with alternative building materials that meet tenants health and the environment. Thus arose "green homes" made with organic materials, among which the most important is wood. One such alternative material consists of chipboard with cement or concrete. Material, in the form of plates or bricks, has a configuration of several layers, with the sides of the wood fibers bonded with cement, concrete and polystyrene core. The wood used to build green houses, as we know, is the oldest material used in construction, being used both as a structural element in exterior walls, interior walls, roofs, floors, woodwork items, or integral structure as well as the furniture and decorations. In general, the construction works carried out in our country use resinous wood (fir, spruce) or oak. This has extended to our country, the trend of completion of houses in natural materials, environmentally friendly and execution price that is lower.*

**Key words:** elasticity, ecological construction, joints, wood

### introduction

Woody materials ensures a high level of thermal and acoustic insulation, in addition, the wall breathe, allowing movement of vapor from inside to outside. Wood tiles are fireproof and very durable, lightweight and economical.

Installation is easy and fast, can be used for any walls, ceiling, dormers, facades, with very good mechanical strength and physical. It can render any kind of plaster. It provides a high speed execution and a healthy home. Costs are quite beneficial to other building material [3].

Other alternative materials may be mentioned in drywall systems which consist of a metallic structure made of horizontal and vertical profiles as support and plates composed of a layer of gypsum quarry rehydrated resistant and very sticky, embedded between two sheets of special carton closing down structure yielding perfectly smooth surfaces.

Support and wooden plates constitute a constructive internal partitioning, such as interior walls, wall cladding and ceiling [2].

This system can be used for various architectures. By modifying elements such as type and number of plates, thickness and size of the steel structure etc. can be obtained various technical and constructive solutions tailored ethnic project of a house.

Green houses are usually constructed from massive logs or profiled, showing interest for their natural appearance and for the short duration of execution and low cost materials.

### MATERIALS AND METHODS

In order to achieve an ecological house as expanded implementation of the houses tend lately, we need natural material, environmental, namely wood. The method of execution of these homes is the combination of logs or shaped elements, without the use of nails or metal ties, perfectly consistent with the concept of "home or ecological house". Wood breathes naturally and adjusts the internal climate of the house, stabilizes moisture and acts as a barrier against external noise.

Technology implementation of these houses is

that resistance wooden structure rises above a platform which in turn rests on a pedestal and foundation, which can be of stone and concrete plain or reinforced concrete or natural stone. Inside the house, the structure is partially apparent resistance, closing the ceiling between the beams and finishing interior walls are made of plywood plank beaded, plain or shaped, varnished with clear varnish. The floor can be made of or parquet floors.

Exterior closures can be achieved with boards made of wood. Finish ensures the paints and varnishes. Cladding may also be used with grooved boards or sections of wood logs. Thermal insulation may be used for mineral wool protected towards the inside by a layer of bitumen cardboard, the role of the water vapor barrier.

If these construction timber full light covers are recommended as shingle, and other lightweight materials.

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## RESULTS AND DISCUSSIONS

### The structure houses built of wood

The components, structural and nonstructural, which run at a wooden house:

#### Foundation:

*a. small houses without basement*, wood structure sits directly on a concrete platform (type slab) thickness of 25-30 cm with Bc 10 and mesh reinforcement  $\emptyset$  (6-10 / 100) mm. This platform has a layer of gravel to break water by capillary rise [8].

*b. houses with one or two levels* using continuous foundations laid in the walls of discharge gates on isolated supports (simple concrete block foundation) [4].

*c. houses with greater height regime placed on land issues* (loess soils, soils susceptible to wetting) using continuous foundations with reinforced concrete block and socket. They will permeate min. 20 cm in good soil foundation and frost depth will exceed 10-20 cm.

*d. house with basement* - the basement walls and the floor above the basement is made of reinforced concrete. The exterior walls will be insulated with polystyrene, brick, bitumen tar paper (2-3 lines) [3].

Construction is wood frame is an affordable way to build a house and maintain it while ensuring those who live in it, all the requirements of comfort . It also houses built in this system adapts to any architectural style, both traditional and the contemporary.

*e. house located in mountain areas* - foundation blocks can be made of stone or concrete masonry cicopian.

#### Base house:

Wood that will fix the base plate using a special mounting system - by cavity or using concrete iron whiskers  $\emptyset 6$  mm, caught in the foundation. It serves as the foundation wall mounting and contour tracing role of the house itself. It will sit on a role paperboard with waterproof layer [4].



Fig. 1. House built on wooden structure

### Walls

It can perform several types of walls, their composition being made to meet all the resistance of the structure of the house, thermal conditions, and furthermore, the terms of harmonization of the architecture [8].

Depending on the chosen construction system, can achieve a number of variants for walls such as:

**System with overlapping beams (with housed** - execution of a notch in a piece of wood, in order to join with another piece of wood):



Fig. 2. System with overlapping beams - the interior upright



Fig. 3. System with overlapping beams - without interior upright

**The wall panels** - they ensure taking vertical loads resulting from the weight of the floors and roof structure and the horizontal loads resulting from seismic wave action and wind action and transmit loads, foundation [5].

**a). - outer cladding** 22-48 mm

- membrane A330
- Upright (pole)
- mineral wool 100-150 mm
- PVC
- Interior paneling or RG 12.5mm de18mm

**b). - exterior cladding** 24-48 mm

- Ruler 20 x 40 mm
- OSB board 9-12 mm
- Upright (pole)
- PVC
- Ruler 20 x 40 mm
- RG 12.5mm or interior paneling de18 mm

**c). - Plaster** 20-40 mm

- plate Heraklith 10 to 20 mm
- membrane A330
- Upright (pole)
- mineral wool 100-150 mm
- PVC
- OSB board or plank 9-12mm 24-30mm
- RG 12.5mm or interior paneling de18 mm

**d). - Plaster** 20-40 mm

- Adhesive, primer, fiberglass mesh
- polystyrene
- plank 24 to 30 mm
- Upright (pole)
- mineral wool 100-150 mm
- PVC
- OSB board 9-12 mm
- RG 12.5mm or interior paneling de18 mm

**e). - Wainscoting - simple patch** (mod fastening boards on an outside wall, a roof, etc., so that each plank to plank previous cover a width of 2 cm [10]. - From Turkish Kaplama.) or false 22-42 mm

- Ruler 20 x 40 mm
- membrane A330
- OSB board 9-12 mm
- Upright (pole)
- Rockwool 100-150
- PVC
- RG 12.5mm or interior paneling de18 mm

**f). - Siding (Plastic cladding)**

- polystyrene 30-50 mm
- membrane A330

- boards 24-30 mm
- Upright (pole)
- mineral wool 100-150 mm
- PVC
- OSB board 9-12 mm
- RG 12.5mm or interior paneling de18 mm

**Attaching the panels** is done with M12 threaded metal rods and washers, each 3 pieces at each joint.

#### **The floor above the ground floor**

- OSB 18 mm or 2 rows of 24 mm board arranged in two directions
- wooden beams (50 x 200-240 mm) away from (350-600 mm), according to the calculation of resistance
- mineral wool 100-150 mm
- PVC
- RG 12.5 mm or 18 mm inner lining

The larger openings in the living room or attic space can be used glulam - laminated beams apparent.

#### **Floors**

- PVC
  - concrete screed 20-50 mm
  - Polyethylene film
  - Laminated parquet or parquet wood normal
- PVC
  - 20-50 mm concrete screed
  - sa
- PVC
  - Screed concrete 20-50 mm
  - mosaic

#### **Roof - Type framework**

##### *a. framework with rafters [10]*

- 50x rafters 150-200 mm 400-600 mm distance acc. Calculation of resistance
- Pliers 50 x 100-150 mm

##### *b. framework on chairs [10]*

- 50 x 150-200 mm rafters
- Kings (100-150) x (100-150) mm
- Fried (100-140) x (100-240) mm

##### *c. framework with farms [10]*

- Truss - size depending on the strength calculation.

**Envelopes** can be made of the following materials constructive:

- Bituminous shingles - Bardoline (Tegola)
- Corrugated - Bituwell
- Lindab board, Plannya, Ranilla
- Ceramic tiles

#### **Staircase**

- Made of softwood with railing in various forms; with handrail and steps headboard made from hardwood (oak or beech);
- Stairs can have different sizes and shapes according to plan and architecture depending on the willingness of the beneficiary;

#### **Woodwork**

- May be of wood, PVC, or aluminum;
- Windows can be made in a traditional classical system with double or laminated wood frames for glazing;
- Optional exterior shutters can be made solid or blind type;
- Interior doors can be made with Fly or glass, and the exterior will be double or simple with one or two openings.

#### **Heating pipes, electrical and plumbing**

- Mounted in walls or apparent;
- Types and materials to be used at the discretion of the client;

#### **Advantages of constructions made of wood:**

- Price low cost up to 30 -40% less than homes made of masonry or metal
- Reduced execution time - about 20-60 days
- Maximum diversity of interior and exterior decorating with art materials
- Repartitioning possibility cavity wall quick and inexpensively
- Elastic wood construction ensures strength an earthquake of up to 8 on the Richter scale
- Wooden structure is slight compared to the masonry or metal, requiring a simple and execute foundation
- Wood treating solution trivalent retardant, fungicidal and antiseptic protects against fire, decay and insects and fungi.

## **CONCLUSIONS**

Made for a very long time from local materials: earth, natural stone, burnt earth, wood and other plant products, "house" was well connected with the natural environment surrounding. House walls, which were made of heavy materials, massive, covering, which was also thick materials and a significant slope, preventing sharp and abrupt cooling interior air temperature in winter and summer excessive growth.

Architecture today has lost most of its traditional roots to achieve house.

Now architectural lines heading inland radically opposed to those of the past. They used new construction materials such as reinforced concrete, steel, glass, plastics, etc., and such walls and roofing are made from low thickness, light, porous, thermally efficient

Over time man was not worried that his health might be influenced by the house in which he lives. He considered the healthy house, the more so since it was done with more modern technology.

Today we are in the situation we face serious health problems that have arisen because of the latest technologies, which were designed to improve our lives.

Currently we have profiled entirely new synthesis of substances, most of which are derived from coal, oil and gas, synthetic materials that form a world foreign to most of us.

Today our house we do not offer the best living conditions. The more it is newer, the natural materials used in the past have been largely replaced by synthetic materials that can pollute the air, water, soil.

Our house is made of many materials based on synthetic resins which pollute the environment, air and water. She is tight, does not allow changes between indoor and outdoor air. In air it retains a lot of water vapor, which increase the likelihood of condensation and favor the growth of fungi, molds and bacteria and toxic vapors that can reach dangerous concentrations, causing diseases. Materials and energy are wasted. Pollute them, in turn, environmentally harmful effects in the long term.

In this context, when people began to ask questions, appear more pronounced and more frequent new technical concepts, new design solutions and "green homes", "smart homes", made of natural materials, the particularly wood.

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## REDEFINING GENDER ROLES WITHIN CONTEMPORARY RURAL FAMILY

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### **Abstract**

*The social construction of gender (male and female) is crucial in analyzing gender roles in rural family. Social interpretation of biological sex leads to identifying a set of gender related behaviors observable in both private and public life of an individual. The aim of this research is to identify the opinion of students at University of Agronomic Sciences and Veterinary Medicine, Bucharest, regarding gender perception, gender characteristics, and gender equality in both private and public life. The conclusion of this survey disclose the existence of a patriarchal traditional model; concerning gender equality, however, there are noticeable modern tendencies within the patriarchal traditional model.*

*Key words:* rural family, gender perception, redefining gender roles

### **introduction**

Family is the most ancient and stable form of community, and it provides support for its members during their lifetime.[10] In this context, the subject of gender is a topic of tremendous interest in our modern society[2]. Gender equality supports the idea that responsibilities, rights, and overall development of individuals should be subject not to the fact of being born man or female, but rather the focus will be towards reaching an individual's full potential regardless their gender. [4].

### **MATERIALS AND METHODS**

The purpose of this research is to identify the opinion of students at University of Agronomic Sciences and Veterinary Medicine, Bucharest, regarding gender perception, gender characteristics, and redefining gender in the sense of gender equality in both private and public life of an individual. The results of this quantitative research are representative for the above-mentioned student population. [3] The sample size for this study is of 375 students. Data was

gathered between June 1st and July 31st, 2014. The main research instrument was a standard written questionnaire, with pre coded questions and answers. [9]

### **RESULTS AND DISCUSSIONS**

The perception of gender translates into specific(male or female) gender roles, and involves a set of gender norms. Through socialization process, an individual becomes accustomed with family and society expectations regarding a set of appropriate (gender) behaviors [6].The gender equality concept involves the acceptance of gender differences and highlights the variety of roles played in contemporary society by both man and women.”[1]. Regarding gender perception, students had to evaluate a set of items describing gender-specific roles and not gender specific roles. [8].

Respondents consider that situation of men is better than women's in Romanian society (positive opinion 33.6%). Asked to evaluate the equality between women and men, respondents believe that both genders are in a winning situation as a result of gender equality (positive opinion 35.73%). Men, as

well as women, have to contribute to family income.

Table 1. Items describing gender roles

Do you agree with the following statements:	Strongly agree %	Agree %	Neither agree nor disagree %	Dis-agree %	Strongly Dis-agree %	NS/ NR
In Romanian society, situation of men is better than women's	5.33	28.27	37.87	23.20	4.27	1.07
Men are winning too, as a result of gender equality	6.93	28.80	35.47	21.60	5.60	1.60
Men, as well as women, have to contribute to family income	53.33	38.40	5.33	2.13	0.27	0.53
Man's responsibility is to earn an income, woman's is to take care of family members and household	5.07	15.20	22.40	36.00	21.33	0
It is not customary for a man to stay home and take care of children and for a woman to earn an income	18.40	23.47	22.93	22.13	11.47	1.60

Regarding traditional gender roles- "Man's responsibility is to earn an income, woman's is to take care of family members and household", students participating in the study have a negative opinion (57.33%). Moreover, respondents have a negative opinion(41.87%) towards redefining gender roles in the sense of assuming gender roles traditionally performed by the other gender. ("It is not customary for a man to stay home and take care of children and for a woman to earn an income").

Concerning professional discrimination, the study found that the female students believe they are discriminated against professionally at a greater extent than their male counterparts (6.22%).(Fig. 1).

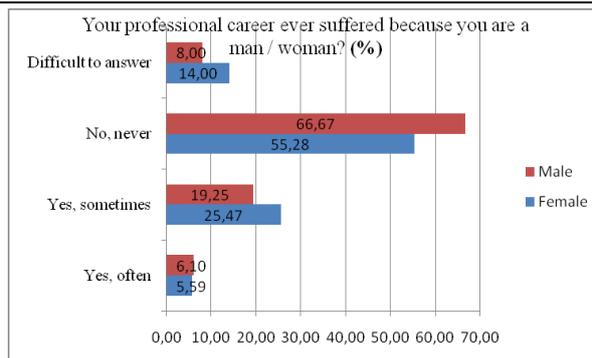


Fig.1. Respondents' perception concerning professional discrimination

Regarding gender characteristics, the students participating in the study consider that female students are as smart as their male counterparts (66.67%), but more sensitive and emotional (75.7%), more empathetic (66.9%), and less interested in affairs concerning the locality or the country(48.3%).(Table 2)

Table 2. Gender characteristics

Generally, in comparison with their male counterparts, do you think that females are: more, the same, or less	More %	The same %	Less %	Ns/ Nr
Smart	18.13	66.67	9.87	5.33
Empathetic	66.9	25.1	3.7	4.3
Interested in affairs concerning the locality or the country	10.9	34.9	48.3	5.9
Violent	6.9	21.3	64.3	7.5
Pragmatic	25.9	49.9	19.5	4.7
sensitive/emotional	75.7	15.5	3.5	5.3

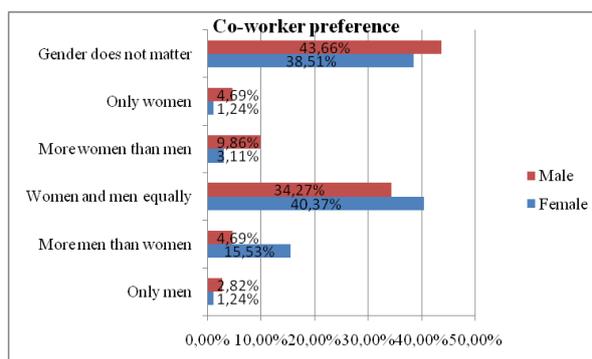


Fig. 2 Project structure colleagues preferences by gender

Concerning co-worker preference, the tendency to choose people to work with based on their gender, respondents believe that the gender is not the main criteria when choosing their team mates (82.17%) and that they

prefer to work with men and women, equally (74.64%).

A small percentage, 7.51% for male students and 4.35% for female students, would prefer to work only with people of the same gender. (Fig. 2).

Also, this study is to evaluate students's opinion regarding authority distribution within the family structure, using the following set of items:

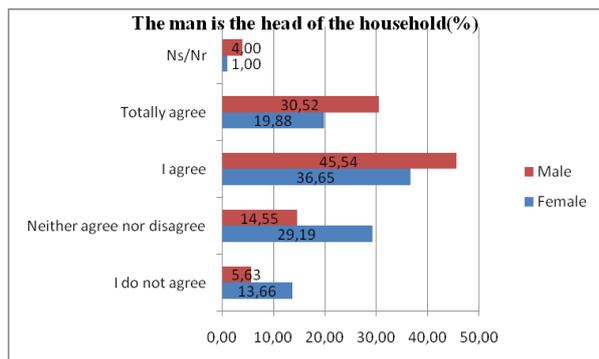


Fig. 3. Family authority structure

Both female students (56.52%), as well as their male counterparts (76.06%) agree that "The man is the head of the household", indicating the existence within the family structure of a patriarchal traditional model regarding authority distribution and decision making. The patriarchal traditional model prevails symbolically within Romanian society. (Fig. 3)

Female students consider at a lesser extent (44.10%) in comparison with their male counterparts (50.70%), that taking care of children is a female specific role. (Fig. 4)

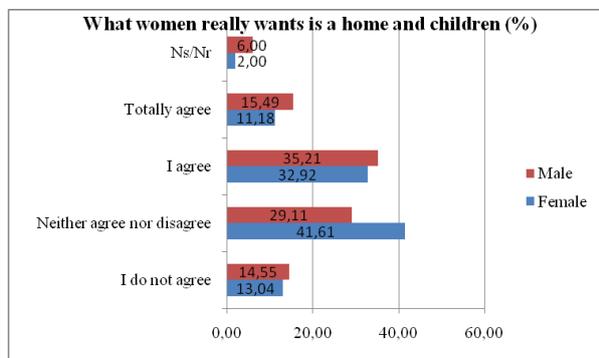


Fig. 4. Structure prescription by gender role

Upbringing and taking care of children is perceived as a traditional female role by

respondents residing in urban area (46.84%) as well as participants in the study residing in rural area (48.65%).

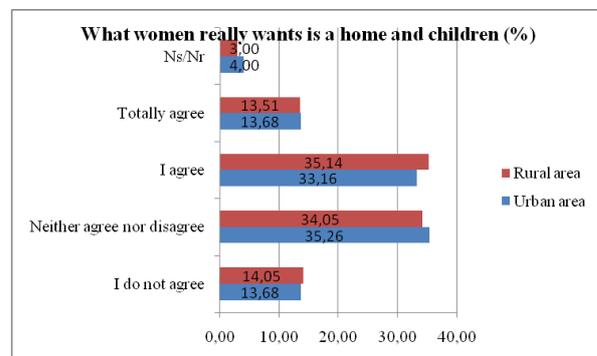


Fig. 5. Structure prescription by residency

The first step in redefining gender roles is defining parental couple model, and after that, through secondary socialization "people become male or female polarized personalities", people express themselves socially through their specific gender roles. Thereafter, people are looking for their significant other, inspired by male-female archetype structure, and attempting to achieve complementarity and personal development. [7]

## CONCLUSIONS

Respondents consider that situation of men is better than women's in Romanian society although the participants to the study also believe that both genders are in a winning situation as a result of gender equality. Men, as well as women, have to contribute to family income. Moreover, respondents have a negative opinion towards redefining gender roles in the sense of assuming gender roles traditionally performed by the other gender. Female students believe they are discriminated against professionally at a greater extend than their male counterparts. Regarding gender characteristics, the students participating in the study consider that female students are as smart as their male counterparts, but more sensitive and emotional, more empathetic, and less interested in affairs concerning the locality or the country .

Regarding family structure, there is a patriarchal traditional model; concerning gender equality, however, there are noticeable modern tendencies within the patriarchal traditional model. [5]

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## VIEWS ON SUCCESS IN LIFE BASED ON GENDER

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### **Abstract**

*In order to study the characteristics of success in life we must consider the social construction of genders (male and female) manifested in the interaction between the sexes. Social interpretation of biological sex leads to the identification of a set of behaviors particular to each sex, both in society and subsequently in private life as well as in the public eye. The research aims to identify the opinions and beliefs on the matter of students from the Veterinary Medicine University of Bucharest, their views on success in life, in the work place, in their study environment and in society as a whole, the characteristics of each gender, equality between women and men. The research findings reveal a specific social pattern determined by gender and residential environment .*

**Key words:** rural family, reconstructing gender roles, socializing

### **INTRODUCTION**

Through secondary socialization the individual appropriates an own set of rules and regulations that ensures social development and cohesive insertion into society. [1] Along with the influence of family and the social environment (*habitus*) it is clearly highly important for representatives of both genders (male / female) to ensure a success model in their learning environment and in society. [5]

*Habitus* allows the individual to insert himself within the social world and to interpret it in a way which is on one hand his own, and on the other hand common among the members of the group he belongs to. [2] The primary socialization (childhood) and secondary (teen years) are a joint cumulation aquired through the years, leading to the formation of social capital and a " lifestyle " similar to those of the same social environment, thus possibly leading to the formation of a *class habitus* [3]

### **MATERIALS AND METHODS**

The research aims to present the views of students from the University of Agronomic

Sciences and Veterinary Medicine, Bucharest, on success characteristics in the learning environment and in society from a gender perspective. Results are obtained from a quantitative research representative of the population studied[4]. The sample is 375 students. The data collection timeframe was from the 1st of June until the 31st of July, 2014. Chosen research tool: written questionnaire, standardized pre-coded questions and answers. [9]

### **RESULTS AND DISCUSSIONS**

In order to comprehensively represent the perception of respondents about the most important features for a man / woman to succeed in their place of learning and society in general, we offered for evaluation the following terms and factors : good education, higher education, talent, a beautiful appearance, the desire to stand out among the crowd, good relations with others, working hard, having money and owning property, being lucky. [7]

Respondents' answers showed that for a man a good education (83.7 %), higher education

( 53.4 % ), sustained effort and work ( 39.47 %) and having good luck ( 39.20 % ) and good relations with others (36.27 %) are guarantees in achieving success at their place of learning and in society.(Table 1)

Table 1. Items of success for man

How important do you consider, in your own opinion, the following aspects so that a man to be successful in their learning environment as well as in society?	Male(%)				
	Very import.	Import.	Unimport	Totally unimport	DK/DA
good education	83,7	14,7	0,8	0,3	0,5
higher education	53,4	39,7	5	1,1	0,8
talent	29,06	50,4	16,8	2,4	1,34
beautiful appearance	20,27	46,13	27,47	4,80	1,33
desire to stand out	31,47	45,87	16,80	4,00	1,87
good relations with others	36,27	46,93	12,80	1,60	2,4
intense work	39,47	45,07	10,67	3,20	1,6
having money and property	24,80	30,13	32,80	10,40	1,87
being lucky	39,20	30,40	20,53	8,00	1,87

Table 2. Items of success for woman

How important do you consider, in your own opinion, the following aspects so that a woman to be successful in their learning environment as well as in society?	Female(%)				
	Very import.	Import.	Unimport	Totally unimport	DK/DA
good education	83,73	12,00	1,60	1,07	1,6
higher education	42,93	50,40	3,20	1,33	2,13
talent	27,73	53,07	14,40	1,60	3,2
beautiful appearance	34,67	44,27	16,53	2,67	1,87
desire to stand out	38,13	44,80	10,67	3,73	2,67
good relations with others	31,73	49,33	14,13	1,87	2,93
intense work	37,60	45,07	10,67	4,00	2,67
having money and property	24,00	34,67	30,93	6,93	3,47
being lucky	34,40	35,73	20,80	5,07	4

Women found that in reaching success at their place of learning and in society the main factors are: a good education ( 83.73 % ), higher education (42.93 %), the desire to stand out ( 38.13 % ), intense work (37. 60% ) and a beautiful appearance (34.67 %).(Table 2.)

As it appears in the data above, the successful model for a man to succeed in their place of learning and among his peers in society differs from that of a woman, even though the first two choices remain the same (good education and higher education), although higher education is perceived as less important by 10.47 percent from the girls' point of view. Talent and having money and estate values are characteristics viewed as less important by both female and male students.

Next for male students follow the expectation of working hard, catching a break (being lucky) and maintaining good relations with others. For female students aspects such as the desire to stand out, intense work and a pleasant exterior are highly valued. Notice the difference in the showcased successful models, rooted in traditional gender characteristics: to succeed, the male students need to work hard, be lucky and mingle, establish bonds, while female students must stand out, work hard and have a pleasant appearance . [8]

The same factors above we also analyzed from gender and residency perspectives. [6]

Regarding **good education** and **higher education** no significant differences appear in terms of gender perception of the respondents. However good education and higher education are slightly more important for female students than for male students ( + 0.2% ).

**Talent** is a feature judged as less important, however girls seem to need it more both in views of male students ( + 0.2 % ) and similarly by the female students ( + 0.1% ).

A **beautiful physical appearance** is a term rated as more important for girls than for boys as seen in the perception of male students ( + 0.13 % ) and female students ( + 0.12 %). We note the presence of a gender stereotype according to which for a woman to succeed in society and within her learning environment, a beautiful appearance is necessary.

The **desire to stand out** and emphasize their qualities is cited as a characteristic most important for girls both from female students (0.07 % ) and male students (+ 0.05 % ) points of view. Another gender stereotype is propagated according to which a girl must show off in order to succeed in the place of learning and in society.

**Good relations** are more important for boys both from female students perspective ( +0.04 % ) as well as in the eyes of male students (+0.01 % ). Female students value a good relations atmosphere and behavior as more important for the male success model.

**Intense work** is seen as more important for boys equally by both genders of the student

body questioned ( 0.02 % ).

**Having money and owning property** is more important for girls from the male students view point (+0.07 % ).

**Being lucky** is more important for boys in the perception of female students (+ 0.04 %) and more important for girls in perception of male students ( 0.03 %). Attribution for success for the opposite gender is thus made considering terms such as luck, chance, opportunity and circumstance rather than personal qualities, in order to succeed in society and life per se.

We will continue our analysis of the items portrayed beforehand in terms of residency (location ).

**Good education** is cited as the most important feature, both by respondents in urban areas, as well as those in rural areas. But a good education is more important for boys than for girls, both for residents of urban areas ( 0.02 % ), as well as for those in rural areas ( 0.03 %).

**Higher education** is deemed important for both sexes , regardless of the residency of each respondent.

**Talent** is appreciated especially in girls, almost equally significant in the views of urban respondents ( 0.02 % ), as well as in those of respondents from rural communities (0.01 %).

A **beautiful physical and aesthetic appearance** is an important feature for girls, perception more common in rural than in urban areas ( +0.05 %). The stereotype of a pleasant look as a way for girls to succeed whether in their place of learning and in society is more frequent in residents with a rural background as a specific manifestation of traditionalism.

The **desire to stand out** is a trait appreciated higher in urban rather than in rural areas for both sexes ( 0.02 %).

**Good relations** are perceived as necessary especially for boys, more in the rural than in the urban environments ( 0.01 %). The formal and informal structure of relationships between family, kin, friends and so on, is valued especially in rural areas.

**Working hard** in order to reach success where they learn and in society is more

important for boys in rural areas than those in the urban ones ( 0.01 %).

**Having money and property** is a more important aspect in urban areas, especially for boys ( 0.07 % ) but also for girls ( 0.01 %).

Being lucky is especially important for boys in the urban areas and girls the rural ones (0.05 %).

## CONCLUSIONS

Respondents' answers showed that for a man a good education, higher education, sustained effort and work) and having good luck and good relations with others are guarantees in achieving success at their place of learning and in society.

Women found that in reaching success at their place of learning and in society the main factors are: a good education, higher education, the desire to stand out, intense work and a beautiful appearance.

The successful model for a man to succeed in their place of learning and among his peers in society differs from that of a woman, even though the first two choices remain the same (good education and higher education). Talent and having money and estate values are characteristics viewed as less important by both female and male students.

Next for male students follow the expectation of working hard, catching a break (being lucky) and maintaining good relations with others. For female students aspects such as the desire to stand out, intense work and a pleasant exterior are highly valued. Notice the difference in the showcased successful models, rooted in traditional gender characteristics: to succeed, the male students need to work hard, be lucky and mingle, establish bonds, while female students must stand out, work hard and have a pleasant appearance.

In conclusion, depending on gender and residency we have different strategies and guidelines in order to be successful in the place of learning and in society :

- For rural boys good relations and working hard are important;
- For boys in urban areas the important factors

are having money and property as well being lucky;

- For girls in rural areas it is important to have good luck and a nice appearance;

- For girls in urban areas talent and the desire to stand out are more significant.

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## THE IMPORTANCE OF LOCAL INSTITUTIONS IN THE SUPPORT OF INVESTMENT ACTIVITY OF FARMS (THE CASE OF POLAND)

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### **Abstract**

*The institutional environment is an essential component of agriculture, an important determinant of performance and the transformation of the sector. Lack of certain institutions, or their weakness is a serious barrier to structural transformation and the modernization of agriculture. A special role in these transformations perform local institutions, which by direct contact with the farmer can effectively interact with the processes taking place in farms. Especially in investing activities associated with significant risk, institutional support is extremely helpful for farmers. The aim of the study is to identify the role of local institutions in the process of investing activities supporting farms in Poland. It was found that the most intense are the relations of farmers with local institutions conducive to the absorption of EU funds. A dominant role in Poland, in this respect, is carried out by public agricultural advisory.*

**Key words:** farms, local institutions, investments

### **INTRODUCTION**

The process of transformation of agriculture started in 1989 highlighted a number of weaknesses in Poland, which are mainly due to faulty structure of agricultural, socio-professional and technological backwardness compared to Western European countries. The introduction of market principles to the Polish economic system has developed in farmers a need to adapt to the new reality in order to cope with international competition. Another challenge for Polish agriculture was the accession to the European Union and the ensuing need to adapt agricultural production to EU standards. Structural changes since 1989 in the sector of private farms in Poland are considered beneficial but slow [11, 13]. There is a permanent process of concentration, increasing the scale of production and technical progress is being implemented.

An important role in the process of structural change in agriculture is played by investments which determine the strength or weakness of the economy, and in terms of microeconomy they constitute the competitive position of a single economic entity. Due to the nature of

agricultural production resulting from its biological nature, diverse market environment, different levels of knowledge and skills, as well as the mentality of farmers, investment activity in agriculture is associated with a high level of risk. For this reason, there are various policy instruments aimed at reducing risk and facilitating and accelerating the process of modernization of agriculture. An important role in supporting the investment activities is served by institutions, especially local institutions - organizations within the meaning of the new institutional economics - working in the immediate vicinity of agriculture, in direct contact with farmers. These organizations allow you to accelerate the process of transformation and development of agriculture, improving access to information and financial resources for the development, implementation of technical progress, engaging in effective market activity, etc.

The aim of the study is to identify the role of local institutions in the process of investing activities supporting farms in Poland.

### **Definitional issues**

In the literature dealing with the subject there are various definitions of institutions. There is

a considerable literature dealing with the question of how best to define institutions [4]. In institutional economics, there are two main trends - the old and the new institutional economics. The main representatives of the mainstream of the old school (Original/Old Institutional Economics) are T. Veblen, J. Commons, W. Mitchell, G. Myrdal, JK Galbraith. For the new trend (New Institutional Economics) we include inter alia R. Coase, D. North, J. K. Galbraith, C.E. Ayres, O. Williamson, and E. Ostrom. T. Veblen defined the institutions as a well-worn customary ways of regulating life processes of society in regard to the material environment in which society lives [16]. In turn, according to D. North's [9] institutions are the „rules of the game in a society or, more formally, [...] the humanly devised constraints shape human interaction”. In the definition of D. North's [9] institutions include both formal rules (law, constitution) and informal constraints such as conventions and standards, which are part of the heritage called „culture”. In this definition institutions are seen as permanent rules governing human interaction, and are invented by humans [6].

Within the framework of institutional economics there is no agreement as to identify the organization of institutions. D. North makes a clear distinction between them, while O. Williamson, and J. Stiglitz treat organizations as a form of institution [16]. Institutions are the rules of the game – both formal rules, informal norms and their enforcement characteristics. Together they define the way the game is played. Organizations are the players. Economic organizations are firms, trade unions, cooperatives, etc.; political organizations are political parties, legislatures, regulatory bodies; educational organizations are universities, schools, vocational training centers. [10].

In this article it is assumed that local institutions are formal and informal subjects, directly affecting the functioning of the farms, which are part of the institutional system of agriculture. Local institutions are located in the immediate vicinity of farms, but that does

not mean their spatial proximity (although this is not excluded). The spatial proximity is believed to exist due to the local nature of the institution and is being more determined by the freedom in choosing courses of action, than by spatial proximity. For this reason, local institutions include a wide spectrum, from which farmers maintain direct contact [2]. Hence, in principle, the only criterion that allowed the institution to qualify to a group of local institutions was the criterion of direct farmer - institution relationship.

## MATERIALS AND METHODS

The study was conducted on farms in the Subcarpathian Province. Choosing the Subcarpathian voivodship for research was dictated by the desire to approach the test problems in the region that is characterized by agriculture with serious structural weakness<sup>1</sup>. It was assumed that the examined farms will meet the following criteria:

- in the years 2004 - 2008 they have made the modernization of workshop production through investments in tangible fixed assets,
- in investing activities they benefited from financial support under the Sectoral Operational Programme (SOP 2004-2006) „*Restructuring and Modernization of the Food Sector and Rural Development 2004-2006*” Measure 1.1 *Investment in agricultural holdings*,
- phase of the life of the investment lasts at least four years (phase investment operation started at the latest in 2008).

The selected region's population of farms that benefited from subsidies in investing activities amounted to 482. The study randomly selected 129 farms. In the selected households, a questionnaire was conducted in 2012 concerning the organization of farms, the results of economic evaluation of the investments, as well as relationships with

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<sup>1</sup> For example in the Subcarpathian region the average size of a farm with an area of agricultural land exceeding 1 hectare is 4.3 hectares (9.5 ha in Poland); people employed in agriculture per 100 ha of agricultural land 41.9 (in Poland 15.6).

local farmers and farming environment institutions. The period of analysis covered the years 2004 to 2011.

For the purposes of the analysis, examined farms were divided into three groups, depending on the sum of incurred for the years from 2004 to 2011 capital expenditures based on the number of employment of human labour in fully fit units<sup>2</sup> in a farm. The choice of this ratio resulted from the fact that among the economic factors influencing the processes of modernization of agriculture, a particular importance have factors such as production and their mutual relationships. Due to the rapid growth of labor costs compared to other factors of production [12, 13], it becomes essential to implement labor-saving technology resulting in an increase in capital-labor relations. For this reason, the studied population has been ordered according to the increasing value of the index. Moreover, it seems that a higher level of realized investments, due to the higher risk, require more intensive contacts with local institutions in order to reduce the risk of making a wrong investment decision. Then a quantile  $C_{25}$  quantile was determined (value of investment per unit of employment of human labour in fully fit = 60 900.0 PLN/employment) and the quantile of the order of  $C_{75}$  (the value of investment per unit of employment of human labour in fully fit = 284 608.7 PLN/employment), thanks to this the following groups of farms were isolated: I group covering 25% of population with the lowest level of investment expenditures per

employment, the second group includes 50% of population has to range from 25% to 75% of the value of investment per employment, the third group includes 25% of the population of the highest level of investment expenditure per employment.

## RESULTS AND DISCUSSIONS

### Characteristics of the studied farms

Changes that have occurred in the surveyed farms as a result of the investments are presented in Table 1. As a result of investment actions taken the production potential of the surveyed farms significantly increased, and improved relations work/land as well as fixed assets/work. The greatest changes have occurred in farms in Group III, that is in farms, which in 2004 were characterized by greater production potential and made investments with the highest value. This points to the fact that the stronger farms grow stronger, faster and more efficiently reach for aid from the European Union. This trend tends to increase diversity within farms and causes the process of concentration of agricultural production in stronger units. From the point of view of efficiency of production this process is considered favorable, provided that we take into account the need to preserve the principles of sustainable agriculture [3, 7, 8, 15]. The level of capital expenditures made in the surveyed farms is presented in Table 2.

### The role of local institutions in the implementation of investments in agriculture

In the process of structural changes occurring in agriculture, institutions play an important role. The importance of institutions in agribusiness is a result of: 1) the biological nature of agricultural production; 2) the need to ensure food security; 3) market failures in agriculture (see [14]); 4) the relationship between agriculture and rural areas. The development of agriculture because of its specificity and listed circumstances require an active role of different institutions. In light of the above, one may extract the following features of an institution: 1) to provide high-quality and healthy food; 2) ensure

<sup>2</sup> to convert all the people working on a farm, a unit of employment of human labour in fully fit was used, meaning one woman aged 18-60 years old and one male aged 18-65 years old. The calculations for the other age groups, the following conversion factors were used: young people aged 15-17 ratio 0.5; women over 60 and men over 65 ratio 0.4. This indicator takes into account both, unpaid and paid labor input. The inclusion of unit of employment of human labour in fully fit in the study and not the total labor input Expressed in AWU (annual work unit = full-time equivalent person) let us draw attention to labor resources and not taking into account the amount of work time. This approach is due to the fact that in parts of the surveyed farms labor resources are not fully utilized.

appropriate conditions for competition between subjects in agriculture and food market; 3) actions to protect the natural environment, genetic; 4) reduce the negative impact of agriculture on the environment and the welfare of animals; 5) actions for the

multifunctional development of rural areas; 6) actions for structural changes in agriculture; 7) contribution to the implementation of technical progress in agriculture and improvement of the quality of human capital.

Table 1. Characteristics of the analyzed farms

Parameter	Total		Group of farms					
			I		II		III	
Year	2004	2011	2004	2011	2004	2011	2004	2011
Agricultural lands [ha]								
- $\bar{x}$	36.6	52.7	18.0	23.8	36.8	43.0	60.9	101.4
- coefficient of variation (V)[%]	114.4	91.4	62.1	81.3	102.0	67.6	110.5	62.0
- min.	2.8	5.4	2.8	5.4	2.9	8.1	12.4	25.0
- max.	248.4	247.4	41.95	74.1	187.1	120.7	248.4	247.4
Numbers of the workers per100 ha AL								
- $\bar{x}$	12.42	9.40	18.3	15.6	12.1	9.5	7.2	3.1
- coefficient of variation (V)[%]	84.1	91.0	67.8	66.1	83.2	77.9	71.5	61.1
- min.	1.12	0.84	6.84	3.18	2.0	1.9	1.1	0.8
- max.	50.14	38.0	42.6	37.8	50.1	31.4	20.0	8.0
The value of fixed assets per workers[thous. PLN/worker]*								
- $\bar{x}$	144.3	306.5	117.9	149.1	134.4	257.3	190.9	563.8
- coefficient of variation (V)[%]	75.2	70.8	57.3	44.6	81.3	36.9	66.7	47.7
- min.	12.0	63.2	36.5	63.2	24.6	113.6	12.0	279.2
- max.	878.0	1348.4	295.5	303.2	878.0	587.4	517.8	1348.8

\*take into account the value of buildings, machinery and technical equipment, transport

Source: own study

Institutional system includes three essential groups of issues: 1) the standards and principles; 2) organizations; 3) mechanisms (e.g. market, legal). Previous studies indicate that the institutions at the local level are [2]: 1) the local government; 2) the institutions of primary markets, such as. financial, insurance, labor, etc.; 3) organization of economic

government and professional government (e.g. chamber of agriculture); 4) professional organizations of agricultural producers (farmers associations, marketing groups); 5) advisory organizations; 6) organizations and private institutions supporting the changes in rural areas and in agriculture.

Table 2. The level of realized investments in examined farms in the years 2004 - 2011

Parameter	Total	Group of farms		
		I	II	III
Investment outlays[PLN]				
- $\bar{x}$	515 847	101 249	413 695	1 137 942
- coefficient of variation (V)[%]	96.6	44.3	60.9	47.7
- min.	23 400	23 400	106 200	585 866
- max.	2 850 400	238 000	1 081 513	2 850 400
Investment outlays per worker [PLN/worker]				
- $\bar{x}$	211 143	42 070	152 019	500 312
- coefficient of variation (V)[%]	96.29	29.39	40.64	39.72
- min.	21 000	21 000	60 900	292 933
- max.	1 108 000	60 333	284 608	1 108 000

Source: own study

When analyzing the intensity of the relationship of farmers with local institutions in the realization of investment processes, it can be seen that the greatest significance of

the assessed institutions belonged to the Agricultural Advisory Center (AAC) and the Agency for Restructuring and Modernization of Agricultural (ARMA) (Tables 3,4,5,6).

Table 3. Structure of all the farms by the intensity of the relationship with institutions [percentage of farms]

1. Institution	2. TOTAL					
	No relationship	Permanent relationships	Once a quarter	Once per half year	Once per year	Less than once per year
Agency for Restructuring and Modernisation of Agriculture	-	26.4	33.3	21.7	17.8	0.8
Agricultural Advisory Centre	-	83.7	10.8	3.9	-	1.6
Agricultural Chamber	35.7	5.4	3.1	10.9	5.4	39.5
Bank	17.1	46.4	26.4	4.7	3.1	2.3
Agricultural Market Agency	28.7	0.8	2.3	4.7	38.7	24.8
Agricultural Property Agency	39.5	-	3.1	10.1	10.9	36.4
Agricultural trade union	85.3	0.8	-	-	2.3	11.6
Agricultural exchange	73.6	1.6	2.3	5.4	1.6	15.5
Self - government of the Commune	8.5	35.7	42.6	12.4	0.8	-
Self - government of the county	27.8	3.9	14.0	10.1	17.1	27.1
Marshal's Office	76.0	-	1.6	3.1	0.8	18.5
Foundations	96.1	0.8	-	-	-	3.1
Association	93.8	2.3	-	0.8	-	3.1
Trade organisations	92.3	5.4	-	-	2.3	-
Research and development centers	98.4	-	1.6	-	-	-
Agricultural university	95.3	-	0.8	-	3.9	-

Source: own study

The intensity of these relationships was high in all analyzed groups of farms. However, in the case of ARMA were most intense in agricultural groups II and III. In households from group I, due to the lower level of capital investments made, these compounds were less intense, usually once a year. The importance of these two institutions stems from the fact that these are organizations that mediate the participation by farmers the EU funds. Agricultural Advisory Centers support farmers with appropriate knowledge and skills to use, inter alia, financial assistance from the European Union. Moreover they provide services in the field of economic consulting, marketing, finance, technology, but also provide training and provide information necessary in the conduction of farms. Services

provided by the Agricultural Advisory Centers are free or partially paid what also increases their attractiveness. In turn, the importance of ARMA derives from the fact that it plays the role of the Paying Agency for EU programs implemented under the Common Agricultural Policy (CAP). And because of the use, by the surveyed farms, of the financial assistance of the European Union investing activities, these relations have to be intense.

Table 7 shows the analysis of the structure of farms benefiting in investing activities from various forms of assistance from local institutions. In the case of obtaining funding from the European Union, farmers mainly used the aid of agricultural advisors (91.5% of farmers) and ARMA (41.1% of farmers).

Table 4. Structure of the farms from the 1st Group by the intensity of the relationship with institutions [percentage of farms]

Institution	I-st Group of Farms					
	<i>No relationship</i>	<i>Permanent relationships</i>	<i>Once a quarter</i>	<i>Once per half year</i>	<i>Once per year</i>	<i>Less than once per year</i>
<i>Agency for Restructuring and Modernisation of Agriculture</i>	-	6.2	25.0	40.6	28.1	-
<i>Agricultural Advisory Centre</i>	-	81.2	6.2	12.5	-	-
<i>Agricultural Chamber</i>	43.7	-	-	3.1	53.1	-
<i>Bank</i>	28.1	37.5	15.6	6.2	3.1	9.4
<i>Agricultural Market Agency</i>	12.5	-	-	-	68.7	18.7
<i>Agricultural Property Agency</i>	43.7	-	-	6.2	6.2	43.7
<i>Agricultural trade union</i>	78.1	3.1	-	-	-	18.7
<i>Agricultural exchange</i>	53.1	-	-	12.5	-	34.4
<i>Self - government of the commune</i>	12.5	31.2	46.87	9.4	-	-
<i>Self - government of the county</i>	31.2	-	3.12	15.6	28.1	21.9
<i>Marshal's Office</i>	75.0	-	-	-	-	25.0
<i>Foundations</i>	93.7	-	-	-	-	6.2
<i>Association</i>	93.7	-	-	-	-	6.2
<i>Trade organisations</i>	90.6	-	-	-	9.4	-
<i>Research and development centers</i>	100.0	-	-	-	-	-
<i>Agricultural university</i>	100.0	-	-	-	-	-

Source: own study

And in the third group of farms some importance had the private advising and banks. These data indicate that in Poland the farmers bestow public agricultural advisory great confidence. It results from the fact that the Agricultural Advisory Centers (AAC) in Poland relatively quickly adapted their advisory offer to the needs and expectations of customers in connection with the Polish accession to the European Union [5]. What is more, AAC had great importance in preparing business plans and loan applications implemented in the surveyed farms investments. Noteworthy is the help of banks in preparing loan applications. Banks also occupied an important place in the close institutional environment, of which 82.9% of farmers (Table 3, 4, 5, 6) maintained relationships with varying degrees of intensity. At the same time the intensity of the relationship of farmers with banks increased

with the increase in the level of investments made. Also, banks' involvement in assisting in the preparation of loan applications was greatest in the group of households with the greatest investment. It may indicate that credit constraints affect mostly smaller farms [1]. Less interest of commercial banks in financing investment in smaller farms may result from a greater level of risk associated with financing investments in small farms and large transaction costs incurred by the bank in relation to the value of the loan.

A significant role in the modernization of agriculture is played by the institutions responsible for the penetration and adaptation of technical progress. The studies show that in this case, also an important role play AAC. Besides the role of AAC in the case of adaptation to technical progress, the role of companies supplying means of production can be noted, but mainly in larger farms (Table 7).

The institution with which farmers maintained closer ties was also the municipal government (Table 3, 4, 5, 6).

Table 5. Structure of the farms from the II-nd Group by the intensity of the relationship with institutions [percentage of farms]

Institution	II-nd Group of Farms					
	<i>No relationship</i>	<i>Permanent relationships</i>	<i>Once a quarter</i>	<i>Once per half year</i>	<i>Once per year</i>	<i>Less than once per year</i>
<i>Agency for Restructuring and Modernisation of Agriculture</i>	-	29.2	35.4	18.5	15.4	1.5
<i>Agricultural Advisory Centre</i>	-	86.2	10.8	1.5	1.5	
<i>Agricultural Chamber</i>	35.4	1.5	4.6	15.4	6.2	36.9
<i>Bank</i>	18.5	43.1	30.8	3.1	4.6	-
<i>Agricultural Market Agency</i>	35.4	-	1.5	4.6	32.3	26.2
<i>Agricultural Property Agency</i>	46.2	-	-	4.6	10.8	38.5
<i>Agricultural trade union</i>	95.4	-	-	-	3.1	1.5
<i>Agricultural exchange</i>	83.1	-	4.6	3.1	3.1	6.2
<i>Self - government of the commune</i>	10.8	36.9	35.4	15.4	1.5	-
<i>Self - government of the county</i>	30.8	4.6	10.8	7.7	16.9	29.2
<i>Marshal's Office</i>	73.9	-	3.1	-	-	23.1
<i>Foundations</i>	100.0	-	-	-	-	-
<i>Association</i>	93.9	4.6	-	1.5	-	-
<i>Trade organisations</i>	96.9	3.1	-	-	-	-
<i>Research and development centers</i>	96.9	-	3.1	-	-	-
<i>Agricultural university</i>	96.9	-	-	-	3.1	-

Source: own study

Probably due to the fact that these relationships concerned basic administrative matters, but also the office of the municipality could be a source of knowledge about the EU funds. Moreover, a part of the investment, especially construction investments required obtaining proper documentation from the municipal office.

An interesting measure of activity in establishing relationships with institutional environment may be „non-compulsory” contacts that have no direct relation to the financial benefits [2], but rather the benefits that may occur in the long term. This concerns the relationships with associations, professional organizations, R & D institutes and agricultural universities, etc. Results show (Table 3, 4, 5, 6) that such contacts are maintained by a small group of farms and

rather by holdings of greater production potential.

The effectiveness of influence of institutions on modernization of agricultural holdings may result from barriers, the source of the barriers may be imbedded in institution as well as farms. The questioned respondents pointed out the most important barriers to be barriers that are connected to the institution, as the high cost of using services (mainly for commercial services) and limited access to institutions (especially long distance, which they can determine the level of usage cost even from the non-commercial services ) and no offers of cooperation (Table 8). However, a noteworthy fact, is that information about the offer of assistance from institutions reached the farmers and a small percentage of farmers pointed to the poor quality of the

offer. In the assessment of these two barriers most responses were in households with the lowest level of investments. Also, in farms from group I there were least indications of lack of barriers in cooperation with institutions.

Table 6. Structure of the farms from the III-rd Group by the intensity of the relationship with institutions [percentage of farms]

Institution	III-rd Group of Farms					
	No relationship	Permanent relationships	Once a quarter	Once per half year	Once per year	Less than once per year
Agency for Restructuring and Modernisation of Agriculture	-	40.6	37.5	9.4	12.5	-
Agricultural Advisory Centre	-	81.2	15.6	-	-	3.1
Agricultural Chamber	25.0	18.7	3.1	9.4	9.4	34.4
Bank	9.4	62.5	21.9	6.2	-	-
Agricultural Market Agency	21.9	3.1	6.2	9.4	31.2	28.1
Agricultural Property Agency	18.7	-	12.5	25.0	15.6	28.1
Agricultural trade union	71.9	-	-	-	3.1	25.0
Agricultural exchange	71.9	6.2	-	3.1	-	18.7
Self - government of the commune	3.1	40.6	53.1	3.1	-	-
Self - government of the county	15.6	6.2	31.2	12.5	6.2	28.1
Marshal's Office	78.1	-	-	12.5	3.1	6.2
Foundations	90.6	3.1	-	-	-	6.2
Association	93.7	-	-	-	-	6.2
Trade organisations	84.4	15.6	-	-	-	-
Research and development centers	100.0	-	-	-	-	-
Agricultural university	87.5	-	3.1	-	9.4	-

Source: own study

These data indicate a high level of competence and skills of farmers in dealing with the institutional environment. However, for a significant percentage from Group I the barriers occur. Households from the first group were characterized by significantly lower production potential (Table 1), and therefore not all institutions, especially private, are interested in cooperation. In turn, the offer of cooperation from the public part of institutions can not fully address the needs of this group.

In our study, farmers voiced their opinions about the importance of particular institutions in the process of modernization of agricultural holdings (Table 9).

In the opinion of farmers, nowadays, the most important role in the process of modernization

of agricultural holdings play AAC and ARMA. In the future, farmers would see the need to increase involvement of banks, municipal offices, chambers of agriculture and agri-food industry in the process of modernization of agriculture.

## CONCLUSIONS

The study allows us to formulate the following statements, in nature of a summary: (a) the most intense relations are the relations of farmers with local institutions conducive to the absorption of EU funds to assist in the financing of investment activity. A dominant role in Poland in this respect is carried out by the public agricultural advisory.

(b)major barriers in cooperation with the institutional environment is the high cost of using the services and limited access to local organizations. At the same time the differences in the level of barriers between the analyzed groups of farms have been highlighted. The smallest percentage of farms in which there were no barriers in access to local organizations occurred in the group of households with the lowest level of investments, and also the smallest production potential. This may be a result of not adjusting an offer of cooperation to the needs of the „small” farms.

(c)the level of the relationship of farmers from group I and farmers from group II and III with financial institutions-banks is relatively lower. What results from banks lower interest in financing 'small' farms. This situation requires new institutional arrangements that will allow this group of farmers to access external sources of financing development activities as well as current.

(d)institutional environment transfers agricultural progress and new innovative solutions relatively poorly which is evidenced by the poor relations of farmers in scientific research institutions.

Table 7. The percentage of farms using different forms of aid of institutions in the modernization process [percentage of farms]

Form of aid	Institutions	Total	Group of farms		
			I	II	III
<i>Aid in getting EU funds</i>	– <i>Agricultural Advisory Centre</i>	91.5	93.7	90.8	90.6
	– <i>Agency for Restructuring and Modernisation of Agriculture</i>	41.1	28.1	47.7	40.6
	– <i>Bank</i>	1.6	-	-	6.3
	– <i>Private consultancy</i>	4.6	-	3.1	12.5
<i>Consulting, training</i>	– <i>Agricultural Advisory Centre</i>	78.3	81.3	75.4	81.3
	– <i>Private consultancy</i>	1.6	-	3.1	-
	– <i>Enterprises providing agricultural input materials</i>	10.6	-	-	25.0
	– <i>Agricultural Chamber</i>	2.3	-	-	9.4
	– <i>Trade organisations</i>	1.6	-	9.2	6.3
<i>Aid in the preparation of business plans</i>	– <i>Agricultural Advisory Centre</i>	86.0	84.4	86.1	87.5
	– <i>Bank</i>	3.9	-	6.1	6.3
	– <i>Private consultancy</i>	4.7	-	6.1	3.1
<i>Aid in the preparation of the loan application</i>	– <i>Agricultural Advisory Centre</i>	47.3	40.6	52.3	43.8
	– <i>Bank</i>	23.3	12.5	23.1	34.4
	– <i>Private consultancy</i>	3.1	6.3	3.1	-
<i>Access to market information for innovation</i>	– <i>Agricultural Advisory Centre</i>	38.0	40.6	36.9	40.6
	– <i>TV, Internet</i>	10.9	9.4	10.9	9.4
	– <i>Agricultural Chamber</i>	1.6	-	1.6	6.3
<i>Implement new technologies</i>	– <i>Agricultural Advisory Centre</i>	47.3	59.4	46.2	37.5
	– <i>Enterprises providing agricultural input materials</i>	2.3	-	1.5	6.3
	– <i>Research institutes</i>	0.8	-	-	3.1
	– <i>TV, Internet</i>	0.8	-	1.5	-
<i>Implement of new products and services</i>	– <i>Agricultural Advisory Centre</i>	11.6	15.6	6.2	18.8
	– <i>TV, Internet</i>	1.6	-	3.1	-

Source: own study

Table 8. Barriers impeding the cooperation between farms and institutions [percentage of farms]

Barriers of cooperation with institutions	Total	Group of farms		
		I	II	III
<i>The high cost of services</i>	24.0	25.0	23.1	25.0
<i>Lack of offer cooperation</i>	17.8	25.0	16.9	12.5
<i>Difficult access to institutions</i>	18.6	28.1	18.4	9.4
<i>Lack of person's first contact with a farmer</i>	2.3	6.3		3.1
<i>Insufficient information about the offer on the part of institution</i>	7.8	12.5	7.7	3.1
<i>Low quality of the institution offer</i>	7.0	18.8	3.1	3.1
<i>Failure the offer to the needs of farm</i>	14.7	21.9	6.2	25.0
<i>Lack of incentives in establishing cooperation with the institution</i>	14.0	9.4	12.3	21.9
<i>Lack of experience in cooperation with the institutions</i>	9.3	12.5	12.3	
<i>Lack of barriers</i>	27.1	9.4	35.4	28.1

Source: own study

Table 9. The importance of institutions in the modernization process of agriculture in the opinion of farmers\*

Institution	Total				Group of farms											
	Currently		It should be		Currently		It should be		Currently		It should be		Currently		It should be	
	evaluation				evaluation				evaluation				evaluation			
	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V	$\bar{x}$	V
	<i>Agency for Restructuring and Modernisation of Agriculture</i>	4.0	21.0	4.7	13.3	3.9	66.0	4.7	48.3	3.9	87.9	4.6	72.7	4.2	88.4	4.8
<i>Agricultural Advisory Centre</i>	4.5	13.7	4.8	8.0	4.5	50.7	4.7	45.7	4.4	68.5	4.8	39.1	4.6	56.0	4.9	24.6
<i>Commune</i>	2.9	34.9	4.2	21.9	3.1	75.9	4.3	58.1	2.9	100.3	4.1	91.8	2.8	119.4	4.2	99.7
<i>Agri-food industry</i>	2.3	44.0	3.9	33.8	1.9	86.4	3.3	154.3	2.3	88.3	3.9	118.7	2.7	114.3	4.2	123.6
<i>Bank</i>	3.3	27.2	4.4	16.1	3.2	75.1	4.3	48.3	3.4	101.0	4.4	69.8	3.3	86.5	4.4	90.7
<i>Agricultural Chamber</i>	2.2	42.7	4.0	29.2	2.0	75.6	3.7	137.0	2.2	95.3	3.9	130.9	2.3	104.9	4.5	57.6
<i>Trade organisations</i>	2.0	50.3	3.3	49.2	2.2	83.4	2.8	160.8	1.9	102.0	3.4	175.4	2.1	101.7	3.6	155.1

\* scale of evaluation: from 1 – not important to 5 – very important

Source: own study

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## ANALYSIS ON THE EVOLUTION OF SURFACES UNDER VINE IN ROMANIA (2003-2013)

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### Abstract

*The paper aimed to make an analysis on the evolution of the areas under vines in Romania for the period 2003-2013 related with the factors that contributed to this evolution. The research method is related with dynamic analyze of time data series, using absolute and relative indicators. The discussions are focused on evolution of total vineyards, underlining the evolution tendencies of grafted vines areas. In Romania, the areas decreased with 23,5 % during the period 2003-2013. The share of grafted vines in the total areas increased from 49,62 % in 2003 to 50,03 % in 2013, but in absolute term the areas with grafted vines decreased with 26.042 ha in the selected period.*

**Key words:** analysis, Romania, vineyards

### INTRODUCTION

The wine sector is considered to be an economic and strategic sector with major importance [4] in the countries with important areas under vines. Romania is considered a tradition wine producing country being member of the International Office of Wine and Vine since 1928. The evolution of the surfaces under vines in Romania followed the EU trends where the production surplus conducted to difficulties in sales on internal and international markets, which also led to measures for ban on planting. As new member state of the EU, Romania benefited of the CMO for wine reform adopted by the EU in 2008. [3] The wine sector in Romania will face new challenges from 2016 when EU restrictions on planting vines will be removed, allowing competitive producers to increase the areas under vines and develop their grapes and wine production. Elimination of restriction in the EU countries will probably change the decreasing trend of world's total vineyard surface area, estimated in 2014 at 7519 million ha. [2] For this paper authors chose to make the analysis of dynamics time series, which is considered to be an efficient method for the macro-economic studies [1].

### MATERIALS AND METHODS

For this paper, we processed time series from national statistic related with the inputs from the wine sector, in order to obtain indicators that helped us in elaborating of a point of view concerning evolution of areas under vines in Romania. The indicators were calculated in absolute, relative and average terms. It was calculated: the absolute change of the areas under vines in Romania for the period 2003-2013, using fixed basis index and variable basis index the dynamic index of the areas under vines; the growth rate of this areas, calculated with fixed basis index and the growth rate calculated with the variable basis index.

### RESULTS AND DISCUSSIONS

In 2003, Romania had 233,316 ha cultivated with vines. In the last ten years the total surfaces under vines decreased to 178,378 ha in 2013 (Table1). The reduction of total areas under vines in Romania was partially offset by the national measures focused on increasing grape production yields, adopting new technologies for harvest, better quality of wine products and wine promotion on national and international markets. In

Romania, the area cultivated with vines is divided between areas cultivated with grafted vines in bearing and hybrid vines in bearing. The share of grafted vines in the total areas increased from 49.62 % in 2003 to 50.03 % in 2013, but in absolute term the areas with grafted vines decreased with 26.042 ha from 2003 to 2013. The promulgation of the Land Law (Law 18/1991) leads to increase of areas under vine in the private sector. In 2004, Romania cultivated 131,325 ha with grafted vines, representing the largest grafted vines bearing area from the analysed period. In this interval of time the largest area with hybrid bearing vines was cultivated in 2003. Until 2014, Romania had to cut down 30,000 ha of hybrid varieties, forbidden for cultivation in the European Union.

Table 1. Evolution of areas under vines in Romania (in absolute terms)

Year	Total Vineyards (ha)	Grafted vineyards (ha)	Hybrid Vineyards (ha)
2003	233,316	115,777	117,539
2004	205,381	131,325	74,056
2005	190,606	98,559	92,047
2006	190,542	96,710	93,832
2007	187,629	92,356	95,273
2008	183,971	92,707	91,264
2009	184,439	93,926	90,513
2010	176,991	90,049	86,942
2011	176,616	88,047	88,569
2012	178,654	89,735	88,919
2013	178,378	89,735	88,643

Source: Tempo Online – National Institute of Statistic -Romania

The national measures for conversion of vineyards had the greatest impact on the wine sector within this period of time. Accessing of this measure, producers in Romania have managed to restructure and modernize important surfaces.

Compared with 2003, the absolute change of grafted vines area had positive value only in 2004. The absolute change of the vines area, calculated with fixed base indicates that in 2011 was recorded the smallest area with total vineyards from Romania in this interval of time (Table 2). In the last years Romania

didn't recorded important changes for the total areas under vines.

Table 2. Evolution of areas under vines in Romania (absolute change calculated with fixed basis – year 2003)

Year	Total vineyards (ha) (+/-)	Grafted Vineyards (ha) (+/-)	Hybrid Vineyards (ha) (+/-)
2003	233,316	115,777	117,539
2004	-27,935	+15,548	-43,483
2005	-42,710	-17,218	-25,492
2006	-42,774	-19,067	-23,707
2007	-45,687	-23,421	-22,266
2008	-49,345	-23,070	-26,275
2009	-48,877	-21,851	-27,026
2010	-56,325	-25,728	-30,597
2011	-56,700	-27,730	-28,970
2012	-54,662	-26,042	-28,620
2013	-54,938	-26,042	-28,896

Source: Own calculation based on Tempo Online series- National Institute of Statistic – Romania

If we calculate the evolution of the absolute change of the areas under vines in Romania (Table 3), using base chained method we can conclude that in 2004 was recorded the highest negative value for total vineyards, comparative with 2003, while in 2012 was recorded the first positive trend, compared to 2011.

Table 3. Evolution of areas under vines in Romania (absolute change calculated with the base chained)

Year	Total vineyards (ha) (+/-)	Grafted Vineyards (ha) (+/-)	Hybrid Vineyards (ha) (+/-)
2003	<b>233,316</b>	<b>115,777</b>	<b>117,539</b>
2004	-27,935	+15,548	-43,483
2005	-14,775	-32,766	+17,991
2006	-64	-1,849	+1,785
2007	-2,913	-4,354	+1,441
2008	-3,658	+351	-4,009
2009	+468	+1,219	-751
2010	-7,448	-3,877	-3,571
2011	-375	-2,002	+1,627
2012	+2,038	+1,688	+350
2013	-276	0	-276

Source: Own calculation based on Tempo Online series- National Institute of Statistic - Romania

The grafted bearing areas had the biggest positive change in 2004 comparative with 2003, followed by the highest negative change in 2005 compared to 2004. Calculating the dynamic index for the areas under vines (Table 4), using the fixed base, we can notice that in 2011 the total areas under vines represented only 75.7 % from the 2003 total vine areas.

Table 4. Dynamic index calculated with fixed base for the areas under vines in Romania

Year	Total vineyards (%)	Grafted Vineyards (%)	Hybrid Vineyards (%)
2003	100	100	100
2004	88.03	113.43	63.01
2005	81.69	85.13	78.31
2006	81.67	83.53	79.83
2007	80.42	79.77	81.06
2008	78.85	80.07	77.65
2009	79.05	81.13	95
2010	75.86	77.78	96.05
2011	75.70	76.05	97.85
2012	76.57	77.51	100.4
2013	76.45	77.51	100.08

Source: Own calculation based on Tempo Online series- National Institute of Statistic - Romania

In 2004, the areas with grafted vines were higher with 13.43 % compared with 2003, while in 2011 represented only 77.51 % from the total grafted areas from 2003.

Table 5. Dynamic index calculated with the base chained for the areas under vine in Romania

Year	Total vineyards (%)	Grafted Vineyards (%)	Hybrid Vineyards (%)
2003	100	100	100
2004	88.03	113.43	63.01
2005	92.81	75.05	124.29
2006	99.97	98.12	101.94
2007	98.47	95.50	101.54
2008	98.05	100.38	95.79
2009	100.25	101.31	99.18
2010	95.96	95.87	96.05
2011	99.79	97.78	101.87
2012	101.15	101.92	100.40
2013	99.85	100.00	99.69

Source: Own calculation based on Tempo Online series- National Institute of Statistic - Romania

The dynamic index calculated with the base chained (Table 5) had the lowest value in 2004 (88.03 %) for the total areas under vines and the highest value in 2012 (101.15%).

The rate of increase, calculate with fixed base (year 2003) had only negative values for the total areas under vine. This indicator was positive only in 2004 for grafted areas under vine (13.43 %). The highest negative rate, corresponding with a negative growth was recorded in 2004 for hybrid vines areas (-36.99%).

Table 6. Rate of increase calculated with fixed base for the areas under vines in Romania

Year	Total vineyards (%)	Grafted Vineyards (%)	Hybrid Vineyards (%)
2003	100	100	100
2004	-11.97	13.43	-36.99
2005	-18.31	-14.87	-21.69
2006	-18.33	-16.47	-20.17
2007	-19.58	-20.23	-18.94
2008	-21.15	-19.93	-22.35
2009	-20.95	-18.87	-22.99
2010	-24.14	-22.22	-26.03
2011	-24.30	-23.95	-24.65
2012	-23.43	-22.49	-24.35
2013	-23.55	-22.49	-24.58

Source: Tempo Online – National Institute of Statistic - Romania

Table 7. Rate of increase calculated with the base chained for the areas under vine in Romania

Year	Total vineyards (%)	Grafted Vineyards (%)	Hybrid Vineyards (%)
2003	100	100	100
2004	-11.97	13.43	-36.99
2005	-7.19	-24.95	24.29
2006	-0.03	-1.88	1.94
2007	-1.53	-4.50	1.54
2008	-1.95	0.38	-4.21
2009	0.25	1.31	-0.82
2010	-4.04	-4.13	-3.95
2011	-0.21	-2.22	1.87
2012	1.15	1.92	0.40
2013	-0.15	0.00	-0.31

Source: Tempo Online – National Institute of Statistic - Romania

The rate of increase calculated with the base chained was positive in 2012 for the total

vineyards. (Table 7).

The average area under vines in Romania for this period was 189,683 ha. In the case of grafted vines areas the average surface in Romania for the period 2003-2011 was 98,084 ha, while for the hybrid vines areas, the average value was 91,599 ha.

## CONCLUSIONS

Romania has important surfaces under vines, which requires a special attention due to sector contribution to the GDP and its social importance for the rural areas population located in the wine traditional regions. In a period when vine cultivators faced important economic difficulties, Romania continued to hold large areas of wine, ranking 11 in terms of area cultivated with vines at world level, respective 5th place in the European Union. The areas under vine from Romania suffered important changes due to new Romanian and EU regulations. Also the orientation for quality, of Romanian producers influenced the structure of the vines surfaces in the last decade.

## ACKNOWLEDGMENTS

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## ROMANIAN WINE TRADE IN THE PERIOD 2007-2013

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### Abstract

*The paper is based on a research that aimed to analyze the wine exports of Romania by top destination countries in the period 2007-2013. The research method was based on statistical interpretations of the trade data provided by International Trade Center. In value terms the Romanian wine exports increased each year during this period, the main export destination being Germania, United Kingdom and China. Spain was the main exporter of wine for Romania, this country taking advantage of reduced Romanian wine production and Romanian domestic market potential for wine sales.*

**Key words:** destinations, Romania, trade, wine

### INTRODUCTION

The wine sector in Romania had fundamental economic, social, political and ideological functions, as it happened in different parts of the world throughout history.[4] As the authors of this paper concluded in a previous research, Romania had in the last years an increase in exports of wine, but also a much higher level of total wine imports, which indicate a low level of competitiveness in this sector.[2] This confirm the conclusion of other authors that revealed the negative impact caused by the huge import of foreign agro-food products on Romanian market with lower prices.[3] The exports of Romanian wine needs to be increased if we consider some appreciation that Romanian wines have a rather good international reputation even if they were affected during this century. [1] For this paper authors aimed to analyze the Romanian trade with wine, by country of origin and destination, based on idea that Romania can gain better trade positions on European Union and on World wine market.

### MATERIALS AND METHODS

For this paper, the authors processed time series from international statistic related with

the wine trade. The Romanian trade with wine was evaluated in absolute and percentage terms, in a quantitative and value perspective.

### RESULTS AND DISCUSSIONS

Romania exported each year, in the period taken into account, between 10,000 and 11,000 to of wine. For the period 2009 – 2012 Germany was the first Romanian wine export destination. (Table 1)

In 2013 the export of wine to United Kingdom increased at a level higher than for Germany. If in 2009 Romania exported important quantities of wine to Russia and Denmark, Spain started to be an important destination for Romanian wines. Romanian wine exporters should analyze what happened with the exports to the south neighbor, Bulgaria, and to evaluate if they can reconquer their position on this market. In Germany were delivered up to 43.71 % (in 2009) of the total wine quantities of the Romanian exports with this product. (Table 2) In 2012, Romania delivered 13.6 % of the total wine export to Spain. Romania also succeeded to deliver in UK, one of its main wine importers, up to 28.74 % of the total quantities of exported wine from 2013.

Table 1. The quantitative structure of Romanian wine export by country destination (data only for the top 10 destination countries of each year)

Country	Quantity (to)				
	2009	2010	2011	2012	2013
Germany	<b>4760</b>	<b>3127</b>	<b>3277</b>	<b>2378</b>	<b>2466</b>
UK	<b>775</b>	357	<b>1359</b>	<b>2099</b>	<b>3013</b>
Canada	-	299	394	290	370
Czech Rep.	<b>559</b>	774	788	511	256
Russia	538	-	-	-	-
Estonia	528	699	670	719	491
Denmark	503	-	-	-	-
Bulgaria	495	355	-	-	-
Italy	432	<b>847</b>	685	820	600
USA	423	811	692	597	584
China	412	<b>991</b>	<b>801</b>	1159	<b>890</b>
Poland	-	-	288	-	-
Spain	-	317	491	<b>1548</b>	461
Netherlands	-	-	-	225	-
Slovenia	-	-	-	-	214
Others	1465	1236	1081	1037	1139
Total	10890	9813	10526	11383	10484

Source: Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3–bold, italic

Table 2. The quantitative structure of Romanian wine export by country destination, expressed as a percentage (data only for the top 10 destination countries of each year)

Country	%				
	2009	2010	2011	2012	2013
Germany	<b>43,71</b>	<b>31,87</b>	<b>31,13</b>	<b>20,89</b>	<b>23,52</b>
UK	<b>7,12</b>	3,64	<b>12,91</b>	<b>18,44</b>	<b>28,74</b>
Canada	-	3,05	3,74	2,55	3,53
Czech Rep.	<b>5,13</b>	7,89	7,49	4,49	2,44
Russia	4,94	-	-	-	-
Estonia	4,85	7,12	6,37	6,32	4,68
Denmark	4,62	-	-	-	-
Bulgaria	4,55	3,62	-	-	-
Italy	3,97	<b>8,63</b>	6,51	7,20	5,72
USA	3,88	8,26	6,57	5,24	5,57
China	3,78	<b>10,1</b>	<b>7,61</b>	10,18	<b>8,49</b>
Poland	-	-	2,74	-	-
Spain	-	3,23	4,66	<b>13,60</b>	4,40
Netherlands	-	-	-	1,98	-
Slovenia	-	-	-	-	2,04
Others	13,45	12,6	10,27	9,11	10,86
Total	100	100	100	100	100

Source: Source: Processed data from International Trade Center, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3 –bold, italic

While the quantities of wine exported by Romania alternated positive and negative trends from a year to other, the value of this exports increased each year. (Table 3) The highest value of wine exports to a country was recorded in 2013, when Romania exported wine worth USD thousand 5,931 to UK. Romanian wine traders managed to export wine worth USD thousand 3,805 to China in

2012 and wine worth USD thousand 4,277 to Germany in 2012.

Table 3. The value structure of Romanian wine export by country destination (data only for the top 10 destination countries of each year)

Country	Value (USD thousand)				
	2009	2010	2011	2012	2013
Germany	<b>4277</b>	<b>3320</b>	<b>3870</b>	<b>2816</b>	<b>3107</b>
China	<b>3089</b>	<b>2858</b>	<b>3111</b>	<b>3805</b>	<b>3000</b>
UK	<b>1602</b>	720	<b>2601</b>	<b>3779</b>	<b>5931</b>
Italy	1182	<b>1822</b>	1604	1591	1423
Estonia	1152	1271	1244	1299	958
USA	1083	1821	1472	1266	1250
Russia	743	-	-	-	-
Denmark	669	-	-	-	-
Canada	638	774	1036	777	983
Spain	615	680	1056	1623	1013
Czech Republic	-	677	731	594	410
Poland	-	408	689	608	-
Netherlands	-	-	-	-	742
Others	3599	2787	2559	2371	3171
Total	19099	17138	19973	20529	21988

Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3–bold, italic

In 2013 about 27 % of incomes from Romanian exports of wine, in terms of value, came from United Kingdom.

Table 4. The value structure of Romanian wine export by country, expressed as a percentage (data only for the top 10 destination countries of each year)

Country	%				
	2009	2010	2011	2012	2013
Germany	<b>24,75</b>	<b>19,37</b>	<b>19,38</b>	<b>13,72</b>	<b>14,13</b>
China	<b>16,17</b>	<b>16,68</b>	<b>15,58</b>	<b>18,53</b>	<b>13,64</b>
UK	<b>8,39</b>	4,20	<b>13,02</b>	<b>18,41</b>	<b>26,97</b>
Italy	6,19	<b>10,63</b>	8,03	7,75	6,47
Estonia	6,03	7,42	6,23	6,33	4,37
USA	5,67	<b>10,63</b>	7,37	6,17	5,68
Russia	3,89	-	-	-	-
Denmark	3,50	-	-	-	-
Canada	3,34	4,52	5,19	3,78	4,47
Spain	3,22	3,97	5,29	7,91	4,61
Czech Republic	-	3,95	3,66	2,89	1,86
Poland	-	2,38	3,45	2,96	-
Netherlands	-	-	-	-	3,37
Others	18,84	16,26	12,81	11,55	14,42
Total	100	100	100	20529	21988

Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3 –bold, italic

The poor wine production from 2010 led to a record of imported wine in Romania. Spain was the main exporter of wine for Romania. In 2011 Spain exported 61,627 to of wine in Romania, this being the highest quantity imported from a specific country during the

period 2009-2013. Italy is an important exporter to Romanian wine market (Table 5), while Moldova and Bulgaria had also important quantities exported each year to Romania.

Table 5. The quantitative structure of wine imported in Romania (data only for the top 10 exporter countries of each year)

Country	Quantity (to)				
	2009	2010	2011	2012	2013
Italy	<b>4108</b>	<b>7649</b>	<b>13603</b>	<b>7891</b>	<b>5538</b>
Slovenia	<b>1775</b>	-	-	-	-
Spain	<b>1764</b>	<b>9177</b>	<b>61627</b>	<b>23578</b>	<b>9038</b>
Republic of Moldova	1521	<b>1191</b>	3191	4745	<b>4943</b>
Bulgaria	926	753	<b>5550</b>	<b>5767</b>	4491
France	886	1116	1319	1216	1012
Austria	601	-	-	-	-
Germany	381	563	2127	1188	1425
Hungary	378	728	449	-	996
Czech Republic	260	414	643	906	-
Slovakia	-	405	-	-	-
Chile	-	108	-	-	2690
Macedonia	-	-	1044	4260	4277
Serbia	-	-	-	3438	774
South Africa	-	-	502	536	-
Others	539	386	714	1004	1563
Total	13139	22490	90979	54529	36747

Source: Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3–bold, italic

Table 6. The quantitative structure of wine imported in Romania, expressed as a percentage (data only for the top 10 exporter countries of each year)

Country	Quantity (%)				
	2009	2010	2011	2012	2013
Italy	<b>31,27</b>	<b>34,01</b>	<b>14,99</b>	<b>14,47</b>	<b>15,07</b>
Slovenia	<b>13,51</b>	-	-	-	-
Spain	<b>13,43</b>	<b>40,80</b>	<b>67,89</b>	<b>43,24</b>	<b>24,60</b>
Moldova	11,58	<b>5,30</b>	3,52	8,7	<b>13,45</b>
Bulgaria	7,05	3,35	<b>6,11</b>	<b>10,58</b>	12,22
France	6,74	4,96	1,45	2,23	2,75
Austria	4,57	-	-	-	-
Germany	2,90	2,50	2,34	2,18	3,88
Hungary	2,88	3,24	0,49	-	2,71
Czech Republic	1,98	1,84	0,71	1,66	-
Slovakia	-	1,8	-	-	-
Chile	-	0,48	-	-	7,32
Macedonia	-	-	1,15	7,81	11,64
Serbia	-	-	-	6,3	2,11
South Africa	-	-	0,55	0,98	-
Others	4,10	1,72	0,79	1,84	4,25
Total	100	100	100	100	100

Source: Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3–bold, italic

We anticipate a higher share of market for Moldavian wines in the context of the import ban of Russia for the Moldavian wines.

Spain gained the highest share of imported wine on Romanian market from 2010 to 2013. In 2011 Spain covered 67.89 % of the Romanian wine imports.

Table 7. The value structure of wine imported in Romania (data only for the top 10 exporter countries of each year)

Country	Value (USD thousand)				
	2009	2010	2011	2012	2013
Italy	<b>5513</b>	<b>8200</b>	<b>13334</b>	<b>11188</b>	<b>11092</b>
France	<b>5370</b>	<b>7609</b>	<b>9323</b>	<b>8783</b>	<b>8589</b>
Republic of Moldova	<b>2458</b>	1917	3012	3953	4607
Germany	1360	1477	4179	2414	3040
Spain	1251	<b>4170</b>	<b>31618</b>	<b>14541</b>	<b>6672</b>
Slovenia	706	-	-	-	-
Hungary	660	797	847	966	1530
Austria	530	-	-	-	-
Bulgaria	489	546	2869	3649	4796
Chile	456	394	616	-	2688
Czech Republic	-	-	580	1327	1180
Macedonia	-	-	-	2473	3188
Serbia	-	-	-	2053	-
Netherlands	-	447	592	-	-
Slovakia	-	727	-	-	-
Others	1852	1368	2510	2617	3120
Total	20648	27652	69480	53964	50502

Source: Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3 –bold, italic

Table 8. The value structure of wine imported in Romania, expressed as a percentage (data only for the top 10 exporter countries of each year)

Country	Value (%)				
	2009	2010	2011	2012	2013
Italy	<b>26,70</b>	<b>29,65</b>	<b>19,19</b>	<b>20,73</b>	<b>21,96</b>
France	<b>26,01</b>	<b>27,52</b>	<b>13,42</b>	<b>16,28</b>	<b>17,01</b>
Moldova	<b>11,90</b>	6,93	4,34	7,33	9,12
Germany	6,59	5,34	6,01	4,47	6,02
Spain	6,06	<b>15,08</b>	<b>45,51</b>	<b>26,95</b>	<b>13,21</b>
Slovenia	3,42	-	-	-	-
Hungary	3,20	2,88	1,22	1,79	3,03
Austria	2,58	-	-	-	-
Bulgaria	2,37	1,97	4,13	6,76	9,50
Chile	2,21	1,42	0,89	-	5,32
Czech Republic	-	-	0,83	2,46	2,34
Macedonia	-	-	-	4,58	6,31
Serbia	-	-	-	3,80	-
Netherlands	-	1,62	0,85	-	-
Slovakia	-	2,63	-	-	-
Others	8,97	4,95	3,61	4,85	6,18
Total	100	100	100	100	100

Source: Source: Processed data from ITC, 2014

Note: Rank 1 – bold, underline, Rank 2 –bold, Rank 3–bold, italic

While Italy was the first exporter of wine on Romanian market in 2009, Moldavia started to extend their exports for Romania, having a share of market 13.45 % in 2013. (Table 6)

Spain had the highest percentage from the total value of imported wines in Romania in 2011, with almost half of this market segment. The value structure of wine imported in Romania indicate that French wines imported in Romania are more expensive as those imported from Spain. Even if the France didn't export very high quantities of wine on Romanian market, the value of this imports put France in the second or third place in the selected period.

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## CONCLUSIONS

Romania exported between 2009 and 2013 around 11,000 to each year, depending on internal production and the demand on internal market. Germany and United Kingdom were the main destinations of Romanian wine export. The value of Romanian exports of wine was close to USD thousand 22,000 in 2013. Romania imported up to 90,079 to in 2011, equivalent of USD thousand 69,480. Spain is the main exporter for Romanian market, followed by Italy. Even if Romania is an important wine producer, the imports of wine are higher than exports, which lead to a negative balance for the Romanian wine trade.

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## DATA ENVELOPMENT ANALYSIS APPROACH ON THE EFFICIENT USE OF RURAL HUMAN RESOURCES IN AGRICULTURE, INDUSTRY AND CONSTRUCTIONS DURING 2006-2013

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### Abstract

*The paper studied the rural human resources efficiency at regional level by using the DEA nonparametric method (Data Envelopment Analysis). The application of this cutting edge method enables the calculation of efficiency scores based on a series of inputs (occupied population in agriculture, industry and construction) and outputs (gross value added in agriculture, industry and construction). The data regarding the rural human resources are retrieved from the Amigo data base, the regional GVA from Tempo online data base and the analysis is performed by MAXDATA 6.3 Beta program. The results revealed that the majority of the regions reach performance with the current input structure, with the exception of the North-East and North-West regions which need to reduce the number of workers in agriculture and increase the GVA from industry and constructions to support real economic growth.*

**Key words:** data envelopment analysis, effective use, human resources, rural areas

### INTRODUCTION

Evaluation of human resource efficiency in rural areas is a significant issue in the development and promotion of social and economic policies aimed at their efficient management and development. Decreasing employment, decreasing numbers of youth entering the labor market or increasing inactive population, the lack of jobs and low skills are just some of the problems facing human resources pools in rural areas. This phenomenon, if not managed effectively, creates long-term negative effects on rural development and reduced performance of local economies.

Assessment of human resources in rural Romania involves two approaches: using indicators collected in the rural areas according to the Romanian legislation (National Institute of Statistics) and indicators collected by the European Union classification of rural areas (Eurostat). Romanian rural areas, regardless of classification, face significant discrepancies compared to the national average and to the urban areas, in terms of both educational and

professional training of the population, and in terms of the labor market function, as in most rural areas there is little diversification of economic activities, and the population is mainly employed in agriculture or in agriculture related activities. In the context of the previously mentioned issues facing the human resources, the research we performed in this paper is intended to highlight the efficient use of human resources in rural areas over the period 2006-2013.

### MATERIALS AND METHODS

In time, the complexity of the concept of human resources has lead to a real necessity of measuring the labor factor productivity at national or regional level. Over time, in addition to analytical methods and econometric models, nonparametric models have also been developed, in which the Data Envelopment Analysis (DEA) has been widely used for assessing labor efficiency [3]. DEA is a non-parametric research technique, a mathematical optimization method, based on a simple linear sequence of programs used to evaluate the technical efficiency of the

"decision making units" (The Decision Making Units, DMU, are characterized by the transfer of a set of inputs into outputs through a uniform production function [4]).

DEA models can be input oriented (objective: to minimize inputs while maintaining the same level of outputs) and output oriented (objective: increasing outputs with the same level of inputs) [1]. As our goal is to measure human resource efficiency, we used an input orientation approach, with the assumption that a DMU (region) can produce the same level of output by using fewer inputs. Since each region uses various amounts of inputs to produce different levels of output, the method compares each region (DMU) with the most effective region (DMU). DEA will actually measure inefficiency and its determinants by evaluating the changes in technical and relative efficiency.

DEA uses the following notation: "n" – the number of DMUs (regions) to be assessed; each DMU has 'm' inputs and produces 's' outputs; in year 'j' a DMU<sub>j</sub> consumes 'x<sub>ij</sub>' from input 'i' and produces 'y<sub>rj</sub>' of output 'r'; λ<sub>j</sub> are the weights assigned by the linear program, 'θ' is the calculated efficiency; 's<sub>i</sub><sup>-</sup>' and 's<sub>r</sub><sup>+</sup>' are errors in input and output; "ε" is defined as an element smaller than any positive real number [2], [5].

CRS - input oriented programming:

$$\begin{aligned} & \text{Min } \theta + \varepsilon \left[ \sum_{i=1}^m S_i^- + \sum_{r=1}^s S_r^+ \right] \\ & \sum_{j=1}^n x_{ij} \lambda_j + S_i^- = \theta x_{i0}, i = 1, 2, \dots, m \\ & \sum_{j=1}^n y_{rj} \lambda_j - S_r^+ = y_{r0}, r = 1, 2, \dots, s \\ & \lambda_j, S_i^-, S_r^+ \geq 0, \quad j = 1, 2, \dots, n \end{aligned}$$

VRS – input oriented programming:

$$\begin{aligned} & \text{Min } \theta + \varepsilon \left[ \sum_{i=1}^m S_i^- + \sum_{r=1}^s S_r^+ \right] \\ & \sum_{j=1}^n x_{ij} \lambda_j + S_i^- = \theta x_{i0}, i = 1, 2, \dots, m \end{aligned}$$

$$\begin{aligned} & \sum_{j=1}^n y_{rj} \lambda_j - S_r^+ = y_{r0}, r = 1, 2, \dots, s \\ & \sum_{j=1}^n \lambda_j = 1 \\ & \lambda_j, S_i^-, S_r^+ \geq 0, \quad j = 1, 2, \dots, n \end{aligned}$$

For the analysis of efficiency scores we used MAXDATA 6.3 Beta program, which allows generation of CRS (technical efficiency), VRS (pure technical efficiency) and scale efficiency scores (VRS/VRS) under input oriented assumptions. This program allowed us to rank regions according to their efficiency scores, due to the fact that the DEA scores are identical within the DMU (in our case regions) as they operate at optimal scale between them, showing the best combination of inputs for a given level of output. Our approach aims to measure labor efficiency and the efficiency of employment in agriculture, industry and construction in rural areas, respectively, for a given level of gross value added of the three sectors at regional level.

## RESULTS AND DISCUSSIONS

Under the CRS assumption, in 2006 and 2013, the Central, South-East, South-West and West regions had an optimal structure reaching performance of agriculture, industry and construction human resources (inputs) in relation to the gross added from these sectors (outputs). The North East and the North-West had high efficiency while South-Muntenia showed average efficiency (50-70%). Under these circumstances, the average technical efficiency of regions was 0.8672, lower than 2006 by approx. 6.0%, the largest decrease occurring in the Northeast region. Under the VRS assumption, the average efficiency score in 2013 was 0.9121 (compared to 2006 when all regions were considered efficient), which means that regions should reduce inputs by almost 8.8 % in order to achieve optimum production frontier (Table 1).

In the South-Muntenia region, which experienced decreasing returns to scale, inefficiency is due to a higher dimension of GVA (AGR, IND, CONS) as compared to the

human resources structure, which places it at approx. 30% against the efficiency frontier.

Table 1. The DEA Model (inputs- population from AGR, IND, CONS; outputs- gross value added from AGR, IND, CONS)

DMU	Input - Population (n°)			Output- Gross added value (thou RON)		
	AGR	IND	CONS	AGR	IND	CONS
2006						
Central	263050	119344	103506	3955.2	10731.9	2743
North-East	132277	119437	95625	3571.7	12180.7	2718.1
North-West	623292	115146	123868	4868.9	7402.9	2818.4
South-Muntenia	298275	78836	92749	3885.7	9428	3608
South-East	397169	205415	172677	4347.1	14138	2875.2
South-West Oltenia	361071	64700	72485	2852.3	8037.2	2406.1
West	121583	86190	65095	2883	8855.2	2516.5
2013						
Central	276598	138989	107561	3717.6	16813.3	4322.9
North-East	101180	106755	106403	3647.2	22703.3	4471
North-West	705935	144934	138015	5109.2	14662.6	4551.8
South-Muntenia	253488	101445	97396	5874.2	16574.6	5209.2
South-East	318062	201073	201972	6143.4	26350.6	4852.3
South-West Oltenia	353818	58620	59072	3622	17433.5	3826.5
West	137452	90037	67564	3380.5	20174.8	3191
		CRS	VRS	CRS/VRS	RTS	
2006						
Central	1.0000		1.0000	1.0000	CRS	
North-East	0.9293		1.0000	0.9293	DRS	
North-West	0.8800		1.0000	0.8800	DRS	
South-Muntenia	0.6475		1.0000	0.6475	DRS	
South-East	1.0000		1.0000	1.0000	CRS	
South-West Oltenia	1.0000		1.0000	1.0000	CRS	
West	1.0000		1.0000	1.0000	CRS	
Average	0.9224		1.0000	0.9224	-	
2013						
Central	1.0000		1.0000	1.0000	CRS	
North-East	0.6063		0.6114	0.9917	DRS	
North-West	0.7674		0.7732	0.9925	IRS	
South-Muntenia	0.6965		1.0000	0.6965	DRS	
South-East	1.0000		1.0000	1.0000	CRS	
South-West Oltenia	1.0000		1.0000	1.0000	CRS	
West	1.0000		1.0000	1.0000	CRS	
Average	0.8672		0.9121	0.9544		
2013/2006 (%)						
Central	100.0		100.0	100.0		
North-East	65.2		61.1	106.7		
North-West	87.2		77.3	112.8		
South-Muntenia	107.6		100.0	107.6		
South-East	100.0		100.0	100.0		
South-West Oltenia	100.0		100.0	100.0		
West	100.0		100.0	100.0		
Average	94.0		91.2	103.5		

Note: IRS- increasing return to scale; DRS- decreasing return to scale; CRS- constant return to scale;

Source: National Institute of Statistics; MAXDATA 6.3 Beta

The North-East region, also with decreasing return to scale, should significantly reduce

human resources in agriculture and increase the value added by industry and constructions. On the other hand, in order to achieve optimal parameters, the North West region should reduce inputs (mainly in agriculture, followed by industry) and increase the gross value added in agriculture and industry (to increase productivity).

If we apply the DEA approach to each sector, we will see that the Central region presents optimal efficiency in the branch of agriculture, followed by the West region with a level of inefficiency of only 26.4%.

South-Muntenia and the South-East present efficiency under the VRS assumption due to the high level of GVA in agriculture, but they are at a level of approx. 40-50% from the efficiency frontier.

The North-East, North-West and South-West regions, where most of the population work in agriculture, registered a very low level of technical efficiency (20-30%), but, due to a quite low GVA compared to other regions, they obtained a high scale efficiency level (Table 2).

Table 2. DEA Model (input- population from AGR; output - gross value added from AGR)

DMU	CRS	VRS	CRS/VRS	RTS
Central	<b>1.0000</b>	<b>1.0000</b>	1.0000	CRS
North-East	0.2008	0.2850	0.7046	DRS
North-West	0.3729	0.3832	0.9730	DRS
South-Muntenia	0.5358	<b>1.0000</b>	0.5358	DRS
South-East	0.6429	<b>1.0000</b>	0.6429	DRS
South-West Oltenia	0.2840	0.2860	0.9931	IRS
West	0.6823	0.7361	0.9269	Increasing

Note: IRS- increasing return to scale; DRS- decreasing return to scale; CRS- constant return to scale;

Source: National Institute of Statistics; MAXDATA 6.3 Beta

In the branch of industry, the South-West region is the most efficient, followed by the Western region with a level of inefficiency of 27.1%.

The Central and South-Muntenia regions present efficiency under the VRS assumption due to the high level of GVA, but they are under the optimum efficiency scale.

The North-East, North-West and South-East regions recorded a low level of technical

efficiency (below 50%), but, due to a quite low level GVA, they obtained a high scale efficiency level.

Table 2. The DEA Model (input- population from IND; output - gross value added from IND)

DMU	CRS	VRS	CRS/VRS	RTS
Central	0.7151	<b>1.0000</b>	0.7151	DRS
North-East	0.3402	0.4045	0.8411	IRS
North-West	0.4068	0.4218	0.9644	IRS
South-Muntenia	0.4407	<b>1.0000</b>	0.4407	DRS
South-East	0.5494	0.5779	0.9507	IRS
South-West				
Oltenia	<b>1.0000</b>	<b>1.0000</b>	1.0000	CRS
West	0.7534	0.9292	0.8109	DRS

Note: IRS- increasing return to scale; DRS- decreasing return to scale; CRS- constant return to scale;

Source: National Institute of Statistics; MAXDATA 6.3 Beta

In the branch of constructions, the South-West region remains the most performant, followed by the South-East region with a level of inefficiency of only 17.6% and efficiency under the assumption of VRS. Other regions have an average technical efficiency (between 50-40%) and high scale efficiencies. The South-Muntenia region holds the last position with inefficiency over 60%.

Table 3. The DEA Model (input- population from CONS; output - gross value added from CONS)

DMU	CRS	VRS	CRS/VRS	RTS
Central	0.6487	0.7231	0.8971	DRS
North-East	0.5091	0.5737	0.8875	DRS
North-West	0.6204	0.6771	0.9163	DRS
South-Muntenia	0.3709	0.4332	0.8561	DRS
South-East	0.8257	<b>1.0000</b>	0.8257	DRS
South-West				
Oltenia	<b>1.0000</b>	<b>1.0000</b>	1.0000	CRS
West	0.7291	0.8743	0.8339	IRS

Note: IRS- increasing return to scale; DRS- decreasing return to scale; CRS- constant return to scale;

Source: National Institute of Statistics; MAXDATA 6.3 Beta

## CONCLUSIONS

In conclusion, the analysis of people employed in agriculture, industry and constructions and the gross value added in these sectors shows that, at the current level of outputs, the most efficient are the Central, South-East, South-West and West regions,

while the North East region, in order to achieve an optimum size, should reduce human resources especially in agriculture and increase the gross value added in industry and constructions. Also, the North-West region needs to reduce human resources in agriculture and industry and increase the gross value added in these industries.

The DEA linear programming scores allow us to conclude that, to be effective, at the current level of GVA, there is a clear need to:

- reduce the human resources in agriculture in the North-East, North-West, South-West and West regions; increase GVA in agriculture in the West region;

- reduce the human resources in industry in the West region; reduce the human resources and increase the GVA in the North-East, North-West and South-East regions;

- reduce human resources in constructions in the Central, North-East, North-West, South-East, West and South-Muntenia; the West region also has to increase GVA in the constructions sector.

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## THE EFFICIENCY FORECAST OF RURAL HUMAN RESOURCES USE BY THE DATA ENVELOPMENT ANALYSIS APPROACH

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### Abstract

*The structure of rural human resources (from agriculture, industry, constructions) represents the most important production factor in order to achieve economic growth (high GDP). In terms of efficiency, it is more important to assess the way in which the combination of human resources between these three branches contributes to GDP formation. To do this assessment for the period 2013-20120, we applied the nonparametric method of DEA (Data Envelopment Analysis). This method enables ranking regions based on a series of inputs (rural population occupied in agriculture, industry and constructions) and outputs (rural gross domestic product). The data regarding the rural human resources are retrieved from the Amigo data base, the rural GDP Eurostat and the analysis was performed by MAXDATA 6.3 Beta program. The results revealed that, by 2020, if maintaining the 2006-2013 trends, the average technical efficiency will decrease by 5.4%, only the Central and the South-West regions will be performing well and the North-East and North-West regions will become more inefficient. Our results reveal that, in the majority of regions, there is a clear need to reduce the population from agriculture, to increase the population from industry and constructions, and to increase de productivity, to ensure real economic growth.*

**Key words:** efficiency, forecast, rural human resources

### INTRODUCTION

Over the last decades the disparities between urban and rural areas have been deepened, most countries facing real problems in providing human resources capable of meeting regional economic and social needs, especially in the context of macroeconomic structural instability, income inequality, unemployment, etc. With the economic crisis of recent years, many countries have reduced social spending measures, especially in health and education, which will have a negative impact on long-term human resources development.

These problems become even more important when viewed in the context of expected changes in the coming decades, such as the changes in the demographic structure, the deepening inequalities, the rising costs of health services, the negative effects of climate phenomena, the globalization of economic effects, the migration on the labor market, etc. Rural areas in particular present other important issues, such as limited access to

education and health, lack of productive employment, gender discrimination, lack of access to modern technologies, labor migration, lower labor productivity etc.

All these problems require the development of effective measures for ensuring human resources efficiency, the stability of the labor market and economic growth, both nationally and regionally. Understanding how the inputs structure can compete to ensure technical and scale efficiency in relation to outputs is an important element in identifying the sources of regional inefficiency and in identifying viable solutions for increasing the efficiency of human resources in rural areas.

### MATERIALS AND METHODS

The Data Envelopment Analysis was developed starting from Farrell studies [3] in 1957. In 1958, Charnes, Cooper și Rhodes [2] created the CCR model utilized to compute the constant return to scale (CRS) and in 1984, Banker, Charnes și Cooper [1] modified

the DEA methodology for the cases when we do not operate with optimum parameters.

The DEA is a non-parametric, mathematical optimisation method, used to calculate technical, purely technical and scale efficiencies for Decision Making Units (DMUs). The DEA method has two approaches: input oriented (identify the inputs quantities which can be reduced without modifying the outputs) and output oriented (identify the measure in which the outputs can be increased without modifying the utilized inputs). The model, for an input oriented approach, has the following formulae:

- Constant return to scale:

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

$$\sum_{j=1}^n x_{ij} \lambda_j + S_i^- = \theta x_{i0}, i = 1, 2, \dots, m$$

$$\sum_{j=1}^n y_{rj} \lambda_j - S_r^+ = y_{r0}, r = 1, 2, \dots, s$$

$$\lambda_j, S_i^-, S_r^+ \geq 0, \quad j = 1, 2, \dots, n$$

- Variable return to scale:

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

$$\sum_{j=1}^n x_{ij} \lambda_j + S_i^- = \theta x_{i0}, i = 1, 2, \dots, m$$

$$\sum_{j=1}^n y_{rj} \lambda_j - S_r^+ = y_{r0}, r = 1, 2, \dots, s$$

$$\sum_{j=1}^n \lambda_j = 1$$

$$\lambda_j, S_i^-, S_r^+ \geq 0, \quad j = 1, 2, \dots, n$$

Where: 'n' - the number of DMUs (regions); 'm' - inputs; 's' outputs; year 'j'; a DMU<sub>j</sub> consumes 'x<sub>ij</sub>' from input 'i' and produces 'y<sub>ij</sub>' of output 'r'; λ<sub>j</sub> - the weights, 'Θ' - calculated efficiency; 's<sub>i</sub>' and 's<sub>r</sub>' are errors in input and output; "ε" - an element smaller than any positive real number [2], [ 5].

We generated the CRS (technical efficiency), VRS (pure technical efficiency) and scale

efficiency scores (VRS/VRS) under input oriented assumption by MAXDATA 6.3 Beta program. Based on these scores, we ranked the regions, starting from efficiency scores which show the best combination of inputs for a given level of output.

By using this method our aim was to measure rural labor efficiency. Inside the DEA model, we used the rural population from agriculture, industry and constructions as inputs, and the rural gross domestic product as output. The forecast of these variables for year 2020 was made starting from the 2006-2013 data, based on a three year moving average trend. The research had the following steps:

- compute the three year moving average for variables and the centered moving average;
- apply the linear trend equation by a regression function:

$$Y_i = a + b t, \text{ where:}$$

'Y' - the projected value of Y for a selected value of t

'i' - the region

'a' - the free element

'b' - correlation coefficient, respectively the mean change in Y from a one unit change of t

't' - time

The 2013-2020 variables dynamics and the ranking of regions based on projected technical efficiency were compared with the DEA parameters for 2013. In this way we identified the solutions to reach performance and efficiency in labor use.

## RESULTS AND DISCUSSIONS

According to the DEA analysis, in 2013, the most efficient regions were the Central and the South-West. Also, we identified a region with high efficiency, over 70% (the West region), two regions with average efficiency, between 50-70% (the North-West and the South-East regions) and two regions with low efficiency, under 50% (the North-East and South-Muntenia) (Table 1).

The North-East region is ranked as the last

with inefficiency of almost 70% proving a sub-optimal dimension of human resources compared to the obtained DGP. The medium technical efficiency under the CRS assumption was 0.6889 and under the VRS assumption was 0.8495, which means that the regions should reduce the inputs by almost 15% in order to reach the production frontier.

Table 1. The DEA model (inputs – population from agriculture, industry and constructions; output – gross domestic product)

	CRS 2013	VRS 2013	RTS	Efficiency
Central	1.0000	1.0000	CRS	Max.
North-East	0.3321	0.4445	IRS	Low
North -West	0.6628	0.7064	IRS	Average
South - Muntenia	0.4916	1.0000	DRS	Max. VRS
South - East	0.5210	0.7956	IRS	Average
South -West	1.0000	1.0000	CRS	Max.
West	0.8149	1.0000	IRS	Max VRS
Average	0.6889	0.8495		

Source: MAXDATA 6.3 Beta

In South-Muntenia region, which experienced decreasing returns to scale (economies of scale), inefficiency is mainly due to the high dimension of the output faced with the capacity of existing human resources (inputs should be increased, especially in agriculture and industry) (under the region VRS assumption it is more performant). In the West region, which experienced increasing returns to scale, the inefficiency under CRS and the efficiency under VRS demonstrate that this region must decrease human resources in all three branches. In the South-East, North-West and North-East regions, inefficiency is due to the low level of GDP relative to inputs (increasing returns to scale, economies of scale) which means that they must reduce inputs, especially in agriculture, and increase GDP.

The DEA recommendations for optimization, under the VRS assumption were to decrease human resources and to increase GDP for the North-East, the North-West and the South-East, the other regions being at optimum efficiency under the VRS assumption. Our forecast, based on the evolution of variables in the intervals 2006-2013, shows a variation of inputs variables between regions (Table 2). Based on 2006-2013 trends, in the Central Region we may observe a marked decrease in

population in agriculture, a slight decrease of population in industry and a rise of population in constructions. If this tendencies are maintained, this region can keep an optimal structure compared to the other regions (Table 3).

Table 2. The evolution of variables compared with the recommendation from the DEA performed for 2013

		AGR	IND	CONS	PIB
Central	DEA - 2013	-	-	-	-
	2013-2020 (%)	38.9	63.1	115.9	116.1
North-East	DEA - 2013	↓	↓	↓	↑
	2013-2020 (%)	118.5	95.9	95.0	115.1
North -West	DEA - 2013	↓	↓	↓	↑
	2013-2020 (%)	114.0	131.4	111.3	113.2
South - Muntenia	DEA - 2013	-	-	-	-
	2013-2020 (%)	59.6	57.2	96.7	136.4
South - East	DEA - 2013	↓	↓	↓	↑
	2013-2020 (%)	104.9	68.2	81.0	127.4
South -West	DEA - 2013	-	-	-	-
	2013-2020 (%)	117.2	41.7	34.2	126.7
West	DEA - 2013	-	-	-	-
	2013-2020 (%)	92.2	102.1	110.7	123.9

Source: MAXDATA 6.3 Beta

Table 3. DEA - 2020

		CRS 2020	2013-2020 (%)	VRS 2020	2013 - 2020 (%)
Central	DEA - 2013	1.0000	100.0	1.0000	100.0
	2013-2020 (%)				
North-East	DEA - 2013	0.2447	73.7	0.3511	79.0
	2013-2020 (%)				
North - West	DEA - 2013	0.5138	77.5	0.5827	82.5
	2013-2020 (%)				
South - Muntenia	DEA - 2013	0.6394	130.1	1.0000	100.0
	2013-2020 (%)				
South - East	DEA - 2013	0.5596	107.4	0.8314	104.5
	2013-2020 (%)				
South - West	DEA - 2013	1.0000	100.0	1.0000	100.0
	2013-2020 (%)				
West	DEA - 2013	0.7705	94.6	1.0000	100.0
	2013-2020 (%)				
		0.6754	98.0	0.8236	96.9

Source: MAXDATA 6.3 Beta

On the other hand, in the South-West and South-East regions, the optimal structure is reached based on the rise of population from agriculture and a high decrease of population from industry and constructions. This is not a viable solution to reach performance. The regions need to raise the GDP and to sustain the sectors with a real impact on economic growth.

By 2020, South-Muntenia region will remain performant under the VRS assumption and will show an increase of technical efficiency by 30.1%. We recommend, however, the

growth of population from industry and the growth of GDP and labor productivity in this branch.

If the current trends are kept, the North-East, North-West and West regions may show an increase in inefficiency and a raising gap faced with the optimal structures of the other regions over the next few years. This requires reducing the population in agriculture and promoting employment in industry and constructions to support the economic growth.

## CONCLUSIONS

In conclusion, the comparative analysis of people occupied in agriculture, industry and constructions versus the GDP reveals that, at the current level of output, the most efficient regions are the Central and South-West ones, while, in order to achieve an optimum size, other regions (excepting the South and West) should decrease inputs (especially agricultural workers) and increase GDP. By 2020, the Central region maintains optimal structure due to the decrease of employment in agriculture and industry and population growth in constructions; the South-West and South-East regions remain effective due to population growth in agriculture and declining employment in industry and constructions (non-optimal economic situation); by 2020, South-Muntenia region will remain effective under the VRS assumption and will register an increase of technical efficiency by 30.1%; the North-East, North-West and West regions present a growing inefficiency and a gap against the optimal structures of other regions.

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## **SUSTAINABLE DEVELOPMENT OF NORTH-EAST REGION DURING 2007-2013 - REFLECTIONS ON REGIONAL DEVELOPMENT STRATEGY IMPLEMENTATION**

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### **Abstract**

*The present paper aims to emphasize the evolution of sustainable development during the 2007-2013 period in the North-East region of Romania, as against the strategic objectives established by the Regional Development Strategy. The sustainable development at regional level can be measured by a group of indicators, established by Eurostat and collected by the National Institute of Statistics, which cover the economic, social and environmental specific dimensions. The paper employed a qualitative analysis of strategic objectives and a quantitative analysis of the main strategic result indicators in order to assess the evolution of the North-East region towards sustainable development. The results revealed the inefficiency of strategic measures and the low impact on the sustainable development of the region.*

**Key words:** *strategic objectives, sustainable development, economic, social and environmental dimensions*

### **INTRODUCTION**

“Sustainable development is development which aims to meet the needs of the present without compromising the ability of future generations to meet their own needs” [10] represents the guiding line which stands on actual policies and strategies. The sustainable development represents a priority at global and European level, the implementation of durable national strategies being assumed by over 145 countries since the ‘90s. These strategies had the purpose to mobilize and concentrate the society achievements towards sustainable development [2], by creating frameworks for a durable future and frameworks for consensus and construction for institutional capacity [6].

Agenda 21 of the European Union established that these kinds of strategies need to incorporate economic, social and environmental sectorial policies and plans and in the meanwhile, to protect the resources for the benefits of a future generation [11].

In addition, there must be pointed out the necessity to establish and collect specific indicators which can measure the

implementation of strategic objectives (sustainable development indicators) that can be included in progress reports [9].

Despite the objectives of Agenda 21, the national strategies regarding sustainability didn’t have obvious implications on production or consumption patterns [8].

Only in 2009, the European Council demanded a review of the European Sustainable Development Strategy (SDS, from 2006) [3] and an improvement of implementation, evaluation and monitoring mechanisms [5].

After the Agenda 21 and SDS implementation, the European countries are considered to be the first in the formulation and implementation of SDS [12].

At present, through the 2020 Strategy [4], the European Commission integrated the sustainable development in one vision under the idea of smart, sustainable and inclusive growth.

Romania has an approved strategy since 2008 (Sustainable Development Strategy 2013-2020-2030), but according to the European Network for Sustainable Development

(ESDN) it doesn't respect the key objectives of European SDS.

However, this remains the main strategic document which integrates the sustainable development objectives of Romania.

## MATERIALS AND METHODS

The main objective of the Regional Development Strategy of the North-East set for 2007-2013 was: "reducing disparities compared to other regions and reducing interregional disparities".

The strategy set out five key priorities which contribute to an increased competitiveness and attractiveness of the region [7]: infrastructure and environment; business support; tourism; rural development; development of human resources and social services.

Our qualitative analysis revealed that the strategy doesn't propose concrete and measurable actions (projects, time, funds, etc.) which gives a confusing picture of the measures that were actually pursued during the implementation.

In these conditions the efforts were focused on the quantitative analysis, but the lack of result indicators (progress monitoring) leads us to adapt the sustainability indicators to each strategic objective and to identify measurable outcome indicators capable to assess the implementation of these policy measures at the regional level. The sustainable indicators time series for 2007-2013 were analyzed by using:

- the annual average rate of dynamic

$$\bar{i} = \sqrt[n-1]{\prod I_{t/t-1}} = \sqrt[n-1]{I_{t/1}} \quad (1)$$

$$\bar{R} = (\bar{i} - 1) \times 100 \quad (2)$$

where:  $I_{t/t-1}$  – partial average rates of dynamic;  
 $n$  – the number of years;

- the linear trend equation (to estimate the trend for the 2007-2013 period based on a three year moving average evolution of indicator during the 2000-2006 period):

$$Y = a + bt$$

(3)

where:  $Y$  – the projected value for a selected value of  $t$ ;  $a$  – estimated value when  $t=0$ ;  $b$  – the slope in the line;  $t$  – value of time (coded).

## RESULTS AND DISCUSSIONS

### Economic dimension of sustainability

**Gross Domestic Product per capita** (RON/capita) had lower dynamics during the 2007-2013 period (20.2%) as against the 2000-2006 period (35.2%) due to the financial crisis (Fig. 1). In this way, the region didn't succeed to continue the previous rising trend and the disparity reached 37.9% toward the average national real GDP/capita.

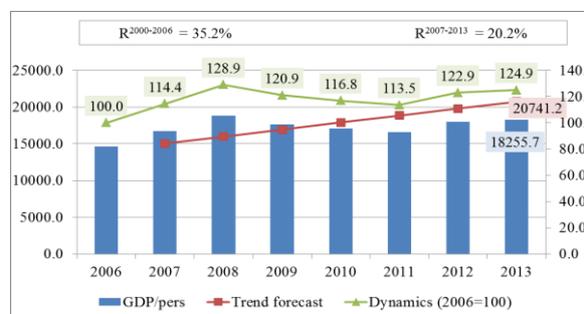


Fig.1. Real GDP per capita, 2006-2013 periods

### The number of active entrepreneurs to 1000 persons

reveals a contraction of the business environment. In 2013 there were 13.6 enterprises/ 1000 persons, with almost 5% less than in 2006 (Fig. 2). Also, the strategic objectives for increasing the active firms in the processing industry failed, this sector having the highest decrease.

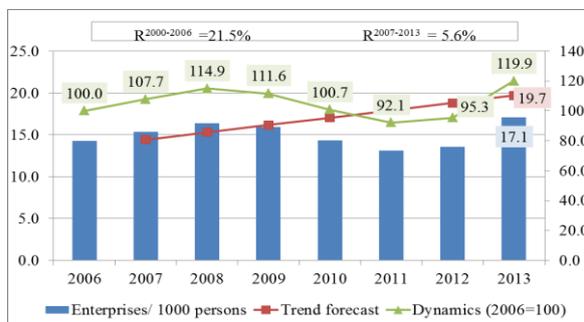


Fig.2. Number of active entrepreneurs to 1000 persons, the 2006-2013 period.

The economic crisis also affected the touristic sector, where, even the touristic accommodation capacity increased, the **Index of net using the touristic accommodation**

capacity in function decreased from 28.9% in 2006, to a value of 21.4% in 2013 (Fig. 3). The support of the business environment by transfers of innovation and new technologies was also very low.

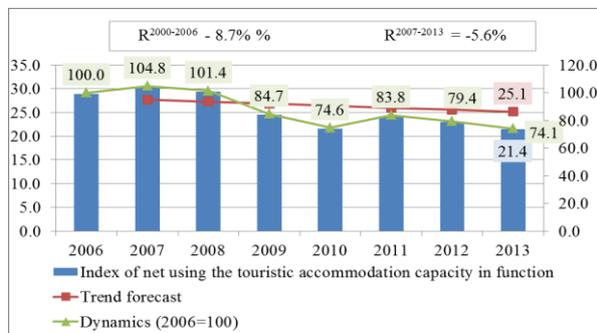


Fig.3. Index of net using the touristic accommodation capacity in function, 2006-2013 periods

After the restructuring from 2005-2006, the research and development activities showed a slow increase, but they represented only 0.38% from the GDP in 2012 (Fig. 4). In this way the sector fails to become an “engine” sector of the regional economy and a real contributor to the regional turnover [11].

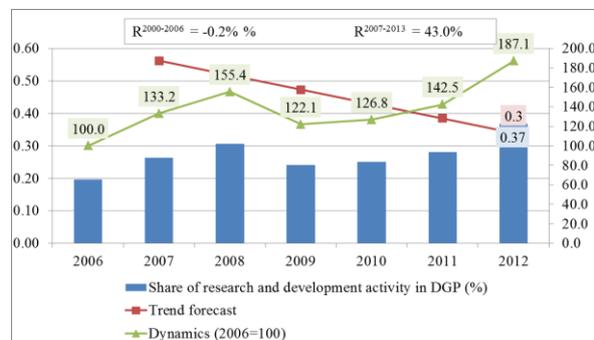


Fig.4. Share of research-development activity in GDP (%), 2006-2012 periods

**Social dimension of sustainability**

**Living conditions – Roads infrastructure**

**The degree of public roads modernization (county and municipal) (%)** – During the 2007-2013 period, the public roads increased with an annual average rate of dynamic of 3.6%.

On the other hand, the degree of modernization increased annually with over 34%, but in 2013 only 20.5% of roads were modernized (Fig. 5).

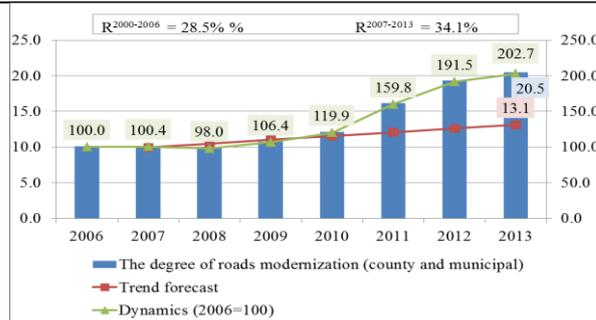


Fig.5. The degree of public roads modernization (%), the 2006-2013 period.

**Living conditions – drinking water system**

**The length of the drinking water distribution network (km)** - The volume of water supplied decreased at an annual rate of 29% in 2000-2006 and with 14.9% in 2007-2013 due to the population reduction and to the closure of many industrial sectors. Therefore, in 2013, only 40% of population had access to the drinking water distribution network. However, the length of the network increased with 35,5%, with an annual rate of 16-18% (Fig. 6).

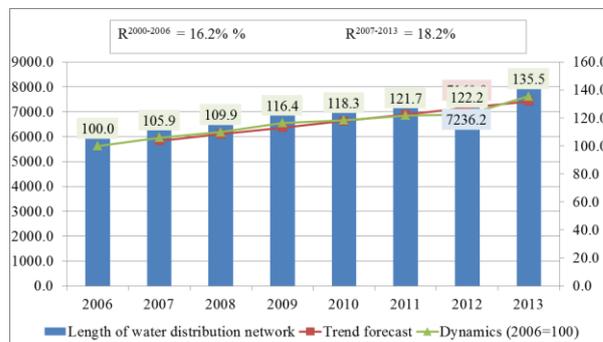


Fig.6. The length of the drinking water distribution network (km), the 2006-2013 period

**Living conditions – sewerage system**

**The length of the sewerage network** - This network increased by 25.4% as compared to 2006, the annual growth rate during the 2007-2013 period being 12.4% compared to only 3.6% in the 2000-2006 period. (Fig. 7)

**Living conditions – Health services**

**Death rate due to chronic diseases** - The rate increased during the 2007-2013 period by 4.1% to 1124.0 deaths per 100,000 persons.

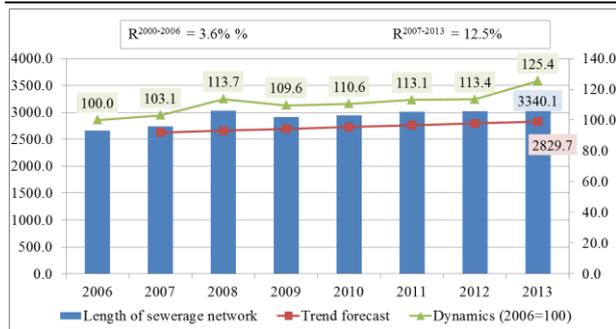


Fig.7. The length of sewerage network (km), the 2006-2013 period

Our analysis revealed a worsening health of the population, even in the same period the number of doctors increased (Fig. 8).

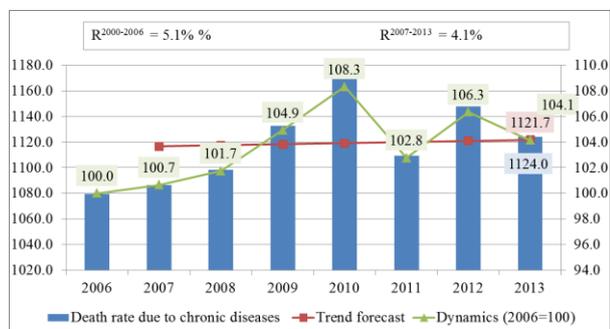


Fig.8. Death rate due to chronic diseases (%), the 2006-2013 period

### Employment and social inclusion

**Poverty rate (%)** – In the North-East region, in 2012, over 52% of population (1,935.0 thousand persons) were at risk of poverty or social exclusion and almost 34% were living in poverty (Fig. 9)

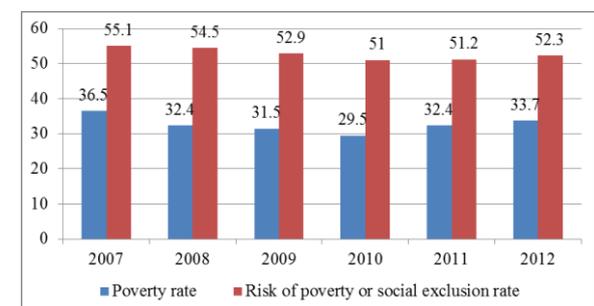


Fig.9. Poverty rate (%) and Risk of poverty or social exclusion rate (%), the 2006-2012 period

### Environment dimension of sustainability

**Area of forestry fund (thou ha)** - One of the strategic objectives for the 2007-2013 period, was to increase the forestry fund through afforestation activities.

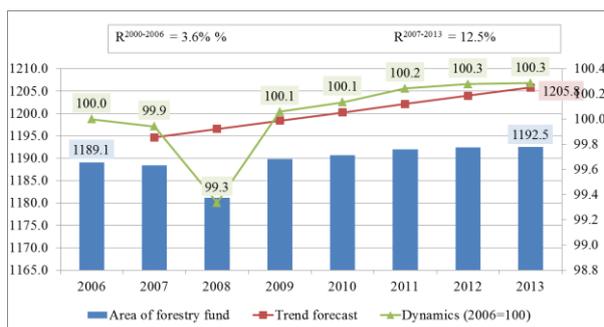


Fig.10. Area of forestry fund (thou ha), the 2006-2013 period

But during this period, the forestry area increased with only 0.3% (3400 ha) while harvested wood mass increased with over 34% (Fig 10).

## CONCLUSIONS

An assessment of the sustainable development indicators for 2007-2013 allowed us to extract the following conclusions for the North East region: a slight economic growth, accompanied by an increase in the employment rate and a reduction in unemployment; the business sector remains underdeveloped; road infrastructure developed too slow; water and sewage networks have expanded, but the number of connected villages is still very low; the health of the population has declined while the number of medical personnel increased; over 30% of the population is in poverty and over 52% of the population is at risk of poverty or social exclusion; R&D sector remained at about 0.38% of GDP, while the number of employees was decreasing.

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## NORTH-EAST REGION - SUSTAINABLE DEVELOPMENT INDICATORS FORECAST 2014-2022

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### **Abstract**

*The present paper aims to forecast the evolution of the main sustainable development indicators for the North-Eastern region of Romania in accordance with their trends from the 2000-2013 and 2007-2013 periods. Our purpose was to compare and complete the result indicators of the Regional Development Strategy of the North-East Region for 2014-2020 and to improve, in this way, the monitoring process in the future. With this objective in mind, we concentrate our quantitative analysis on the main sustainable indicators which can be correlated with the strategic objectives. The results revealed that many indicators are over-dimensioned and that many sustainable indicators are not included in the monitoring process.*

**Key words:** assessment, sustainable development, development strategy, trends

### **INTRODUCTION**

Since the Brundtland Report (1987) [5] and the Rio Conference (1992) in the implementation and monitoring process of sustainable development were involved governments, organizations, universities, researchers, etc. All these entities developed indicators in order to understand the progress of implementation of the sustainable development strategies and guidelines. Until now, in the UN initiative for monitoring sustainable development there were involved over 1500 organizations in from 60 countries that have created more than 1,000 reports in the field [6].

The concept of sustainable development has been widely accepted and there has been recent progress in developing its measurement systems. However, progress has been much lower in the actual implementation of sustainable development measures [3] and the integration of the three pillars (economic, social, environmental) remains problematic because during international meetings "concrete discussions about moving towards a global economy based on reduced emissions of carbon are avoided... and international discussions have become disconnected from

the real world politics "[2]. Although national governments have developed plans and strategies for sustainable development, the implementation activities didn't produce fundamental changes, these activities focusing on the introduction of the sustainability concept in society and on some fiscal ineffective measures [1].

Post-2015 Millennium Development Goals Agenda [7] aims to integrate the economic, social and environmental dimensions of sustainability, this time providing 17 objectives and involving over 100 countries (six regional consultations and 11 thematic consultations at world level).

In Romania, the first Sustainable Development Strategy was developed in 1997-1999 with the assistance of the United Nations Development Programme (UNDP) and involved a participatory approach coordinated by the Romanian Government. This document has provided the methodological framework for the implementation of Agenda 21 and was revised in 2008. In 2013 was elaborated the National Strategy for Regional Development which includes several aspects meant to ensure sustainable development.

**MATERIALS AND METHODS**

The main objective of the Regional Development Strategy of the North-East set for 2014-2020: “achieving sustainable economic growth, favorable to economic competitiveness and social inclusion”, which can lead to a decrease of the gaps between regions.

The strategy set out four priorities which contribute to increasing competitiveness and attractiveness of the region [4]: improving human capital; modern infrastructure development; supporting a competitive economy and local development; optimum use and protection of natural resources. The strategy integrates all three dimensions of sustainable development, proposing detailed objectives and outcome indicators, from which but not all are measured. The future monitoring process is based on a set of measurable indicators selected by the authors, that are meant to capture the essential regional impact.

Our approach was to determine how to evaluate the future implementation of strategic objectives (2014-2020) based on statistical socio-economic and environmental indicators and in the same time, to forecast the sustainable development evolution in accordance with the national and local INS-EUROSTAT methodology [2].

We focused on the main indicators afferent to the national objectives of sustainability. For each indicator we computed the linear trend equation (to estimate the trend for the 2014-2020 period, based on a three year evolution of the moving average indicator during the 2000-2013 and 2007-2013 period):

$$Y = a + bt$$

where: Y – the projected value for a selected value of t; a – estimated value when t=0; b – the slope in the line; t – value of time (coded).

**RESULTS AND DISCUSSIONS**

During the future implementation of the Regional Development Strategy for the North-Eastern Region 2014-2020, sustainable development objectives are to be pursued directly or indirectly through four strategic

priorities and related measures. The objectives pursued are partially expressed through outcome indicators, which is why we propose concrete ways of tracking the process of sustainable development by correlating the trends from the last decade with strategic targets and with national objectives for sustainable development.

**National objective - Structural changes and macroeconomic equilibrium**

**Disparity index for the GDP/capita**

The proposed strategy of the disparity index of 25%, is not feasible in the context of the regional development from the last decade. We recommend maintaining the disparity at the level of 2013 or at least lower than 42.7% (Table 1).

Table 1. Disparity index for the GDP/capita (%)

Baseline	2000-2013	2007-2013
Trend Equation	Y = 70,49 - 0,98 t	Y = 62,45 - 0,365 t
2013	37.9	
2014	42.3	39.7
2015	43.2	40.1
2016	44.2	40.5
2017	45.2	40.8
2018	46.2	41.2
2019	47.2	41.6
2020	48.1	41.9
2021	49.1	42.3
2022	50.1	42.7
Strategic objective	25%	

**Active enterprises per 1000 inhabitants**

The strategy proposes 20 enterprises per 1000 inhabitants, but the potential is higher. We recommend supporting the creation of over 30000 new firms, so the number of enterprises per 1000 inhabitants can reach a value over 22 (Table 2). The annual rate of establishment has to be over 16.4%.

Table 2. Active enterprises per 1000 inhabitants

Baseline	2000-2013	2007-2013
Trend Equation	Y = 10,28 + 0,57 t	Y = 16,57 - 0,818 t
2012	13.6	
2013	17.2	12.5
2014	17.8	11.7
2015	18.3	10.8
2016	18.9	10
2017	19.5	9.2
2018	20	8.4
2019	20.6	7.6
2020	21.2	6.7
2021	21.8	5.9
2022	22.3	5.1
Strategic objective	20	

**Share of employment in agriculture (%)**

The strategy proposes a decrease of the share to 35% in 2022. Based on the evolution from the last decade, the indicator can decrease with only 5.7% per year. In this condition, the share will reach a value of minimum 42.9%, therefore, the strategy's target is not feasible (Table 3).

Table 3. The share of employment in agriculture

Baseline	2000-2013	2007-2013
<b>Trend Equation</b>	<b>Y = 51.92 – 0.429 t</b>	<b>Y = 48.44 – 0.001 t</b>
2013	47.3	
2014	46.3	48.4
2015	45.9	48.4
2016	45.5	48.4
2017	45.1	48.4
2018	44.6	48.4
2019	44.2	48.4
2020	43.8	48.4
2021	43.3	48.4
2022	<b>42.9</b>	<b>48.4</b>
<b>Strategic objective</b>	<b>35%</b>	

**National objective – sustainable transport**

**Degree of modernization of public roads (rural and municipal) (%)**

Our forecasts reveal a potential of growth between 12.3% (baseline 2000-2013) and 92.5% (baseline 2007-2013). In these conditions, the share can reach 23-39.4%, which means over 4500 km of modernized roads (Table 4). Even this target is high, but the strategy's target of 60% is obviously not reachable if we take into consideration that in the last seven years there have been modernised only 1300 km.

Table 4. Degree of modernization of public roads (rural and municipal) (%)

Baseline	2000-2013	2007-2013
<b>Trend Equation</b>	<b>Y = 5.59 + 0.83 t</b>	<b>Y = 7.93 + 2.25 t</b>
2013	20.5	
2014	16.4	21.4
2015	17.2	23.7
2016	18	25.9
2017	18.8	28.2
2018	19.7	30.4
2019	20.5	32.6
2020	21.3	34.9
2021	22.2	37.1
2022	<b>23.0</b>	<b>39.4</b>
<b>Strategic objective</b>	<b>60%</b>	

**National objective – Sustainable production and consumption**

**Rural localities with water distribution network**

According to our forecasts, the water distribution network has a potential of expanding with 2400 km (70%) in rural areas. This means that about 85 villages could have access to drinking water systems, but only if the infrastructure works are implemented with an annual rhythm of 16.4% (13-14 villages/year). In these conditions, around 66% of the population will benefit from water infrastructure (faced with 80% - strategic target).

Table 5. Rural localities with water distribution network

Baseline	2000-2013	2007-2013
<b>Trend Equation</b>	<b>Y = 215.73 + 8.51 t</b>	<b>Y = 285.92 + 3.33 t</b>
2013	309	
2014	326	306
2015	335	309
2016	343	313
2017	352	316
2018	360	319
2019	369	323
2020	377	326
2021	386	329
2022	<b>394</b>	<b>333</b>
<b>Strategic objective</b>	<b>80% of population</b>	

**Rural localities with sewage network**

Regarding the sewage systems, our calculation reveals a potential of construction of only 360 km (at an annual average rate of 1.5%), which means only 15 villages (a maximum 5% of population) (Table 6). In this condition, only 35% of population will benefit, not 65% as expected in the strategy.

Table 6. Rural localities with sewage network

Baseline	2000-2013	2007-2013
<b>Trend Equation</b>	<b>Y = 88.68 + 1.36 t</b>	<b>Y = 93.75 + 3.13 t</b>
2013	123	
2014	106	113
2015	108	116
2016	109	119
2017	110	122
2018	112	125
2019	113	128
2020	115	131
2021	116	134
2022	<b>117</b>	<b>138</b>
<b>Strategic objective</b>	<b>65% of population</b>	

**National objective – Conservation and management of natural resources**

**Area of forestry fund (thou ha)**

The strategy proposes the reduction of the slope phenomenon for 250000 ha, including by afforestation. We propose that at least 7%

of this target should be done by afforestation therefore, at a regional level, we may have an increase of forestry fund (at least 17500 ha) (Table 7).

Table7. Area of forestry fund (thou ha)

Baseline	2000-2013	2007-2013
<b>Trend Equation</b>	<b>Y = 1186,84 + 0,33 t</b>	<b>Y = 1185,34 + 1,77 t</b>
2013	1192.5	
2014	1191.1	1196
2015	1191.5	1197.7
2016	1191.8	1199.5
2017	1192.1	1201.3
2018	1192.5	1203.1
2019	1192.8	1204.8
2020	1193.1	1206.6
2021	1193.5	1208.4
2022	1193.8	1210.1
<b>Strategic objective</b>	<b>25 thou ha – slope phenomenon reduction</b>	

### National objective – Public Health

#### *Infant mortality rate – rural areas*

Regarding the health services in the last years, the infant mortality rate decreased. Based on this trend, our forecast shows that the target established by the strategy, of 8% can be reached. (Table 8)

Table 8. Infant mortality rate (%)

Baseline	2007-2013
<b>Trend Equation</b>	<b>Y =14.25 - 0,523 t</b>
<b>2013</b>	<b>10.4</b>
2014	11.11
2015	10.59
2016	10.06
2017	9.54
2018	9.02
2019	8.49
2020	7.97
2021	7.45
2022	<b>6.92</b>
<b>Strategic objective</b>	<b>8%</b>

### National objective - Social inclusion, demography and migration

#### *Risk of poverty and social exclusion rate (%)*

Table 9. Risk of poverty and social exclusion rate (%)

Baseline	2007-2012
<b>Trend Equation</b>	<b>Y =54,328 – 0,942 t</b>
<b>2012</b>	<b>52.3</b>
2013	49.6
2014	48.7
2015	47.7
2016	46.8
2017	45.9
2018	44.9
2019	44
2020	43
2021	42.1
2022	<b>41.1</b>
<b>Strategic objective</b>	<b>3.5%</b>

This indicator’s trends reveal a potential of decreasing the rate with 1.4% annually, which means around 400 thou people.

This would mean a rate of 41.1% in 2022. We believe that the rate of 3.5% - reducing persons at risk from 1.95 million to just 127000 - is not realistic.

## CONCLUSIONS

In conclusion, the research conducted, based on the analysis of the Regional Development Strategies in the North-East for 2014-2020 and the trend line for sustainable development indicators, aims to improve the future implementation of the strategic objectives by offering progress monitoring solutions, through limiting the oversized values. The target indicators proposed in this work allow a realistic estimation by measuring the impact of strategic objectives. In this context, we believe that the outcome indicators proposed and substantiated from the previous trend of the region, for all 2014-2020 strategic priorities, can be better shaped into a major impact on regional sustainable development.

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## CONSIDERATIONS ON THE TRENDS OF INTERNATIONAL TOURIST FLOWS

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### *Abstract*

*The paper purpose was the purpose to analyze the flow of international tourists in the period 1980-2012 using the empirical data provided by UNWTO. In 2012, tourist arrivals reached 1,035 and in 2030 it is expected to exceed 1,800 million. The market share of main geographical regions in 2012 was the following one: Europe 51.61 %, Asia and the Pacific 22.57 %, the Americas 15.75 %, Africa 5.06 % and the Middle East 5.01 %. The top 10 countries receiving tourists and their market share at world level was the following one: France 8.21 %, the USA 6.63 %, China 5.71 %, Spain 5.71 %, Italy 4.59 %, Turkey 3.53 %, Germany 3 %, United Kingdom 2.90 %, Russia 2.54 %, Malayezia 2.47 %. All these 10 countries were visited by 457.9 million tourists in 2012, representing 45.75 % of the world tourist arrivals. Europe is the main source of international tourists, supplying over 50 % of the world tourists, followed by Asia and the Pacific with 23 %, the Americas with 17 %, the Middle East with 3 % and Africa with 3 %. Europe generates the most important tourism flows.*

*Key words:* tourism flows, international tourism, trends

### INTRODUCTION

Tourism is the most dynamic branch of the world economy with a deep impact on the development of other economic branches.

Nowadays, it is a real "industry" giving an important contribution to gross domestic product, employment, and payment balance in many countries.[14].

At global scale, the volume of tourism business exceeded the volume of oil, food and car exports [18].

The increased living standard, the longer free time and vacations, the higher income, the need to explore other destinations and extend culture and education of the people have stimulated the growth and diversification of the demand for tourism products and services and continuously developed and enlarged the tourism offer. As a result during the last decades tourism was facing as remarkable growth of tourism flows and receipts.[1, 7,9,10]

Tourism development is deeply influenced a large variety of factors such as: political, economic, social, environmental and

technological factors. [8,12]

Among the most important trends in the evolution of these factors could be mentioned:(a)*The economic trends* regarding the macroeconomic policies, transport liberalization, the growth of trade and investments, and fast extend of private business, (b)*The social trends* in terms of increased tourism demand and number of travelers, the need to "escape" of stress in week-ends and vacations, population aging, the seek of new experiences, the increased attention paid to health, well-being, culture, education, self improvement, (c)*The political trends* represented by the change in political forces at world level, the appearance of many regional conflicts, (d) *The environmental trends* regarding climate change, global warming, destroy of ozone cover, increased sun radiation, rise of the sea-water level, change of ocean streams, the melt of polar ice, loss of snow straw, will determine tourism movement to higher altitudes and latitudes [2], to destinations with the preferred climate by tourists according to their age, health status and income [3, 17], also the need to preserve

biodiversity and reduce pollution (e) *Technological trends* regarding the gains in information and communication technology, infrastructure, (f) *The change in natural resources* related to a higher food requirement, water diminished resources, high energy consumption, (g) *The travel safety and security* concerning more frontier control due to the increasing terror acts and danger for spreading infectious diseases. All these factors will have a deep influence on tourism flows, but also on tourism management and marketing of products and services, This imposes as tourism to be flexible and fast adapt to changes by establishing corresponding strategies. [4,5]

In 2013, tourism arrivals reached 1,087 billion by 52 billion more tourists than in 2012, reflecting a 5 % growth rate. The growth rate is different from a geographical region to another showing changes from the traditional destinations. Thus, the growth rate was +6% in Asia and the Pacific, +6% in Africa, +5% in Europe and + 4% in the Americas. (Fig.1).[13]



Fig.1. Growth rate in tourist arrivals in 2013  
Source: UNWTO, Tourism Highlights, 2013 [16].

Comparing outbound and inbound tourism, domestic tourism is several times larger than international tourism.[6].

In this context, the paper aimed to analyze the dynamics of tourism flow during the last decades in order to identify the major trends regarding tourist arrivals at world level and by geographical area and sub regions, tourist structure by country of origin and destination

country, the most visited countries at world level and by geographical areas.

## MATERIALS AND METHODS

The paper is based on a large documentation including the updated and well known UNWTO publications providing empirical data in the field of tourism such as: Tourism Highlights, Tourism Market Trends, World Tourism Barometer, as well as various articles regarding the evolution of tourism flows. [15,16,19,20,21].

The period of reference was 1980-2012 and mainly 1990-2012, and the specific indicators taken into consideration to characterize international tourism flow have been the following ones: tourist arrivals in million persons, tourist arrivals by geographical area in million persons, structure of tourist arrivals in percentage by geographical area, the market share of the geographical areas in the international tourism, the market share by subregion, average annual growth rate of tourist arrivals at world level and by geographical areas, tourist arrivals by destination country, the top 10 countries receiving tourists and their market share in the world tourism, tourist arrivals by country of origin.

The dynamics of tourism was studied based on fixed indices and structural indices allowing comparisons at world level and also by geographical areas and sub regions.

## RESULTS AND DISCUSSIONS

**World tourist arrivals.** In the period 1980-2012, the number of tourist arrivals increased 3.72 times from 287 millions in the year 1980 to 1,035 millions in 2012 (Table 1).

Tourist arrivals vary according to the season, in general recording the highest level in the month of July, the period of vacations and the lowest level in January and February ( Fig.2).

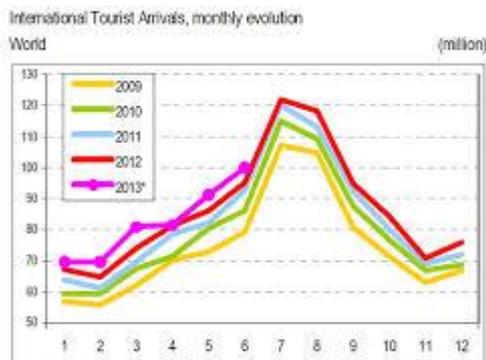
**The growth of tourist arrivals by geographical areas.** Asia and the Pacific registered the most dynamic growth, 10.15 times from 23 million arrivals in 1980 to 233.6 million arrivals in 2012. On the 2nd

position came Africa where the tourist arrivals increased 7.17 times from 7.3 million in 1980 to 52.4 million in 2012.

Table 1. International tourists arrivals, 1980-2012 ( Millions)

	1980	1985	1990	1995	2000	2005	2010	2012	2012/1980 %
Arrivals of international tourists	277.6	319.5	437.7	539.4	686.8	806.3	949	1,035	372.83

Source: Tourism Highlights, 2013, UNWTO, [16]. Own calculations



Source: World Tourism Organization (UNWTO) ©

Fig.2. The monthly evolution of tourist arrivals

times from 7.5 million in 1980 to 52 million in 2012. In 2010, the Middle East was visited by 58.2 million tourists, but then, due to the political instability in the Arabian area, the number of tourists declined to 52 million in 2012. On the 4th position is situated Europe, where in 2012 it was registered a number of 534.2 million tourist arrivals, 3 times more than in the year 1980 ( 177.5 million). On the last position are situated the Americas where the tourist arrivals increased only 2.61 times from 62.3 million in 1980 to 163.1 million in 2012 (Table 2).

On the 3rd position is the Middle East where the number of tourist arrivals increased 6.93

Table 2. The dynamics of international tourist arrivals by geographical regions

	1980	1985	1990	1995	2000	2005	2010	2012	2012/1980 %
<b>World</b>	<b>277.6</b>	<b>319.5</b>	<b>437.7</b>	<b>539.4</b>	<b>686.8</b>	<b>806.3</b>	<b>949</b>	<b>1,035</b>	<b>372.83</b>
Africa	7.3	9.6	15.2	20.3	28.2	36.7	49.9	52.4	717.80
Americas	62.3	65.1	92.8	109.0	128.2	133.5	150.4	163.1	261.79
Asia and Pacific	23.0	32.9	56.1	82.7	111.4	155.5	205.1	233.6	1,015.65
Europe	177.5	203.4	263.6	313.1	393.8	441.5	485.5	534.2	300.95
Middle East	7.5	8.5	10.0	14.3	25.2	39.1	58.2	52.0	693.33

Source: Tourism Highlights, 2013, UNWTO, [16]. Own calculations

**The structure of tourist arrivals by geographical area.** In 2012, Europe preserved its top position regarding the number of tourist arrivals with a share of 51.61 % in the world tourist arrivals.

Table 3. The structure of tourist arrivals by geographical area, 1980-2012 (%)

	1980	1985	1990	1995	2000	2005	2010	2012
WORLD	100	100	100	100	100	100	100	100
Africa	2.62	3.00	3.47	3.76	4.10	4.55	5.25	5.06
The Americas	22.44	20.37	21.20	20.20	18.66	16.55	15.84	15.75
Asia and The Pacific	8.28	10.29	12.81	15.33	16.22	19.28	21.61	22.57
Europe	63.94	63.66	60.22	58.04	57.33	54.75	51.15	51.61
Middle East	2.72	2.68	2.30	2.67	3.69	4.87	6.15	5.01

Source: Own calculations

This weight is smaller compared to the one recorded in the year 1980 (63.94 %), reflecting a less importance of Europe in the world tourism. Also, in 2012, on the 2nd position are placed Asia and the Pacific with a share of 22.57 % in the world tourist arrivals, a higher weight compared to 8.28 % recorded in 1980, when this geographical area occupied the 3rd position in the world. Therefore, it was noticed a growth of the tourist flow in this geographical area. [11]. ( Table 3)

On the 3rd position are situated the Americas, weighting 15.75 % in the world tourist arrivals in 2012 compared to 22.44 % in 1980, reflecting a decreasing trend in the number of international tourists visiting this geographical region. On the 4th position it is

situated Africa with a share of 5.06 % in 2012 in comparison with 2.62 % in 1980, showing a higher interest of tourists to visit the countries of this continent.

On the 5th position came the Middle East with a share of 5.01 % in the world tourist arrivals in 2012 compared to 2.72 % in 1980. It is important to notice that the Middle East enjoyed an increased number of tourist arrivals in 2010, when its weight accounted for 6.15 % placing this geographical area on the 4th position in the world, but, later it registered a decreasing trend because of the internal war in the Arabian area which positioned this geographical region on the last position in the world ( Table 3).

Table 4. The market share of the geographical areas in the international tourism according to tourist arrivals flow

	1990	1995	2000	2005	2010	2012	2012/1990 %	Market share in 2012 %
<b>WORLD</b>	<b>2. 437.7</b>	<b>3. 539.4</b>	<b>4. 686.8</b>	<b>5. 806.3</b>	<b>949</b>	<b>1,035</b>	<b>236.46</b>	<b>100</b>
<b>Europe</b>	<b>6. 263.6</b>	<b>7. 313.1</b>	<b>8. 393.8</b>	<b>9. 441.5</b>	<b>485.5</b>	<b>534.2</b>	<b>202.65</b>	<b>51.61</b>
10. Northern Europe	30.3	39.4	44.6	52.9	62.8	64.9	214.19	6.27
11. Western Europe	108.6	112.2	139.7	142.7	154.3	166.6	153.40	16.09
12. Central and Eastern Europe	32.0	55.0	59.1	87.9	95.0	111.6	348.75	10.78
13. Southern and Mediterranean Europe	92.7	106.5	150.4	158.0	173.5	191.1	206.14	18.46
<b>Asia and the Pacific</b>	<b>14. 56.1</b>	<b>15. 82.7</b>	<b>16. 111.4</b>	<b>17. 155.5</b>	<b>205.1</b>	<b>233.6</b>	<b>416.39</b>	<b>22.57</b>
18. Northern-Eastern Asia	28.0	44.1	62.5	87.6	111.5	122.8	438.57	11.86
19. Southern-Eastern Asia	21.5	28.6	37.0	49.3	70.0	84.6	393.48	8.17
20. Oceania	5.2	8.1	9.2	10.5	11.6	12.1	232.62	1.16
38. Southern Asia	1.4	4.2	2.7	8.1	12.0	14.1	100.71	1.36
<b>The Americas</b>	<b>21. 92.8</b>	<b>22. 109.9</b>	<b>23. 128.2</b>	<b>24. 133.5</b>	<b>150.4</b>	<b>163.1</b>	<b>175.75</b>	<b>15.75</b>
42. Northern America	71.7	80.7	91.5	89.9	99.3	106.7	148.81	10.30
25. The Caribbean area	11.4	14.0	17.1	18.9	19.5	20.9	183.33	2.01
43. Central America	1.9	2.6	4.3	6.5	7.9	8.9	468.42	0.85
26. Southern America	7.7	12.6	15.3	18.2	23.6	26.7	346.75	2.57
<b>Africa</b>	<b>15.2</b>	<b>27. 20.3</b>	<b>28. 28.2</b>	<b>29. 36.7</b>	<b>49.9</b>	<b>52.4</b>	<b>344.73</b>	<b>5.06</b>
47. Northern Africa	8.4	7.3	10.2	13.7	18.8	18.5	220.23	1.78
30. Sub-Saharan Africa	6.8	13.0	18.0	23.0	31.1	33.8	497.05	3.26
<b>The Middle East</b>	<b>31. 10.0</b>	<b>14.3</b>	<b>32. 25.2</b>	<b>33. 39.1</b>	<b>58.2</b>	<b>52.0</b>	<b>520.00</b>	<b>5.02</b>

Source: Tourism Highlights, 2013, UNWTO, [16]. Own calculations

**The market share of the geographical areas in the international tourism according to the tourist arrivals.**

In 2012, the highest market share belonged to Europe, which preserved its top position in the world with 51.61 % of the total number of tourist arrivals.

On the next positions came Asia and the Pacific with 22.57 %, the Americas with 15.75 %, Africa with 5.06 % and the Middle East with 5.02 % ( Table 4).

**The market share by geographical sub regions.** In 2012, *regarding Europe*, it was noticed that on the top position was situated the Southern Mediterranean area with a share of 18.46 % in the world tourist arrivals. Obviously, the shores of many Southern countries such as Spain, France, Italy, Monaco, Slovenia, Croatia, Cyprus etc have attracted and still attract numerous tourists looking for sun, beach, water sports, relaxation and entertainment.

On the 2nd position is situated the Western Europe with a share of 16.09 % in the world market. On the 3rd position there are the Central and Eastern European countries with 10.78 % market share and on the last position the Nordic countries having 6.27 % market share.

Also, in 2012, within *Asia and the Pacific region*, the highest market share was registered by Northern Asia 11.86 % and

Southern Asia 8.17 %, followed by Southern Asia with 1.36 % and Oceania with 1.16 %.

*Within the Americas*, the North area has the highest market share 10.30 %, followed by the Southern America with 2.57 %, then by the Caribbean region with 2.01 % and finally by the Central America with 0.85 %.

*Within Africa*, the sub-Saharan region has the highest market share 3.26 %, while the Northern Africa registered only 1.78 %.

**The average annual growth rate of tourist arrivals at world level and by geographical areas.** At world level, the average growth for a period of 5 years was very high, 6.5 % in the interval 1985-1990, but then, it recorded a decline to 2.7 % in the period 2000-2004, being even below the interval 1980-1985. After 2005, it was noticed a recover of the world tourism, the average annual growth rate being 3.6 % in the period 2005-2012.

By geographical areas, the highest average annual growth rate of the tourist arrivals was recorded by Asia and the Pacific, followed by the Middle East and Africa. In Europe, it was noticed a low average annual growth rate, 2.5 % in the period 2005-2012, and in the Americas 2.9 % ( Table 5).

**Tourist arrivals by destination in the period 1990-2012** are presented in the tables given below (Tables 6,7,8,9,10).

Table 5. Average annual growth rate of tourist arrivals at world level and by geographical regions, 1980-2012 (%)

Period/Region	WORLD	Africa	The Americas	Asia and the Pacific	Europe	The Middle East
1980-1985	2.8	5.1	0.9	7.4	2.8	2.5
1985-1990	6.5	9.6	7.3	11.3	5.3	3.5
1990-1995	4.3	6.0	3.3	8.1	3.5	7.3
1995-2000	4.9	6.8	3.3	6.1	4.7	12.0
2000-2004	2.7	4.4	0.5	6.9	1.8	9.5
2005-2012	3.6	6.0	2.9	6.2	2.5	5.2

Source: Tourism Market Trends, UNWTO, 2005. [19]. Tourism Highlights, UNTWO, 2013 [16].

**The top 10 countries receiving tourists and their market share at world level.** Among the countries situated in the top at international level, there are mentioned in the decreasing order: France with 8.21 % market share, the USA with 6.63 % market share, China with 5.71 % market share, Spain with

5.71 %, Italy with 4.59 %, Turkey with 3.53 %, Germany with 3 %, United Kingdom with 2.90 %, Russia with 2.54 %, Malaysia with 2.47 %.(Table 11).

These countries are followed by other 5 countries, which in the decreasing order are:

Mexico, Austria, Hong Kong China and Thailand.

Therefore, the 10 top countries in the world tourism, all together, have been visited in the year 2012 by 457.9 million tourists, representing 45.75 % of the total number of international tourists.

Their share reflects the tourists' interest for destinations of high attraction in the world.

The number of tourists is continuously increasing and it is close related to the variety of tourism offer, price and service quality.

In Africa, the most visited countries in the decreasing order are the following ones: Morocco, South Africa, Tunisia, Zimbabwe, Algeria, Kenya, Uganda, Namibia, Senegal and Mauritius ( Table 12).

Table 6. Tourist arrivals in Africa by destination country, 1990-2012 (Thousand persons)

	1990	1995	2000	2004	2010	2012
<b>Africa- Total</b>	<b>15,160</b>	<b>20,311</b>	<b>28,184</b>	<b>33,436</b>	<b>49,860</b>	<b>52,359</b>
<b>North Africa</b>	<b>8,398</b>	<b>7,271</b>	<b>10,240</b>	<b>12,770</b>	<b>18,756</b>	<b>18,536</b>
Algeria	1,137	520	866	1,234	2,070	-
Morocco	4,024	2,602	4,278	5,477	9,288	9,375
Sudan	33	29	38	61	495	-
Tunisia	3,204	4,120	5,058	5,998	6,902	5,950
<b>West Africa</b>	<b>1,352</b>	<b>1,913</b>	<b>2,444</b>	<b>3,142</b>	-	-
Benin	110	138	96	174	199	-
Burkina Faso	74	124	126	222	274	-
Cape Verde	24	28	115	157	336	482
Cote d'Ivoire	196	188	-	-	-	-
Gambia	100	45	79	90	91	-
Ghana	146	286	399	584	931	-
Guinea	-	-	33	45	-	-
Mali	44	42	86	113	169	-
Mauritania	-	-	30	-	-	-
Niger	21	35	50	-	-	-
Nigeria	190	656	813	962	1,555	-
Senegal	246	280	389	363	900	-
Sierra Leone	96	38	16	44	39	60
Togo	103	53	60	83	202	235
<b>Central Africa</b>	<b>365</b>	<b>357</b>	<b>666</b>	<b>729</b>	<b>1,406</b>	-
Angola	67	9	51	194	425	-
Cameroon	-	100	277	190	573	817
Centr.Afr.Rep.	-	26	11	8	54	-
Chad	9	19	43	-	71	-
Congo	33	37	19	-	194	-
Dem.R Congo	55	35	103	30	81	-
Gabon	109	125	155	-	-	-
SaoTome Prn	3	6	7	-	8	-
<b>East Africa</b>	<b>2,842</b>	<b>4,906</b>	<b>5,600</b>	<b>7,597</b>	<b>11,659</b>	-
Burundi	109	34	29	-	142	-
Comoros	814	23	24	18	15	-
Djibouti	33	21	20	26	-	-
Eritrea	-	315	70	87	-	-
Ethiopia	79	103	136	210	468	-
Kenya	824	896	899	1,199	1,470	-
Madagascar	53	75	160	229	196	256
Malawi	130	192	228	471	746	-
Mauritius	292	422	656	719	935	965
Mozambique	-	-	-	470	1,718	-
Reunion	200	304	430	430	421	447
Rwanda	-	-	104	-	619	-
Seychelles	104	121	130	121	175	208
Tanzania	-	285	459	566	754	1,043
Uganda	68	160	193	512	946	-
Zambia	140	163	457	515	815	-
Zimbabwe	636	1416	1,957	1,854	2,239	1,794
<b>Southern Africa</b>	<b>2,203</b>	<b>5,864</b>	<b>8,234</b>	<b>9,199</b>	<b>12,465</b>	-
Botswana	543	521	1,104	-	2,145	-
Lesotho	171	87	-	-	414	-
Namibia	-	272	656	-	964	-
South Africa	1,025	4,684	6,001	6,815	8,074	8,339
Swaziland	263	300	281	459	868	-

Source: UNWTO Tourism Highlights, 2013 [16].

In the Middle East, the most visited countries are: Saudi Arabia, Egypt, United Arab Emirates, Syria, Jordan, Israel, Qatar, Lebanon, Yemen and Palestina, as their market share show at world level (Table 12).

Table 7. Tourist arrivals in the Americas by destination country, 1990-2012 (Thousand persons)

	1990	1995	2000	2004	2010	2012
<b>America</b>	<b>92,804</b>	<b>109,029</b>	<b>128,164</b>	<b>125,739</b>	<b>150,364</b>	<b>163,115</b>
<i>North America</i>	<i>71,744</i>	<i>80,663</i>	<i>91,500</i>	<i>85,854</i>	<i>99,305</i>	<i>106,683</i>
Canada	15,209	16,932	19,627	19,152	16,219	16,311
Mexico	57,172	20,241	20,641	20,617	23,290	23,403
United States	39,363	43,490	51,238	46,085	59,796	66,969
Caribbean	11,392	14,024	17,086	18,091	19,537	20,887
Anguilla	31	39	44	54	62	65
Antigua, Sasb	206	220	207	245	230	247
Aruba	433	619	721	728	824	904
Bahamas	1,562	1,598	1,544	1,561	1,370	1,419
Barbados	432	442	545	552	532	536
Bermuda	435	387	332	272	232	232
Bonaire	37	59	51	63	-	-
Br. Virgine Is.	160	219	272	305	330	351
Cayman Islands	253	361	354	260	288	322
Cuba	327	742	1,741	2,017	2,507	-
Curacao	219	224	191	223	342	420
Dominica	45	60	70	79	77	78
Dominican Rep.	1,305	1,776	2,978	3,450	4,125	4,563
Grenada	76	108	129	134	110	112
Guadaloupe	330	640	603	456	392	-
Haiti	144	145	140	96	255	-
Jamaica	988	1,147	1,323	1,415	1,922	1,986
Martinique	282	457	526	471	476	486
Montserrat	13	19	10	10	6	5
Puerto Rioo	2,560	3,131	3,341	3,541	3,186	3,069
Saba	-	10	9	11	-	-
Saint Lucia	141	231	270	298	306	307
St. Eustatius	-	9	9	11	-	-
St. Kitts-New	73	79	73	118	98	102
St. Maarten	545	449	432	475	443	457
St Vincent, Grenadines	54	60	73	87	72	74
Trinidad Tbg	195	260	-	443	386	-
Turks, Caicos	49	79	152	173	281	-
US.Virgin Is	463	454	546	544	590	-
<i>Central America</i>	<i>1,945</i>	<i>2,611</i>	<i>4,346</i>	<i>5,740</i>	<i>7,908</i>	<i>8,872</i>
Belize	197	131	196	231	242	277
Costa Rica	436	785	1,068	1,453	2,100	2,343
El Salvador	194	235	795	966	1,150	1,255
Guatemala	509	563	826	1,182	1,219	1,305
Honduras	250	271	471	672	863	906
Nicaragua	106	281	6	615	1,011	1,180
Panama	214	345	484	621	1,324	1,606
<i>South America</i>	<i>7,722</i>	<i>11,731</i>	<i>15,227</i>	<i>16,054</i>	<i>23,614</i>	<i>26,673</i>
Argentina	1,930	2 289	2,909	3,353	5,325	5,599
Bolivia	254	284	319	405	807	-
Brazil	1,091	1,991	5,313	4,794	5,161	5,677
Chile	943	1,540	1,742	1,785	2,801	3,554
Colombia	81.3	1,3991	557	791	2,385	2,175
Ecuador	362	440	627	819	1,047	1,272
French Guiana	-	-	-	-	-	-
Guyana	64	106	105	122	152	-
Paraguay	260	438	289	309	465	579
Peru	317	479	800	1,208	2,299	2,846
Suriname	46	43	57	138	204	240
Uruguay	-	2,022	1,968	1,756	2,349	2,695
Venezuela	525	700	469	492	526	710

Source: UNWTO Tourism Highlights, 2013 [16].

Table 8. Tourist arrivals in Asia and the Pacific by destination country , 1990-2012 ( Thousand persons )

	1990	1995	2000	2004	2010	2012
<b>Asia and the Pacific</b>	<b>56,138</b>	<b>82,747</b>	<b>111,372</b>	<b>145,491</b>	<b>205,060</b>	<b>233,564</b>
<i>North East Asia</i>	<i>26,367</i>	<i>41,256</i>	<i>58,276</i>	<i>79,412</i>	<i>111,508</i>	<i>122,768</i>
China	10,484	20,034	31,229	41,761	55,665	57,725
Hong Kong (China)	-	-	8,314	13,655	22,085	23,770
Japan	3,236	3,345	4,757	6,138	8,611	8,368
Korea D P Rp	115	-	-	-	-	-
Korea Rep.	2,959	3,753	5,322	5,818	8,798	11,140
Macao (China)	2,583	4,202	5,197	8,324	11,926	13,577
Mongolia	147	108	37	301	456	476
Taiwan (pr. of China)	-	2,332	2,624	2,950	5,567	7,311
<i>South-East Asia</i>	<i>21,469</i>	<i>29,173</i>	<i>37,763</i>	<i>48,309</i>	<i>69,996</i>	<i>84,555</i>
Brunei	377	498	964		214	209
Daeusaalam						
Cambodia	17	220	465	1,055	2,508	3,584
Indonesia	2,178	4,324	5,064	5,321	7,003	8,044
Lao P.D.R.	14	60	191	236	1,670	-
Malaysia	7,446	7,469	10,222	15,703	24,577	25,033
Myanmar	21	117	2DB	242	311	593
Philippines	1,025	1,750	1,992	2,291	3,520	4,273
Singapore	4,842	8,422	6,9-7		9,161	-
Thailand	5,299	6,952	9,579	11,737	15,936	22,354
Vietnam	250	1,351	2,140	2,972	5,050	6,848
<b>Oceania</b>	<b>5,152</b>	<b>8,085</b>	<b>9,247</b>	<b>10,157</b>	<b>11,556</b>	<b>12,138</b>
American Samoa	26	34	44		23	-
Australia	2,215	3,726	4,530	4,774	5,885	6,146
Cock Is	34	48	73	83	104	122
Fiji	279	318	294	500	632	661
French Polynesia	132	172	252	212	154	169
Guam	780	1,362	1,287	1 160	1,197	1,308
Kinibat	3	4	5	3	5	5
Marshal Is	5	6	5	9	5	5
Micronesia (Fed Stof )			21	19		-
N Mariana Is	426	669	517	525	375	-
New Caledonia	87	86	110	100	99	112
New Zealand	976	1,409	1,787	2,348	2,525	2,565
Niue	1	2	2	3	6	5
Palau	33	53	58	95	86	119
Papua New Guinea	41	42	58	59	147	164
Samoa	48	68	88	98	122	126
Solomom Is	9	12			21	23
Tonga	21	29	35	4!	47	-
Tuvalu		1		1	2	
Vanuatu	35	44	5S	51	97	108
<i>South Asia</i>	<i>3,150</i>	<i>4,233</i>	<i>6,086</i>	<i>7,613</i>	<i>12,000</i>	<i>14,103</i>
Bangladesh	115	156		271	303	-
Bhutan	2	5	8	9	27	44
India	1,707	2,124	2,649	3,457	5,776	6,649
Iran	154	489	1,342	1 659	2,938	-
Maldives	196	315	467	617	792	958
Nepal	255	363	464	385	603	-
Pakistan	424	378	557	648	907	-
Sri Lanka	298	403	400	556	654	1,005

Source: UNWTO Tourism Highlights, 2013 [16].

Table 9. Tourist arrivals in Europe by destination country, 1990-2012 (Thousand persons)

	1990	1995	2000	2004	2010	2012
<b>Europe</b>	<b>263,623</b>	<b>313,144</b>	<b>393,781</b>	<b>422,937</b>	<b>485,550</b>	<b>534,171</b>
<i>Northern Europe</i>	<i>30,777</i>	<i>39,400</i>	<i>44,508</i>	<i>48,373</i>	<i>62,752</i>	<i>64,878</i>
Denmark	-	-	3,535	3,358	8,744	-
Finland	-	1 779	2,714	2,840	3,670	4,226
Iceland	142	190	634	836	489	-
Ireland	3,666	4,818	6,646	6,982	7,134	-
Norway	1,955	2,880	3,104	3,600	4,767	-
Sweden	-	2,309	2,746	3,003	4,951	10,914
United Kingdom	16,013	23,537	25,209	27,754	28,296	29,282
<i>Western Europe</i>	<i>108,626</i>	<i>112,184</i>	<i>139,659</i>	<i>138,821</i>	<i>154,347</i>	<i>166,579</i>
Austria	19,011	17,173	17,982	19,373	22,004	24,151
Belgium	-	5,580	6,457	6,710	7,186	7,505
France	52,497	60,033	77,190	75,121	77,648	83,018
Germany	17,045	14,838	18,992	20,137	26,875	30,408
Lichtenstein	78	59	62	49	50	54
Luxemburg	820	769	882	874	793	889
Monaco	245	233	300	250	279	-
Netherlands	5,795	6,574	10,003	9,646	10,883	11,880
Switzerland	7,963	6,946	7,821	-	8,628	8,566
<i>Central Eastern Europe</i>	<i>30,313</i>	<i>58,840</i>	<i>68,778</i>	<i>86,296</i>	<i>94,968</i>	<i>111,640</i>
Armenia	-	12	45	263	687	843
Azerbaijan	-	93	681	1,349	1,280	1,986
Belarus	-	161	60	67	120	119
Bulgaria	-	3,466	2,785	4,630	6,047	-
Czech Rep	-	3,391	4,666	6,061	8,629	8,908
Estonia	-	530	1,220	1,750	2,372	2,744
Former U.S.S.R.	2,20	-	-	-	-	-
Georgia	-	95	367	368	1,057	1,790
Hungary	-	-	-	12,212	9,510	10,353
Kazakhstan	-	-	1,471	3,073	3,393	4,438
Kyrgyzstan	-	35	59	398	1,316	-
Latvia	-	539	509	1,080	1,373	1,435
Lithuania	-	650	1,063	1,800	1,507	-
Poland	-	19,215	17,400	14,290	12,470	14,840
Rep Moldova	-	32	18	24	64	89
Romania	1,432	766	867	1,359	1,343	1,653
Russian Federation	-	-	-	19,892	20,271	25,736
Slovakia	822	903	1,053	1,401	1,327	1,511
Tajikistan	-	-	4	-	-	-
Turkmenistan	-	218	-	-	-	-
Ukraine	-	3,718	6,431	15,629	21,203	23,013
Uzbekistan	-	92	302	262	875	-
<i>Southern Mediter. Eu.</i>	<i>93,907</i>	<i>102,720</i>	<i>140,756</i>	<i>149,447</i>	<i>173,482</i>	<i>191,074</i>
Albania	30	40	32	42	2,347	-
Andorra	-	-	2,949	2,791	1,808	2,233
Bosnia & Herzg	-	-	171	190	365	439
Croatia	-	1495	5,831	7,312	9,111	10,369
Cyprus	1,561	2100	2,686	2,349	2,173	2,465
F Yug Rp Macedonia	-	147	224	165	262	351
Greece	8,873	11, 130	13,066	13,271	15,007	15,518
Israel	1,063	2,215	2,417	1,506	2,803	2,886
Italy	26,679	31,052	41,181	37,071	43,626	46,360
Malta	672	1,116	1,216	1,156	1,348	1,454
Portugal	8,020	9,511	12,097	11,617	6,832	7,696
San Marino	45	28	43	42	120	139
Serbia & Montenegro	-	228	239	583	683	810
Slovenia	-	732	1,090	1,439	1,869	2,156
Spain	34,055	34,920	47,805	52,430	52,677	57,701
Turkey	4,799	7,083	9,566	16,826	31,364	35,698
Yugoslav SFR	7,880	-	-	-	-	-

Source: UNWTO Tourism Highlights, 2013 [16].

Table 10. Tourist arrivals in the Middle East, 1990-2012 ( Thousand persons)

	1990	1995	2000	2004	2010	2012
<b>Middle East</b>	<b>10,040</b>	<b>14,300</b>	<b>25,238</b>	<b>36,272</b>	<b>58,181</b>	<b>51,986</b>
Bahrain	1,376	1,396	2,420	3514	-	-
Egypt	2,411	2,971	5,126	7,795	14,051	11,196
Iraq	748	-	61	-	1,518	-
Jordan	572	1,075	1,560	2,953	4,207	4,162
Kuwait	15	72	78	91	207	-
Lebanon	-	450	742	1,278	2,168	1,365
Libian Arab.	96	56	174	149	-	-
Oman	149	279	571	-	-	-
Palestine	-	-	330	-	522	488
Qatar	136	329	375	732	1,519	-
Saudi Arabia	2,209	3,325	6,585	8,850	10,850	13,664
Syrian Arab Republic	562	815	1,416	3,032	8,546	-
United Arab Emirates	973	2,315	3,907	-	7,432	8,977
Yemen	52	81	73	274	1,025	-

Source: UNWTO Tourism Highlights, 2013 [16].

Table 11. The top 10 countries receiving tourists in 2012 ( Million persons)

Country	Tourist arrivals	Market share(%)
France	83	8.21
USA	67	6.63
China	57.7	5.71
Spain	57.7	5.71
Italy	46.4	4.59
Turkey	35.7	3.53
Germany	30.4	3.00
United Kingdom	29.3	2.90
Russia	25.7	2.54
Malayezia	25	2.47
<b>Total 10 countries</b>	<b>457,900</b>	<b>45.75</b>
<b>Totalworld</b>	<b>1,010</b>	<b>100</b>

Source: [http://en.wikipedia.org/wiki/World\\_Tourism\\_rankings](http://en.wikipedia.org/wiki/World_Tourism_rankings) UNWTO, 2012, [21]. [www.indexmundi.com](http://www.indexmundi.com), [20].

Table 12. The top 10 countries receiving tourists in Africa and the Middle East in 2012 (Million tourists)

Africa	Tourist arrivals	The Middle East	Tourist Arrivals
Morocco	9.3	Saudit Arabia	17.4
South Africa	8.3	Egypt	9.4
Tunisia	4.7	Arabian Emirates	8.1
Zimbabwe	2.4	Syria	5.0
Algeria	2.3	Jordan	3.9
Kenya	1.7	Israel	2.8
Uganda	1.1	Qatar	2.5
Namibia	0.9	Lebanon	1.6
Senegal	0.9	Yemen	0.8
Mauritius	0.8	Palestina	0.4
<b>Africa-Total</b>	<b>50.17</b>	<b>Middle East-Total</b>	<b>55.9</b>
<b>World</b>	<b>983</b>	<b>World</b>	<b>983</b>

Source: [www.indexmundi.com](http://www.indexmundi.com), [20]. [www.en.wikipedia.org/wiki/World\\_Tourism\\_Rankings](http://www.en.wikipedia.org/wiki/World_Tourism_Rankings) UNWTO, 2012, [21].

In America, the most visited countries are: the USA, Mexico, Canada, Brazil, Argentina, Dominican Republic, Chile, Puerto Rico, Peru, Uruguay ( Table 13).

In Asia and the Pacific area, the most visited countries are: China, Malayesia, Hong Kong, Thailand, Macau, South Korea, Japan, Indonesia, Taiwan and Vietnam (Table13).

Table 13. The top 10 countries receiving tourists in the Americas and Asia and Pacific areas in 2012 (Million)

The Americas	Tourist arrivals	Asia and the Pacific	Tourist arrivals
The USA	67	China	57.7
Mexico	23.4	Malayesia	25
Canada	16.3	Hong Kong	23.7
Brazil	5.6	Thailand	22.3
Argentina	5.5	Macau	13.5
Dominicana Rep.	4.5	South Korea	11.1
Chile	3.5	Japan	8.3
Puerto Rico	3	Indonesia	8.0
Peru	2.8	Taiwan	7.3
Uruguay	2.6	Vietnam	6.8
<b>The Americas-Total</b>	<b>163.1</b>	<b>Asia and the Pacific-Total</b>	<b>233.5</b>
<b>Total world</b>	<b>983</b>	<b>Total world</b>	<b>983</b>

Sursa: [www.indexmundi.com](http://www.indexmundi.com), [20] [www.en.wikipedia.org/wiki/World\\_Tourism\\_Rankings](http://www.en.wikipedia.org/wiki/World_Tourism_Rankings) UNWTO, 2012, [21]

In Europe, the most visited countries are France, Spain, Italy, Turkey, Germany, United Kingdom, Russia, Austria, Ukraine and Greece ( Table 14).

Table 14. The top 10 countries in Europe receiving tourists in 2012 (Million)

Country	Tourist arrivals
France	83
Spain	57.7
Italy	46.4
Turkey	35.7
Germany	30.4
United Kingdom	29.3
Russia	25.7
Austria	24.1
Ukraine	23
Greece	15.5
EUROPE-TOTAL	233.5
TOTAL WORLD	983

Sursa: [www.indexmundi.com](http://www.indexmundi.com), [20]  
[www.en.wikipedia.org/wiki/World\\_Tourism\\_Rankings](http://www.en.wikipedia.org/wiki/World_Tourism_Rankings)  
 UNWTO, 2012, [21]

**Tourist arrivals by country of origin.** The empirical data showed that the most numerous travels at international level are oriented to the regions of the tourists' origin. It is said that 4

of 5 arrivals have the origin in the same region.

The markets supplying international tourists are situated especially in the countries with advanced economies in Europe, Americas and Asia and the Pacific.

Therefore, Europe is the main source of international tourists, supplying over 50 % of the world tourists. It is followed by Asia and the Pacific with 23 %, the Americas with 17 %, the Middle East with 3 % and Africa also with 3 %.( Table 15).

Despite this, the increased available income for travels in many of the countries with emergent economy has determined a fast growth rate of the tourist flow during the last years and especially in the markets such as: Asia, Central and Eastern Europe, Middle East, Africa and Latin America.

Table 15. Tourist arrivals by region of origin, 1990-2012 ( Million)

	1990	1995	2000	2005	2010	2012	Market share %	Annual growth rate %
<b>World, of which:</b>	<b>436</b>	<b>529</b>	<b>677</b>	<b>807</b>	<b>949</b>	<b>1,035</b>	<b>100</b>	<b>3.6</b>
Europe	251.9	303.4	388.6	449.7	497.1	539.8	52.1	2.6
Asia and the Pacific	58.7	86.4	114.2	153.2	206.4	236.4	22.8	6.4
The Americas	99.3	108.5	130.8	136.5	158.3	171.5	16.6	3.3
The Middle East	8.2	9.3	14.1	22.9	34.5	31.7	3.1	4.5
Africa	9.8	11.5	14.9	19.3	28.1	30.8	3.0	6.9
Unspecified origin	7.9	10.3	14.0	25.4	26.5	25.0	2.4	-
The same region	350.3	423.4	532.4	630.7	728.3	799.8	77.3	3.5
Other regions	77.6	95.7	130.3	151.0	194.2	210.4	20.3	4.9

Source: UNWTO, Tourism Highlights, 2013 [16]

**Forecast of tourist arrivals for the year 2030.** In the year 2020, it is expecting as the tourist arrivals to reach 1,360 millions and in 2030 about 1,800 millions, meaning 33.01 %

more than in the year 2010. The growth rate will account for 20 % in the advanced economies and for 44 % in the emerging economies.

Table 16. Forecast of International Tourist Arrivals towards 2030 by region of destination (Million)

	2010 Reference year	Forecast		2020/2010 %	2030/2020 %
		2020	2030		
<b>World, of which:</b>	<b>940</b>	<b>1,360</b>	<b>1,809</b>	<b>144.68</b>	<b>133.01</b>
- to Advanced economies	498	643	772	129.11	120.06
- to Emerging economies	442	717	1,037	162.21	144.63
<b>By UNWTO regions:</b>					
Europe	475.3	620	744	130.44	120.00
Asia and the Pacific	204.0	355	535	174.01	150.70
Americas	149.7	199	248	132.93	124.62
Middle East	60.9	101	149	165.84	147.52
Africa	50.3	85	134	168.98	157.64

Source: UNWTO Tourism Highlights, 2012, [22] Own calculations.

By region, the most substantial increase, more than 57 % is expected to be recorded by Africa, then over 50 % by Asia and the

## CONCLUSIONS

In 2012, tourist arrivals increased accounted for 1,035 millions being 3.72 times higher than in the year 1980, reflecting that tourism is a very dynamic branch of the world economy. For this reason, it is expected as in 2030, to be recorded about 1,800 million tourist arrivals of which 1,037 million to emerging economies and 772 million to advanced economies.

The highest growth rate was registered by Asia and the Pacific, then by Africa, followed by the Middle East, Europe, and finally by Americas.

Europe is situated in the top position with 51.61 % of the world tourist arrivals. On the 2nd position comes Asia and the Pacific with 22.57 %, followed on the 3rd position by the Americas, weighting 15.75 % in the world tourist arrivals. On the 4th position it is situated Africa with 5.06 % and on the 5th position came the Middle East with 5.01 % of the world tourist arrivals.

The share of various European regions in the world tourist flow is the following one: the Southern Mediterranean area 18.46 %, the Western Europe 16.09 %, the Central and Eastern European countries 10.78 % and the Nordic countries 6.27 %. In Asia and the Pacific region, the market share of various regions is Northern Asia 11.86 %, Southern Asia 8.17 %, Southern Asia 1.36 % and Oceania 1.16 %. In America, the market share of various regions is: North America 10.30 %, Southern America 2.57 %, the Caribbean 2.01 % and the Central America 0.85 % of the world tourist arrivals. In Africa, the sub-Saharan region account for 3.26 %, and the Northern Africa for 1.78 % of the world tourist flow.

The top 10 countries receiving tourists and their market share at world level is the following one: France 8.21 %, the USA 6.63 %, China 5.71 %, Spain 5.71 %, Italy 4.59 %, Turkey 3.53 %, Germany 3 %, United

Pacific, over 47 % by the Middle East, 24 % by the Americas and about 20 % by Europe.(Table 16)

Kingdom 2.90 %, Russia 2.54 %, Malayezia 2.47 %.

All these 10 countries were visited by 457.9 million tourists in 2012, representing 45.75 % of the world tourist arrivals.

Europe is the main source of international tourists, supplying over 50 % of the world tourists. Asia and the Pacific provide 23 %, the Americas 17 %, the Middle East 3 % and Africa 3 %.

As a conclusion, Europe remain the region attracting the most numerous international tourists and also it is the most important provider of travellers around the world.

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## RESEARCH REGARDING THE USE OF DISCRIMINANT ANALYSIS FOR ASSESSING THE BANKRUPTCY RISK OF AGRICULTURAL COMPANIES

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### Abstract

*The paper aimed to apply the discriminant analysis using Altman Z' Score model in order to predict bankruptcy risk of the agricultural companies, using a study case regarding three representative companies dealing with dairy farming in Ilfov County of Romania. The results discriminated the companies according to their financial statement and ratios and mainly Z Score values. The company F1 proved the most difficult financial statement being classified in the Distress zone every year ( Z'=1.003 in the year 2011, 1.098 in the year 2012 and 0.971 in the year 2013). For this reason, this company is bankrupt. The company F2 was situated in the "Grey zone" every year, because the financial situation is not so good, but it is able to pay a part of its debts. However, it is in danger to fail in the future, if measures to recover are not taken in time. (Z'=1.436 in the year 2011, 1.269 in the year 2012 and 1.343 in the year 2013). The company F3 registered a different situation from a year to another. In the first two years, 2011 and 2012, it was facing a difficult financial statement being placed in the "Distress zone". In the year 2013, the financial statement has recovered due to the measures taken by managers and it passed in the "Safe zone", characterized by a good financial situation and solvency, enabling it to pay all its debts.(Z'=1.126 in the year 2011, 0.928 in the year 2012 and 3.189 in the year 2013). The agricultural companies dealing with dairy farming have a low profitability, and the degree of bankruptcy risk is high. For this reason, managers have to keep under control the financial indicators any moment and take urgent measures to recover by the end of the year as their company not to fail.*

**Key words:** agricultural companies, Altman model, bankruptcy risk, dairy farming

### INTRODUCTION

Linear Discriminant Analysis is the first statistical method used to analyze which company enter bankruptcy and which company survives. It is the fundamental method which supported the Scoring Method largely applied to predict the bankruptcy risk of an enterprise.

The scoring method allows the division of various companies into two categories: bankrupt and non bankrupt enterprises, based on a Z Score linear model including a range of financial ratios, weighted with specific percentage coefficients.

The Z Score function is represented as a linear model as given below:

$Z = a_1 * X_1 + a_2 * X_2 + \dots + a_i * X_i$ , where:  
 $X_i$  = financial ratios taken into consideration,  
and  $a_i$  = percentage coefficient of each ratio.

The Z Score value discriminates the companies and decides which one is in danger to fail and which has a good or better financial situation. [4].

Z-score linear model is largely used to assess bankruptcy risk based on information provided by Balance Sheet and Profit and Loss Account and the calculation of several accounting ratios characterizing the financial "health" of a company.

Starting from Fisher Ronald Aylmer's multiple measurements used for various taxonomic problems (1936), [14] Edward Altman (1968) established a Z Score model which is still considered a leading model in practical applications. [2,4].

Since that time his models have been continuously improved in order to better correspond to various types of companies (manufacturing companies, financial firms,

crediting companies etc.), economic and financial situations, market evolution. [9].

Even though Altman models were found to be 72-80 % accurate in predicting bankruptcy, since 1985, the Z-score models are largely used and accepted by accountants, auditors, managers etc for risk evaluation of a company [3].

Bankruptcy risk evaluation was approached by many researchers who established various mathematical and statistical models. Among them, a well known Z score model is the one established by Connan and Holder (1978) also used as a term of reference in the company financial assessment.

Heffernan (2005) suggested that banks should improve discriminant analysis, changing the ratios used in the financial assessment from time to time in order to increase the accuracy of risk prediction. [13]

In Romania, the prediction of bankruptcy risk started in the last decade and the most frequent applied models have been Altman and Connan and Holder models.

Birsan et al.(2007) applied Connan and Holder model and concluded that risk factors should be monitored and prevention measures are required to prevent bankruptcy in order to avoid or diminish its effects.

Popescu Agatha (2007 a, b) applied Connan J. and Holder M. Model (1978) for determining the bankruptcy risk for a Fruit Tree Company in Romania and concluded that the risk coefficient was 80 % very high in this field of activity not justifying any measure for recover. [18, 19]

Mandru et al. (2010) applied Connan Holder and Altman model and concluded that when developing such models it is needed to take into consideration both non-financial and qualitative indicators significant for a specific economic sector which can influence the company performances and also the precision of forecast. [17]

Bordeianu et al.(2011) applied various models for evaluation of risk bankruptcy such as: Altman model, Connan and Holder model, Taffler model, The Model of the Balance Sheet Central of the Banque de France and the Romanian School models (Bailesteanu model,

Anghel model, Manecuta and Nicolae model, Paul Ivoniciu model). [8]

Vintila et al.(2011) used the discriminant analysis to substantiate a score function effective in bankruptcy risk prediction of enterprises in Romania. The discrimination between bankrupt and non-bankrupt enterprises was based on the financial ratios regarding activity, liquidity, leverage and profitability included in the Z Score model as follows: return on revenue, cash-flow to debt ratio, debt to assets ratio, total debt payment period. [21]

Achim et al. (2012) developed a statistical model for predicting bankruptcy risk of the Romanian manufacturing companies by a multidimensional analysis technique, namely Principal Component Analysis also including the global financial crisis impact. [1]

Armeanu et al. (2012) built a scoring function used to identify bankrupt companies, using a sample of 60 companies listed on Bucharest Stock Exchange taking into account a total of seven financial indicators: total assets, sales, operating profit, net cash flow from operating activities, net profit, total liabilities and average market value of equity. They concluded that the financial rates could be changed in time, according to market and business environment where the companies operate and the banks have also to improve the discriminant and risk models used in practice [5]

Tomescu-Dumitrescu et al.(2013) applied both Altman and Connan and Holder models for bankruptcy risk prediction [20].

Barbuta et al.(2014) made a comparative analysis of bankruptcy risk for companies in the field of buildings, using the both Conan & Holder, and Altman models, proving that the same company could be classified differently by these two models and it could be useful to assess companies from these two perspectives. [6]

Kulcsar Edina (2014) quantified the bankruptcy risk for the Romanian small and medium manufacturing and trading enterprises representing the backbone of the economy. They made a comparison between Altman's Z-score model, and Teti et. al model

(2012). The conclusion was that Teti model; can quickly detect the bankruptcy risk, being more recommended in case of SMEs and Altman model need more caution from analysts and managers. [16]

Condei et al.(2014) approached risk bankruptcy in agricultural companies in Romania using Connan and Holder model [12].

Choles (2014) affirmed how important is risk assessment in in project planning using FMEA and Critical Path Method [10].

Most of the studies carried out in Romania approached both the theoretical aspects and practical application of various models used in the prediction of risk bankruptcy on samples of enterprises (manufacturers, traders, creditors etc), but just a few studies are dealing with the risk of failure in agriculture where companies are working in a more risky environment.

In this context, the paper aimed to evaluate the risk of bankruptcy of the private companies operating in agriculture, considering a study case of private companies dealing with dairy farming, a field where financial statement is critical reflecting the lowest profitability compared to other branches of animal husbandry or agriculture.

## MATERIALS AND METHODS

In order to fulfill the objective of the paper, a sample of three important agricultural companies dealing with dairy farming in Ilfov County, close to Bucharest, the capital of Romania was selected. It included F1-SC Agroindustriala Pantelimon SRL, F2- SC Agroindaf Afumati SA and F3-SC Agricola Berceni SRL.

The paper used the financial data registered in the Balance Sheets and Profit and Loss Accounts concluded in the year 2011, 2012 and 2013 by the three dairy farming companies [20,21,22].

The financial information regarded the following aspects: Total Assets (TA), Current Assets (CA), Book Value of Equity (BVE), Total Liabilities (TL), Current Liabilities (CL), Net Sales (S), Earnings Before Interest

and Taxes (EBIT) and Retained Earnings (RE).

In order to predict bankruptcy, it was used Altman Z-Score model, considered to be suitable to private companies, as given below:

$$Z' = 0.717 T_1 + 0.847 T_2 + 3.107 T_3 + 0.420 T_4 + 0.998 T_5, \text{ where:}$$

$$T_1 = (\text{Current Assets} - \text{Current Liabilities}) / \text{Total Assets}$$

$$T_2 = \text{Retained Earnings} / \text{Total Assets}$$

$$T_3 = \text{Earnings Before Interest and Taxes} / \text{Total Assets}$$

$$T_4 = \text{Book Value of Equity} / \text{Total Liabilities}$$

$$T_5 = \text{Sales} / \text{Total Assets}$$

The ranking of the company was established using the Points Method, giving points from 1,2 3,...n for the decreasing value of Z Score.

The interpretation of the results was based on the zones of discrimination as established by Altman:

$Z' > 2.9$  -“Safe” Zone;  $1.23 < Z' < 2.9$  -“Grey” Zone;  $Z' < 1.23$  -“Distress” Zone. [2,3,4,13].

## RESULTS AND DISCUSSIONS

### Company F1.

#### *Economic and Financial indicators.*

In case of F1, Total assets/Liabilities remained relatively at the same level in the analyzed period. Thus, in 2013, they accounted for Lei 6,729,589, only by 0.87 % higher than in the year 2011.

The Current assets increased by 28.09 % from Lei 1,685,854 in the year 2011 to Lei 2,159,509 in 2013.

The Book value of Equity increased by 12.85 % in 2013, accounting for Lei 4,010,373.

Current liabilities declined by 8.69 % from Lei 2,585,759 in 2011 to Lei 2,361,141 in 2013.

Sales registered a slight increase of 1.41 % from Lei 4,342,081 in 2011 to Lei 4,403,307 in the year 2013.

Earnings Before Interest and Taxes registered a deep decline, by about 60% from Lei 402,123 in the year 2011 to Lei 163,405 in the year 2013.

Retained earnings also declined by about 60 % from Lei 337,977 in 2011 to Lei 133,541

in the year 2013.(Table 1).

**Accounting ratios.**

The  $T_1 = (CA-CL)/TA$  registered a negative value and a decreasing trend in each of the analyzed years. In the year 2013, it accounted for 21.61 % of the level registered in the year 2011.

The  $T_2 = RE/TA$  had positive values every year, but also registered a declining trend from 2011 to 2013. Thus, in 2013, it accounted for 38.00 % being by 62 % lower than in 2011.

The  $T_3 = EBIT/TA$  registered a positive value every year and also with a decreasing trend so that in the year 2013 it accounted for 40.00 % of the level registered in 2011.

The  $T_4 = BVE/TL$  had positive values and a continuous growth every year so that in the year 2013 its value was by 11.84 % higher than in the year 2011.

The  $T_5 = S/TA$  had also positive values every year and a slight trend to increase, so that in 2013 it was by 0.61 % higher than in 2011.(Table 1).

Table 1.Primary data, Accounting ratios and Z' Scores for F1 in the period 2011-2013(Lei)

	2011	2012	2013	2013/2011 %
<b>Primary Data</b>				
1. Total Assets (TA),	6,671,158	6,660,036	6,729,589	100.87
Current Assets (CA),	1,685,854	1,865,876	2,159,509	128.09
Book Value of Equity (BVE)	3,553,532	3,876,574	4,010,373	112.85
Total Liabilities (TL),	6,671,158	6,660,036	6,729,589	100.87
Current Liabilities (CL),	2,585,759	2,334,047	2,361,141	91.31
Net Sales (S),	4,342,081	4,569,091	4,403,307	101.41
Earnings Before Interest and Taxes (EBIT)	402,123	389,890	163,405	40.63
Retained Earnings (RE)	337,977	323,043	133,541	39.51
<b>Accounting Ratios</b>				
$T_1 = (CA-CL)/TA$	- 0.134	- 0.070	- 0.029	21.61
$T_2 = RE/TA$	0.050	0.048	0.019	38.00
$T_3 = EBIT/TA$	0.060	0.058	0.024	40.00
$T_4 = BVE/TL$	0.532	0.582	0.595	111.84
$T_5 = S/TA$	0.650	0.686	0.654	100.61
<b>Z' Score</b>	<b>1.003</b>	<b>1.098</b>	<b>0.971</b>	<b>96.80</b>

Source: Balance Sheet and Profit and Loss Account of F1 [22] , Own calculations

**Z' Score** was very small in all the analyzed years: 1.003 in the year 2011, 1.098 in the year 2012 and 0.971 in the year 2013, reflecting a slight declining trend. In 2013, it was by 3.20 % lower than in 2011. (Table 1)

**Company F2.**

**Economic and Financial indicators.**

In case of F2, Total assets/Liabilities increased by 15.41 % from Lei 7,012,037 in 2011 to Lei 8,092,869 in 2013.

The Current assets declined by 18.03 % from Lei 2,924,052 in 2011 to Lei 2,396,929 in 2013.

The Book value of Equity increased by 3.25 %, from Lei 5,528,406 in 2011 to Lei

5,708,615 in 2013 .

Current liabilities increased by 113.52 % , from Lei 874,944 in 2011 to Lei 1,868,181 in 2013.

Sales increased by 20,85 % from Lei 5,036,070 in the year 2011 to Lei 6,086,554 in the year 2013.

Earnings Before Interest and Taxes an increase 57.34 % from Lei 342,467 in the year 2011 to Lei 538,856 in the year 2013.

Retained earnings increased by 63.46 % from Lei 272,404 in the year 2011 to Lei 445,274 in the year 2013.

**Accounting ratios.**

The  $T_1 = (CA-CL)/TA$  registered positive values every year, but also a decreasing trend from the year 2011 to 2013 so that in the last year of the analysis represented 22.26 % of the level registered in 2011.

The  $T_2 = RE/TA$  recorded positive values every year and an increasing trend, so that in 2013 it was by 44.73 % higher than in 2011.

The  $T_3 = EBIT/TA$  registered a positive value every year and increased by 37.50% in 2013 compared to 2011.

The  $T_4 = BVE/TL$  had positive values, but in the year 2013 it represented 89.46 % from the level registered in the year 2011.

The  $T_5 = S/TA$  had also positive values every year and a slight trend to increase, so that in 2013 it was by 4.73 % higher than in 2011.(Table 2).

**Z' Score** was 1.436 in the year 2011, 1.269 in the year 2012 and 1.343 in the year 2013, reflecting a slight declining trend. In 2013, it was by 6.48 % lower than in 2011. (Table 2)

Table 2.Primary data, Accounting ratios and Z' Scores for F2 in the period 2011-2013.

	2011	2012	2013	2013/2011 %
<b>Primary Data</b>				
Total Assets (TA),	7,012,037	6,714,891	8,092,869	115.41
Current Assets (CA),	2,924,052	2,430,249	2,396,929	81.97
Book Value of Equity (BVE)	5,528,406	5,323,342	5,708,615	103.25
Total Liabilities (TL),	7,012,037	6,714,891	8,092,869	115.41
Current Liabilities (CL),	874,944	829,171	1,868,181	213.52
Net Sales (S),	5,036,070	4,789,242	6,086,554	120.85
Earnings Before Interest and Taxes (EBIT)	342,467	108,976	538,856	157.34
Retained Earnings (RE)	272,404	65,450	445,274	163.46
<b>Accounting Ratios</b>				
$T_1 = (CA-CL)/TA$	0.292	0.238	0.065	22.26
$T_2 = RE/TA$	0.038	0.009	0.055	144.73
$T_3 = EBIT/TA$	0.048	0.016	0.066	137.50
$T_4 = BVE/TL$	0.788	0.792	0.705	89.46
$T_5 = S/TA$	0.718	0.713	0.752	104.73
<b>Z' Score</b>	<b>1.436</b>	<b>1.269</b>	<b>1.343</b>	<b>93.52</b>

Source: Balance Sheet and Profit and Loss Account of F2 [23], Own calculations

**Company F3.**

**Economic and Financial indicators.**

In case of F3, Total assets/Liabilities declined by 4.79 % from Lei 7,012,037 in 2011 to Lei 650,389 in 2013.

The Current assets increased by 27.35 % from Lei 165,138 in 2011 to Lei 210,310 in 2013.

The Book value of Equity increased 5.19 times from Lei 64,113 in 2011 to Lei 332,968 in 2013.

Current liabilities declined by 48.72 %, from Lei 618,963 in 2011 to Lei 317,421 in 2013.

Sales increased by 50.17 % from Lei 777,725 in the year 2011 to Lei 1,167,980 in the year 2013.

Earnings Before Interest and Taxes increased 3 times from Lei 74,055 in the year 2011 to Lei 222,208 in the year 2013.

Retained earnings also increased by 3 times from Lei 62,199 in the year 2011 to Lei 186,558 in the year 2013.

**Accounting ratios.**

The  $T_1 = (CA-CL)/TA$  registered negative values every year, but also a decreasing trend from the year 2011 to 2013 so that in the last year of the analysis represented 24.69 % of the level registered in 2011.

The  $T_2 = RE/TA$  recorded positive values every year and an increasing trend, so that in 2013 it was by 3.14 times higher than in 2011.

The  $T_3 = \text{EBIT}/\text{TA}$  registered a positive value every year and increased 3.15 times in 2013 compared to 2011.

The  $T_4 = \text{BVE}/\text{TL}$  had positive values, and in the year 2013 it increased 5.49 times than in the year 2011.

The  $T_5 = \text{S}/\text{TA}$  had also positive values every year and increased by 57.73 % in 2013

compared to 2011.( Table 2).

**Z' Score** was 1.126 in the year 2011, 0.928 in the year 2012 and 3.189 in the year 2013, reflecting a slight declining towards the year 2012 but a string increasing trend towards the year 2013, when it reached a value 2.83 times higher than in 2011.(Table 3)

Table 3.Primary data, Accounting ratios and Z' Scores for F3 in the period 2011-2013

	2011	2012	2013	2013/2011 %
<b>Primary Data</b>				
Total Assets (TA),	683,076	142,775	650,389	95.21
Current Assets (CA),	165,138	403,854	210,310	127.35
Book Value of Equity (BVE)	64,113	146,410	332,968	519.34
Total Liabilities (TL),	683,076	142,775	650,389	95.21
Current Liabilities (CL),	618,963	796,365	317,421	51.28
Net Sales (S),	777,725	726,570	1,167,980	150.17
Earnings Before Interest and Taxes (EBIT)	74,055	97,973	222,208	300.05
Retained Earnings (RE)	62,199	82,297	186,558	299.93
<b>Accounting Ratios</b>				
$T_1 = (\text{CA}-\text{CL})/\text{TA}$	- 0.664	- 0.416	- 0.164	24.69
$T_2 = \text{RE}/\text{TA}$	0.091	0.087	0.286	314.28
$T_3 = \text{EBIT}/\text{TA}$	0.108	0.103	0.341	315.74
$T_4 = \text{BVE}/\text{TL}$	0.093	0.155	0.511	549.46
$T_5 = \text{S}/\text{TA}$	1.138	0.770	1.795	157.73
<b>Z' Score</b>	<b>1.126</b>	<b>0.928</b>	<b>3.189</b>	<b>283.21</b>

Source: Balance Sheet and Profit and Loss Account of F3 [24], Own calculations

### Company ranking based on the Z Scores and number of points.

Analyzing the scores obtained by each company, one can notice that there are differences between them. In the year 2011, on the 1st position came F2 with highest Z Score, 1.436, while F1 was positioned on the

3rd position with the lowest score, 1.003. In the year 2012, F2 remained on the 1st position, even thou its score was only 1.269, and the lowest score was registered by F3, 0.928. In the year 2013, F3 passed on the 1st position with the highest score, 3.189, and on the last position came F1 with 0.971.

Table 4.Z' Score by company and year and company ranking

Company	2011		2012		2013		Total points
	Z Score	Points	Z Score	Points	Z Score	Points	
F1	1.003	3	1.098	2	0.971	3	8
F2	1.436	1	1.269	1	1.343	2	4
F3	1.126	2	0.928	3	3.189	1	6

Source: Own calculations

As results, after allowing points to each company, the final classification was the following one: on the 1st position came F2 with 4 points, on the 2nd position F3 with 6 points and on the 3rd position F3 with 8 points.( Table 4).

### Interpretation of Z Score value, the results of the discriminant analysis

**The company F1** has been in the Distress zone every year, because of the low value of Z Score. Its financial statement is very risky,

and as a result it is expecting to fail in the near future.

**The company F2** was situated in the "Grey zone" every year. It is in a difficult financial situation. The performances are deeply diminished and the company is in danger to fail.

**The company F3** was placed in the "Distress zone" in the year 2011 and 2012, but after the measures taken by the managers of the enterprise, in the year 2013 it passed in the "Safe zone", having a good financial situation and solvency, enabling it to pay all its debts.(Table 5).

Table 5. Interpretation of the results by company and year

Company	2011	2012	2013
F1	"Distress zone" The company is going to fail.	"Distress zone" The company is going to fail.	"Distress zone" The company is going to fail.
F2	"Grey zone" The company has a difficult financial situation. The performances are deeply diminished and the company is in danger to fail.	"Grey zone" The company has a difficult financial situation. The performances are deeply diminished and the company is in danger to fail.	"Grey zone" The company has a difficult financial situation. The performances are deeply diminished and the company is in danger to fail.
F3	"Distress zone" The company is going to fail.	"Distress zone" The company is going to fail.	"Safe zone" The company has a good financial situation and solvency, enabling it to pay all its debts.

Source: Own interpretations

## CONCLUSIONS

The analysis of risk bankruptcy based of Altman model allowed to discriminate the three companies dealing with dairy farming and establish which one is going to fail and which one has a "healthy: financial statement. The company F1 had the most difficult financial statement with a negative impact on the accounting ratios and finally on the Z Score values, which were very small and situated the company in the Distress zone every year.

For this reason, it is considered, that this company is bankrupt.

The company F2 was situated in the "Grey zone" every year, because the financial situation is not good, the company is not able to pay all its debts and could be in danger to fail in the future.

The company F3 registered a different situation from a year to another. In the first two years, 2011 and 2012, it was facing a difficult financial statement being placed in the "Distress zone".

In the year 2013, the financial statement has received due to the measures taken by managers and it passed in the "Safe zone", characterized by a good financial situation and solvency, enabling it to pay all its debts.

Because, the three companies dealing with dairy farming are at the limit of surviving, a very low profitability, the managers have to keep under control the financial indicators any moment and take urgent measures to recover. Managers have to know every moment the degree of bankruptcy risk, not only at the end of the year after concluding the financial statement when usually it is too late.

They have to be informed, for instance at the end of June, which is the financial situation of the company and to have time to take measures to improve it by the end of the year as their company not to fail.

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## CONSIDERATIONS ON THE TRENDS OF INTERNATIONAL TOURISM RECEIPTS

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### Abstract

*The paper aimed to analyze the evolution of tourism receipts at world level and by geographical area and in the main countries of tourist interest. In the period 1980-2012, the tourism income increased 10.14 times. In 2012, it accounted for USD Billion 1,075, to which Europe contributed by 42.58 %, Asia and the Pacific by 30.13 % and the Americas by 19.77 %. The USA, Spain, France, China, Macau, Italy, Germany, United Kingdom, Hong Kong and Australia are the top 10 countries according to the receipts, earning USD Billion 508.8, which represented 47.55 % of the world tourism income in 2012. The European countries with the highest contribution to tourism revenue are: Spain 12.21 %, France 11.72 %, Italy 8.99 %, Germany 8.32 %, United Kingdom 7.94 %, Turkey 5.60 %, Austria 4.12 %, Switzerland 3.62 %, Sweden 3.36 % and The Netherlands 3.03 %. Their contribution to Europe tourism receipts was 68.97 % in 2012. As a conclusion, international tourism is a very dynamic field of activity with a high contribution to the development of the world economy.*

*Key words:* international tourism, receipts, trends

### INTRODUCTION

The increase rate of tourist flows at international level has determined a growth of receipts coming from this field of activity. Also the changes registered in the tourist flows regarding the geographical areas are reflected by tourism receipts. [9]

All the incomes obtained from tourism products and services sold to domestic and foreign tourists are used, first of all, to create tourism profit, to pay its employees dealing with accommodation services, food products and services, entertainment services, transport and other services.

Secondly, the incomes have to be distributed to other economic branches, suppliers of products and services for tourism such as: building industry, financial-banking units, trade units, transport industry, food industry, cultural and sport institutions, etc.

Thirdly, the incomes are also used to pay taxes to the public and local budget, to create new jobs in the tourism network, to support the economic and social development in the areas where tourism attractions are found.

[10,11]

Also, but not finally, tourism receipts are destined to support the commercial trade balance of a country, because tourism is a component of the so called "invisible trade", besides transport, currency exchange, banking, insurance, license trade, know-how, cultural exchange.

The commercial trade balance is an "active one" when export exceeds import and a "passive one" when import is higher than export, and also when export is equal to import the trade balance is considered to be a "balanced one".

More than this, the payment balance is deeply influenced by external trade, meaning that tourism as a part of it brings an important contribution to this balance.[2, 6,7, 11, 12]

For this reason, international tourism is similar to international trade being a source of convertible currencies useful for the development of the economy of any country. Many of the countries with emergent economies make substantial efforts for the development of tourism aiming to increase their currency sources. [1,3,4,8]

A part of the incomes obtained in the field of tourism have to be spent for diminishing its negative effects on environment. Sustainable tourism involves the rational use of resources, environment protection, the minimization of negative effects, development of the local communities. [5]

In this context, the paper goal was to analyze the dynamics of tourism receipts during the last decades at world level and by geographical area in order to identify the major trends.

## MATERIALS AND METHODS

In order to set up this paper, the empirical data supplied UNWTO in Tourism Highlights, recent publications were used. [13,14,15,16,17].

The period of analysis was 1980-2012 and mainly 1990-2012, and the main indicators taken into account characterizing tourism receipts flows have been the following ones: receipts in terms of USD Billion at world level, by geographical area and by country, the market share of the top 10 countries classified based on this criterion.

In this purpose, fixed indices and structural indices and comparison method were used.

## RESULTS AND DISCUSSIONS

### World tourism receipts.

The value of tourism receipts increased 10.14 times from USD Billion 106 in the year 1980 to USD Billion 1,075 in the year 2012, reflecting how dynamic is this branch of the world economy.

By geographical areas, in the year 1980, the highest tourism receipts were carried out in Europe, the Americas, Asia and the Pacific, the Middle East and Africa.

In the year 2012, the ranking of the geographical regions has been changed, the empirical data reflecting a different growth rate from an area to another. In the decreasing order, the situation was the following one: Europe USD Billion 457.8 (42.58 %), Asia and the Pacific USD Billion 323.9 (30.13 %), the Americas USD Billion 212.6 (19.77%), the Middle East USD Billion 47 (4.37 %) and Africa USD Billion 33.6 (3.15%) (Table 1).

Table 1. Dynamics of international tourism receipts ( USD Billion)

	1980	1985	1990	1995	2000	2012	2012/1980 %
World	106	120.8	273.4	414.2	483.8	1,075	1,014.15
Africa	3.4	3.1	6.4	8.5	10.5	33.6	988.23
The Americas	24.7	33.3	69.3	98.4	130.8	212.6	860.72
Asia and the Pacific	11.3	16.3	46.8	82.5	91.3	323.9	2,866.37
Europe	63.7	63.9	145.6	212.2	232.5	457.8	718.68
The Middle East	3.5	4.2	5.2	12.5	18.7	47.0	1,342.85

Source: UNWTO, Tourism Highlights, 2006, 2013. [13, 15]Own calculations

### Tourism receipts by geographical area and destination country.

*In Africa*, the highest receipts achieved in the year 2012 were recorded by South Africa, Morocco, Tunisia and Mauritius. In the same year, the Sub Saharan Africa registered USD Billion 24,220 (73.12%), being on the 1st position compared to North Africa which recorded only USD Billion 9,366 (27.88 %) (Table 2).

The market share of the top 3 countries in

Africa based on tourism receipts was the following one in the year 2012: South Africa 29.75 %, Morocco 19.98 % and Tunisia 6.49 %, all together accounting for 56.23 % of the total receipts obtained from tourism by Africa.( Table 3)

*In the Americas*, in the year 2012, the highest receipts were recorded by the USA, the Carribeans, Canada, Mexico, Brazil and Dominicana Rep. The North America registered the highest incomes USD Billion

156,355 (73.53 %) being situated on the 1st position, the South America USD Billion 23,705 (11.14%) coming on the 2nd position and the Central America USD Billion 8,028 (3.77%) being situated on the 3rd position (Table 4).

Table 2. Tourism receipts in Africa by destination country, 1990-2012 ( USD Billion)

	1990	1995	2000	2012
<b>Africa</b>	<b>6,402</b>	<b>8,500</b>	<b>10,505</b>	<b>33,585</b>
<b>North Africa</b>	<b>2,333</b>	<b>2,667</b>	<b>3,823</b>	<b>9,366</b>
Algeria	105	33	96	209(2011)
Morocco	1,259	1,295	2,039	6,711
Sudan	21	8	5	185(2011)
Tunisia	948	1,530	1,683	2,183
<b>West Africa</b>	<b>605</b>	<b>538</b>	<b>1,007</b>	<b>1,036</b>
Benin	55	85	77	187(2011)
Bukina Faso	11		19	133(2011)
Cape Verde	6	10	41	414
Cote d' Ivoire	51	89	45	141(2011)
Gambia	26	28		96(2011)
Ghana	85	11	335	694(2011)
Guinea	30	1	12	2(2011)
Guinea Bissau				
Mali	47	25	40	227(2011)
Mauritania	9	11		
Niger	17	7	23	96(2011)
Nigeria	25	17	101	622
Senegal	167	168	144	484(2011)
Sierra Leone	19	57	11	44(2011)
Togo	53	13	8	79(2011)
<b>Central Africa</b>	<b>93</b>	<b>133</b>	<b>181</b>	
Angola	13	10	18	647(2011)
Cameroon	53	36		
Cent.Afr.Rep	3	4	5	
Chad	8	43	14	
Congo	6	14	12	
Dem.R.Congo	7			11(2011)
Ecuatorial Guinea	1	1	5	
Gabon	3	18	20	
Sao Tome Pm	2		10	
<b>East Africa</b>	<b>1,285</b>	<b>2,323</b>	<b>2,377</b>	<b>5,528</b>
Burundi	4	1		3(2011)
Comoros	2	22	15	42(2011)
Djibouti		4		19(2011)
Eritrea		58	36	
Ethiopia	25	16	£7	763(2011)
Kenya	443	486	283	901
Madagascar	40	53	121	
Malawi	16	17	25	34(2011)
Mauritius	244	430	542	1477
Mozambique			74	250
Reunion		233	296	434(2011)
Rwanda	10	2	4	282
Seychelles	126	129	13?	305
Tanzania	65	502	377	1564
Jgarda	10	78	165	
Zambia	41	47	111	146(2011)
Zimbabwe	60	145	125	749
<b>Southern Africa</b>	<b>2,051</b>	<b>2,640</b>	<b>3,115</b>	<b>11,479</b>
Botswana	117	152	222	
Lescena	17	27	24	
Namibia	85	278	160	485
South Africa	1,832	2,125	2,675	9,994
Swaziland	30	43	77	

Source: UNWTO, Tourism Highlights, 2006, 2012 [13, 14]Nota: The figure in the bracket represents the year 2011.

Table 3. The top 3 countries in Africa by tourism receipts and their market share in 2012

Crt. No.	Country	Tourism receipts ( USD Billion)	Market share (%)
1.	South Africa	9,994	29.75
2.	Morocco	6,711	19.98
3.	Tunisia	2,183	6.49
Total 3 countries	-	18,888	56.23
Total Africa	-	33,585	100.00

Source: Own calculations

Table 4. Tourism receipts in the Americas by destination country, 1990-2012 ( USD Billion)

	1990	1995	2000	2012
<b>Americas</b>	<b>69,320</b>	<b>98,449</b>	<b>130,807</b>	<b>212,623</b>
<b>North America</b>	<b>54,872</b>	<b>77,491</b>	<b>101,472</b>	<b>156,355</b>
Canada	6,339	7,917	10,778	17,401
Mexico	5,526	6,179	8,294	12,739
United States	43,007	61,395	82,400	126,214
Caribbean	6,731	12,246	17,157	24,536
Arquila	35	50	56	113
Arquila Barb	298	247	291	319
Anuba	350	521	814	1,404
Bahamas	1,333	1,348	1,734	2,367
Barbados	494	622	723	916
Bermude	290	488	431	441
Borane	18	37	59	
Br Virg. Is	132	211	345	397
Caiman Island	23b	394	559	
Cuba	243	963	1,737	2,283(2011)
Curacao	120	175	183	543
Dominica	25	42	46	210
Dominican Rep.		1,571	2,860	4,549
Grenada	38	76	93	110
Guadeloupe	197	458	418	583(2011)
Haiti	46	90	128	162(2011)
Jamaica	740	1,089	1,333	2,043
Martinique	240	384	302	516(2011)
Montserrat	7	17	9	5
Puerto Rico	1,366	1,828	2,388	3,193
Sant Lucia	154	230	279	335
St. Kiss Nev	58	63	58	94
St. Maarten	316	349	511	842
St. Vincent. Grenadines	56	53	75	93
Trinidad Tbg	95	77	213	472(2011)
Turks Caicos	37	53	285	
US Virgin Is	697	822	1,206	
<b>Central America</b>	<b>755</b>	<b>1,523</b>	<b>2,964</b>	<b>8,028</b>
Belize	44	78	116	299
Costa Rica	275	681	1,302	2,425
El Salvador	18	85	217	544
Guatemala	185	213	482	1,419
Honduras	29	107	260	661
Nicaragua	12	50	129	422
Panama	172	309	458	2,259
<b>South America</b>	<b>4,982</b>	<b>7,189</b>	<b>9,215</b>	<b>23,705</b>
Argentina	1,131	2,222	2,904	4,895
Bolivia	91	55	68	532
Brazil	1,492	972	1,810	6,645
Chile	540	911	819	2,201
Colombia	406	657	1,030	2,351
Ecuador	188	255	402	1,026
French Guiana				
Guyana	27	33	75	
Paraguay	128	137	73	239
Peru	217	428	837	2,657
Suriname	1	21	16	61(2011)
Uruguay	238	611	713	2,076
Venezuela	496	849	423	844

Source: UNWTO, Tourism Highlights, 2006, 2012 [13, 14]

The top countries in the Americas regarding the receipts from tourism have the following market shares: the USA 59.36 %, the Carribeans 11.53 %, Canada 8.18 %, Mexico 5.99 %, Brazil 3.12 %, Argentina 2.30 %,

followed by Puerto Rico, Peru, Costa Rica and Bahamas, all these 10 countries together obtained USD Billion 203,072 representing 95.50 % of the total receipts registered by Americas.( Table 5).

Table 5.The top 10 countries in the Americas according to tourism receipts and their market share in 2012

Crt. No.	Country	Tourism receipts ( USD Billion)	Market share (%)
1.	The USA	126,214	59.36
2.	The Carribeans	24,536	11.53
3.	Canada	17,401	8.18
4.	Mexico	12,739	5.99
5.	Brazil	6,645	3.12
6.	Argentina	4,895	2.30
7.	Puerto Rico	3,193	1.50
8.	Peru	2,657	1.24
9.	Costa Rica	2,425	1.14
10.	Bahamas	2,367	1.11
Total top 10		203,072	95.50
Total Americas	-	212,623	100.00

Source: Own calculations

Table 6. Tourism receipts in Asia and the Pacific by destination country, 1990-2012 ( USD Billion)

	1990	1995	2000	2012
<b>Asia and the Pacific</b>		<b>82,549</b>	<b>91,259</b>	<b>323,865</b>
<i>North-East Asia</i>	<b>23,001</b>	<b>38,015</b>	<b>46,025</b>	<b>166,843</b>
China	2,218	8,730	16,230	50,028
Hong Kong (China)	5,032	9,604	7,495	32,089
Japan	3,578	3,224	3,373	14,576
Korea, DP Rep	29			
Korea, Republic of	3,559	5,150	6,811	14,231
Macao (China)	3,473	3,102	3,203	23,707
Mongolia	5	21	36	233
Taiwan (pr.of China)	1,740	3,286	3,738	11,707
<i>South-East Asia</i>	<b>14,479</b>	<b>26,972</b>	<b>26,158</b>	<b>9,665</b>
Cambodja		53	304	1,800
Indonesia	2,105	5,223	4,975	8,325
Lao PD.R.	3	51	114	506
Malaysia	2,667	3,989	5,011	20,250
Myanmar	9	151	162	281(2011)
Philippines	1,306	1,136	2,134	4,014
Singapore	4,937	7,646	5,142	19,261
Thailand	4,326	8,035	7,483	30,092
Vietnam	85			21(2011)
<i>Oceania</i>	<b>7,316</b>	<b>14,159</b>	<b>14,246</b>	<b>41,201</b>
American Samoa	10			
Australia	4,246		8,846	31,534
Cook Islands	16	29	36	
Fiji	202	291	182	728
French Polynesia	17!			385(2011)
Guam	936			
Kirbati	1	2	3	
Marshall Is		3	4	3
Micronesia (Fed.8t.cf)			15	
N. Mariana Is	455	655		
New Caledonia	94	108	111	154(2011)
New Zealand	1,030	2,318	2,267	5,454
Niue		2		
Palau			53	2(2011)
Papua New Guinea	41	25	21	3(2011)
Samoa	20	35	41	148
Solomon Is	7	16	4	73
Tonga	90	10	7	28(2011)
Vanuatu	39	45	56	226(2011)
<i>South Asia</i>	<b>2,029</b>	<b>3,404</b>	<b>4,797</b>	<b>24,156</b>
Bangladesh	11	25	50	
Bhutan	2	5	10	110
India	1,513	2,581	3,460	17,971
Iran	61	67	467	2,381(2011)
Maldives	89	211	321	1,873
Nepal	64	177	158	352
Pakistan	156	110	81	341
Sri Lanka	132	226	246	1,039

Source: UNWTO, Tourism Highlights, 2006, 2012. [13, 14]

**In Asia and the Pacific**, in 2012, the highest tourism receipts were achieved by China, Hong Kong, Thailand, Macao, Malaysia, Singapore, India, Japan, Korea DR.Rep and Australia. The North Asia registered USD Billion 166,843 (51.51%), being placed on the 1st position, the South Eastern Asia gained USD Billion 91,665 (28.30 %), coming on the 2nd position, Oceania obtained USD Billion 41,201 (12.72 %) being situated on the 3rd position and the South Asia USD Billion 24,156 (7.45 %) coming on the 4th position. (Table 6).

The top 10 countries in Asia and the Pacific according to the income earned from tourism in the year 2012 were: China with a market share of 15.44%, Hong Kong China 9.90 %, Australia 9.73 %, Thailand 9.29 %, Macao China 7.32 %, Singapore 5.94 %, Japan 4.50 %, Korea Rep. 4.39 %, Taiwan 3.61 % and Indonesia 2.57%. All these 10 countries together earned USD Billion 235,550 representing 72.73 % of the total income coming from tourism in Asia and the Pacific (Table 7).

Table 7. The top 10 countries in Asia and the Pacific according to tourism receipts and their market share in 2012

Crt. No.	Country	Tourism receipts (USD Billion)	Market share (%)
1.	China	50,028	15.44
2.	Hong Kong China	32,089	9.90
3.	Australia	31,534	9.73
4.	Thailand	30,092	9.29
5.	Macao China	23,707	7.32
6.	Singapore	19,261	5.94
7.	Japan	14,576	4.50
8.	Korea Rep.	14,231	4.39
9.	Taiwan	11,707	3.61
10.	Indonesia	8,325	2.57
Total top 10	-	235,550	72.73
Total Asia and the Pacific	-	323,865	100.00

Source: Own calculations

**In Europe**, in the year 2012, the highest receipts were registered by the countries of high tourism attraction, in the decreasing order being the following ones: France, Spain, Italy, Germany, United Kingdom, Turkey, Austria, Switzerland, Sweden, The Netherlands and Greece (Table 8).

In Europe, in the year 2012, the market share of the top 10 countries was the following one: Spain 12.21 %, France 11.72 %, Italy 8.99 %, Germany 8.32 %, United Kingdom 7.94 %, Turkey 5.60 %, Austria 4.12 %, Switzerland 3.62 %, Sweden 3.36 % and The Netherlands 3.03 %.

All these 10 countries together earned USD Billion 315,727 representing 68.97 % of tourism receipts registered by Europe. (Table 9).

**In the Middle East**, in the year 2012, the highest receipts were registered by the United Arab Emirates, Egypt and Saudi Arabia (Table 10).

In the Middle East, in the year 2012, the market share of the main countries with high revenues

from tourism was the following one: United Arab Emirates 22.07 %, Egypt 21.13 %, Saudi Arabia 15.80 %, Lebanon 14.60 % and Jordan 7.35 %.

All these 5 countries together earned USD Billion 38,083, representing 80.91 % of the receipts received from tourism in the Middle East. (Table 11).

**The top 10 countries in the world based on the tourism receipts registered** in the year 2012 have been: the USA, Spain, France, China, Macau, Italy, Germany, United Kingdom, Hong Kong and Australia.

All these ten countries obtained USD Billion 508.8 from tourism, representing 47.55 % of the world receipts, which accounted for USD Billion 1,075.

The highest market share was recorded by the USA 11.79 %, being situated on the 1st position, followed by Spain with 5.22 % on the 2nd position, France with 5.01 % on the 3rd position, China with 4.67 % on the 4th position, Macau with 4.08 % on the 5th position, and Italy 3.85 % on the 6th position. (Table 12).

Table 8. Tourism receipts in Europe by destination country, 1990-2012 ( USD Billion)

	1990	1995	2000	2012
<b>Europe</b>	<b>145,637</b>	<b>212,157</b>	<b>232,483</b>	<b>457,832</b>
<i>Northern Europe</i>	<i>26,267</i>	<i>33,016</i>	<i>35,932</i>	<i>7,384</i>
Denmark	3,645	3,673	3,694	6,162
Finland	1,167	1,641	1,406	4,139
Iceland	151	186	229	845
Ireland	1,453	2,208	2,633	4,078
Norway	1,570	2,238	2,050	5,359
Sweden	2,906	3,471	4,064	15,427
United Kingdom	15,375	20,500	21,857	36,373
<i>Western Europe</i>	<i>63,114</i>	<i>80,821</i>	<i>82,774</i>	<i>157,040</i>
Austria	13,417	12,827	9,931	18,894
Belgium		4,548	6,592	11,381
Belgium/Luxemburg	3,702			
France	20,184	27,587	30,757	53,697
Germany	14,265	18,031	18,693	38,114
Luxembourg		1,721	1,806	4,486
Netherlands	4,155	6,578	7,217	13,887
Switzerland	7,411	9,459	7,777	16,581
<i>Central Eastern Europe</i>	<i>4,849</i>	<i>19,633</i>	<i>20,372</i>	<i>5,971</i>
Armenia		1	38	451
Azerbaijan	228	70	63	2,433
Belarus		23	93	654
Bulgaria	320	473	1,074	3,748
Czech Rep	419	2,880	2,973	7,035
Estonia		557	505	1,226
Georgia			87	1,411
Hungary	824	2,953	3,757	4,845
Kazakhstan		122	356	1,347
Kyrgyzstan		5	15	698
Latvia		20	131	745
Lithuania		77	391	1,313
Poland	358	6,614	5,677	10,938
Rep Moldova		57	39	213
Romania	106	590	359	1,467
Russian Federation		4,312	3,430	11,187
Slovakia	70	623	433	2,299
Tajikistan				34, 1
Ukraine		131	394	4,842
Uzbekistan			27	28
<i>Southern Mediter Eu.</i>	<i>51,408</i>	<i>77,787</i>	<i>93,405</i>	<i>17,437</i>
Albania	4	85	389	1,471
Bosnia & Herzg			233	603
Croatia		1,349	2,782	8,774
Cyprus	1,258	1,798	1,941	2,600
F.Yug.Rp Macedonia		19	38	233
Greece	2,587	4,135	9,219	12,879
Israel	1,396	2,993	4,088	5,493
Italy	16,453	28,731	27,493	41,185
Malta	496	651	610	1,265
Portugal	3,555	4,831	5,243	11,056
Serbia & Montenegro		42	30	1,732
Slovenia		1,080	964	2,577
Spain	18,484	25,252	29,968	55,916
Turkey	3,225	4,957	7,636	25,653
Yugoslav SFR	2,774			

Source: UNWTO, Tourism Highlights, 2006, 2013 [13, 15]

Table 9. The top 10 countries in Europe according to tourism receipts and their market share in 2012

Crt. No.	Country	Tourism receipts ( USD Billion)	Market share (%)
1.	Spain	55,916	12.21
2.	France	53,697	11.72
3.	Italy	41,185	8.99
4.	Germany	38,114	8.32
5.	United Kingdom	36,373	7.94
6.	Turkey	25,653	5.60
7.	Austria	18,894	4.12
8.	Switzerland	16,581	3.62
9.	Sweden	15,427	3.36
10.	The Netherlands	13,887	3.03
Total top 10	-	315,727	68.97
Total Europe	-	457,832	100.00

Source: UNWTO, Tourism Highlights, 2006, 2013 [13, 15]

Table 10. Tourism receipts in the Middle East by destination country, 1990-2012 ( USD Billion)

	1990	1995	2000	2012
<i>Middle East</i>	<b>6,185</b>	<b>12,503</b>	<b>18,703</b>	<b>47,031</b>
Bahrain	135	247	573	1,035(2011)
Egypt	1,100	2,684	4,345	9,940
Iraq	173	18	2	1,544(2011)
Jordan	512	680	723	3,460
Kuweit	132	121	98	425
Lebanon				6,871(2011)
Lybian Arab J.	6	2	75	
Oman	89		221	1,095
Palestine			226	795(2011)
Gaza			126	
Saudi Arabia				7,432
Syrian Arab. Republic	320	1,258	1,082	
United Arab Emirates	315	532	1,063	10,380
Yemen	20	50	73	783(2011)

Source: UNWTO, Tourism Highlights, 2006, 2013 [13, 15]

Table 11. The top 5 countries in the Middle East according to tourism receipts and their market share in 2012

Crt. No.	Country	Tourism receipts ( USD Billion)	Market share (%)
1.	United Arab Emirates	10,380	22.07
2.	Egypt	9,940	21.13
3.	Saudi Arabia	7,432	15.80
4.	Lebanon	6,871	14.60
5.	Jordan	3,460	7.35
Total top 5	-	38,083	80.91
Total the Middle East	-	47,031	100.00

Source: Own calculations

Table 12. The top 10 countries in the world according to their tourism receipts and their market share in 2012

Country	Tourism receipts ( USD Billion )	Market share (%)
The USA	126.2	11.79
Spain	55.9	5.22
France	53.7	5.01
China	50.0	4.67
Macau, China	43.7	4.08
Italy	41.2	3.85
Germany	38.1	3.56
United Kingdom	36.4	3.40
Hong Kong China	32.1	3.00
Australia	31.5	2.94
Total top 10 countries	508.8	47.55
Total World	1,070	100.00

Source: [http://en.wikipedia.org/wiki/World\\_Tourism\\_rankings](http://en.wikipedia.org/wiki/World_Tourism_rankings)

UNWTO World Tourism Barometer for the full rankings [16, 17]

## CONCLUSIONS

The tourism receipts registered an important growth in the period 1980-2012, increasing 10.14 times. Thus, in 2012, the revenues coming from world tourism accounted for USD Billion 1,075.

The highest contribution to the international tourism receipts is given by Europe 42.58 %, which is situated on the 1st position. On the 2nd position it is situated Asia and the Pacific with 30.13 % and on the 3rd position are placed the Americas with 19.77 %.

A number of 10 countries are situated in the top at world level: the USA, Spain, France, China, Macau, Italy, Germany, United Kingdom, Hong Kong and Australia, whose receipts accounted for USD Billion 508.8, representing 47.55 % of the world tourism income.

The leading countries of Europe from the point of view of their contribution to tourism receipts are: Spain 12.21 %, France 11.72 %, Italy 8.99 %, Germany 8.32 %, United Kingdom 7.94 %, Turkey 5.60 %, Austria 4.12 %, Switzerland 3.62 %, Sweden 3.36 % and The Netherlands 3.03 %. Their contribution to Europe revenue from tourism is 68.97 %.

As a conclusion, the growth rate of tourism receipts was very dynamic and reflect a continuous trend to develop in the coming years confirming the high contribution of tourism to the world economy.

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## RESEARCH ON REGRESSION MODELING OF PROFIT RELATED TO MILK YIELD IN DAIRY FARMING

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### Abstract

*The paper aimed to establish a corresponding regression model reflecting the relationship between profit, as the main barometer of economic efficiency and milk yield in dairy farming using a sample of 8 farms operating in the Southern Romania. Two regression models were compared: the linear regression and the quadratic fit. Average milk yield registered 6,088.57 kg/cow and had just 9.24 % variation among farms. Profit per cow recorded Lei 2,096.57 in average with a very high variation from a farm to another ( 46.20%). The correlation coefficient between milk yield and profit per cow,  $r_{xy} = 0.921$ , reflected a strong positive link between the two economic indicators. The regression model had the form  $Y = 1.584x - 7,508.66$  with the standard error  $S_{est} = 407.370428$  and the parabolic fit was  $Y = 0.006x^2 - 5.7649x + 14,250$  having a higher standard error  $S_{est} = 18,786.96$ . From this comparison, the linear regression model proved to be the most suitable one to reflect the relationship between profit per cow and milk yield with the highest accuracy. According to this model, it was estimated that for an annual 500 kg gain in milk yield, profit per cow could be higher by Lei 792 per year with a deep impact on farm profitability.*

**Key words:** dairy farming, regression modeling, profit, milk yield

### INTRODUCTION

Milk yield has a deep impact on the economic results in dairy farming being in its turn influenced by technological aspects, mainly regarding cow feeding, but also breeding herd structure, reproduction and natural conditions. Miron and Lup (2013) affirmed how important is dairy farm size in determining economic efficiency. [8]

Kopecek in 2002, using the cost function, noticed that the costs for marketed milk for one feeding day of a cow have a lower growth compared to milk yield and using the expense function he determined the maximum profit per litre of marketed milk, maximum profit per cow and year and the interval of profitability for milk production. [6]

Grigoroiu (2008) proposed a new method for establishing the threshold average marketed milk production for assuring profitability in dairy farms in Romania. [4]

Between milk yield, variable cost and gross margin per cow is a close relationship with

major results for farm profitability as mentioned by Pirvutoiu and Popescu Agatha in 2012. [10]

The correlation between milk yield and profit per cow is a strong positive one, as found by Popescu Agatha and Gyeresi Stefan in 1989 [15]

Economic performance in terms of milk yield and the financial performance in terms of gross margin are closely related to farm size as affirmed by Popescu Agatha in 2009 and 2010. [11,12]

Profit variation depends on marketed milk and production cost as mentioned by Kopecek in 2002 and Popescu Agatha in 2014. [6,14] A gain of 100 kg in milk production could increase milk cost by Lei 0.02 per milk kilogram and farmers profit by Lei 118.9 per cow and year as obtained by Popescu Agatha in 2014 in Romania. [14]

The relationship between milk cost, return and profitability in dairy farming was put into evidence by Popescu Agatha (2014b) [15]

The relationship between milk yield and economic indicators in dairy farming was studied using various modeling techniques. Popescu Agatha in 2010 used linear regression function in gross margin forecast based on milk yield.[12,13]

Murphy et al. in 2014 used nonlinear autoregressive model with exogenous input, a static neural network and a multiple linear regression model for predicting daily milk yield per herd over various forecast horizons. He concluded that the non linear autoregressive model with exogenous input is the more accurate solution to conventional regression techniques for short-term prediction of milk yield. [8]

Ramsbottom et al. in 2011 used linear and quadratic models to determine the correlation between dairy cow genetic merit in terms of economic breeding index, milk yield, fat and protein content, calving interval and financial indicators: income per cow, cost per cow, and profit in commercial spring calving dairy farms. [18]

Hansen et al. in 2005 measured the financial performance in dairy farms in close relationship with milk production. [5]

The correlation coefficient is largely used to reflect the relationship between various variables as affirmed by Colton in 1974, [2], Pearson in 1985, [9], Sponaugle et al. in 2014, [20].

Linear regression is used to reflect the relationship and evolution trend between different variables which depend one to another as affirmed by Murphy et al. in 2014 [6], Popescu Agatha in 2010 [12], Sokal et al. in 1995 [19].

Quadratic models are also used to characterize the link between different variables and their dependence one to another as mentioned by Popescu Agatha and Gyeresi Stefan in 1989 [16], Ramsbottom et al. in 2011 [18].

Standard error of linear regression, quadratic fit and other mathematical models assures the highest accuracy of the prediction [19].

For this reason, it is commonly used in the decision what mathematical model should be chosen to reflect the best way the link between various indicators or variables and to

predict their future evolution with the highest precision.

Also, the determination coefficient or R squared is used to explain how much of the total variation of the dependent variable is given by the independent variable as mentioned by Bolboaca [1], Dufour et al. in 2011 [3].

In this context, the present paper aimed to test two mathematical models: linear regression and quadratic fit in the analysis of milk yield impact on profit in dairy farming in Romania in order to establish the most suitable modeling technique in profit prediction based on average milk production.

## MATERIALS AND METHODS

In order to set up this paper, the primary data were collected from a sample of 8 dairy farms situated in the Southern Romania in the year 2013.

The economic indicators taken into consideration were divided into two categories of variables: (i) independent variables, in this case X-milk yield/cow/year, and (ii) dependent variables symbolized Y, as follows: Y<sub>1</sub>-milk production/farm, Y<sub>2</sub>-production expenses/cow/year, Y<sub>3</sub>-milk cost, Y<sub>4</sub>-profit/cow/year, and Y<sub>5</sub>-profit/farm.

For each economic indicators, the following statistical parameters have been determined:

(a)Average of the variable,  $\bar{X}$ , using the well known formula:

$$\bar{X} = \frac{X_1 + X_2 + \dots + X_n}{n} \quad (1)$$

(b)Variance of variable,  $S^2$ , according to the formula:

$$S^2 = \frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1} \quad (2)$$

(c)Standard Deviation, S, based on the formula:

$$S = \sqrt{\frac{\sum_{i=1}^n (X_i - \bar{X})^2}{n-1}} \quad (3)$$

(d) Variation Coefficient,  $V_{\%}$ , using the formula:

$$V_{\%} = \frac{S}{\bar{X}} \times 100 \quad (4)$$

The correlation coefficients between milk yield and each of the other economic indicators: milk production/farm, production expenses/cow/year, milk cost, profit/cow/year and profit/farm were determined using Pearson product-moment correlation coefficient,  $r_{xy}$ , whose mathematical formula is:

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}} \quad (5)$$

The economic optimization was based on the estimation of profit per cow/year, the dependent variable,  $Y_4$ , reflecting the best manner the results of the activity in dairy farming, related to milk yield,  $X$ , considered the independent variable.

In order to establish which mathematical model is suitable to the evolution of this pair of indicators, two regression functions were tested:

- **Linear regression**, whose formula is:

$$y = ax + b, \quad (6)$$

where  $y$  = the dependent variable and  $x$  = the independent variable,

**Least Square Method of Regression Analysis** allowed to calculate the values of the coefficients  $a$  and  $b$ , solving the system of the two normal equations given below:

$$\begin{aligned} \sum y &= a \sum x + nb \\ \sum xy &= a \sum x^2 + b \sum x \end{aligned} \quad (7)$$

and using the formulas:

$$a = \frac{[\sum x_i \sum x_i^3 - (\sum x_i^2)^2] \sum y_i - [n \sum x_i^3 - \sum x_i \sum x_i^2] \sum x_i y_i + [n \sum x_i^2 - (\sum x_i)^2] \sum x_i^2 y_i}{\Delta}$$

$$a = \frac{\sum x \sum y - n \sum xy}{(\sum x)^2 - n \sum x^2} \quad (8)$$

$$b = \frac{\sum x \sum xy - \sum y \sum x^2}{(\sum x)^2 - n \sum x^2} \quad (9)$$

**The standard error of the estimate**,  $S_{est}$ , was also required to be determined as a measure of the accuracy of predictions, using the formula given below:

$$S_{est} = \sqrt{\frac{\sum (Y_i - Y_{icalc})^2}{N-2}} \quad (10)$$

where  $Y$  is the actual value,  $Y_{icalc}$  is a predicted value, and  $N$  is the number of pairs of values.

Also, **the determination coefficient or R squared**,  $R^2$ , was calculated using the formula:

$$R^2 = 1 - \frac{\sum_{i=1}^n (Y_i - Y_{icalc})^2}{\sum_{i=1}^n (Y_i - \bar{Y})^2} \quad (11)$$

- **Quadratic or Parabolic Fit**, whose formula is:

$$y = ax^2 + bx + c, \quad (12)$$

where  $y$  = the dependent variable and  $x$  = the independent variable.

**Least Square Method of Regression Analysis** allowed to calculate the values of the coefficients  $a$ ,  $b$  and  $c$  solving the system of the normal equations given below:

$$\begin{aligned} \sum x_i^2 y_i &= a \sum x_i^4 + b \sum x_i^3 + c \sum x_i^2 \\ \sum x_i y_i &= a \sum x_i^3 + b \sum x_i^2 + c \sum x_i \\ \sum y_i &= a \sum x_i^2 + b \sum x_i + nc \end{aligned} \quad (13)$$

$$\text{where } x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (14)$$

The formulas for the parameters  $a$ ,  $b$  and  $c$  are given below: (15)

$$b = \frac{[\sum_i x_i^2 \sum_i x_i^3 - (\sum_i x_i \sum_i x_i^4)] \sum_i y_i - [(\sum_i x_i^2)^2 - n \sum_i x_i^4] \sum_i x_i y_i + [\sum_i x_i \sum_i x_i^3 - n \sum_i x_i^3] \sum_i x_i^2 y_i}{\Delta}$$

$$c = \frac{[\sum_i x_i^2 \sum_i x_i^4 - (\sum_i x_i^3)^2] \sum_i y_i - [\sum_i x_i \sum_i x_i^4 - \sum_i x_i^2 \sum_i x_i^3] \sum_i x_i y_i + [\sum_i x_i \sum_i x_i^3 - (\sum_i x_i^2)^2] \sum_i x_i^2 y_i}{\Delta}$$

where  $\Delta = [\sum_i x_i^2 \sum_i x_i^4 - (\sum_i x_i^3)^2]n - [\sum_i x_i \sum_i x_i^4 - \sum_i x_i^2 \sum_i x_i^3] \sum_i x_i + [\sum_i x_i \sum_i x_i^3 - (\sum_i x_i^2)^2] \sum_i x_i^2$

and  $\sum_{i=1}^n x_i = \sum_i x_i$ . (16)

Also, the standard error and R squared were calculated for the parabolic function.

The most adequate regression function was chosen to forecast profit per cow using the regression model having the lowest standard error for assuring the highest prediction and a 500 kg/cow gain interval for milk yield.

## RESULTS AND DISCUSSIONS

The economic indicators characterizing each farm are presented in Table 1.

Table 1. The economic indicators by farm in the year 2013

Farm	Number of dairy cows	Milk yield kg/cow	Milk production per farm Kg/farm	Production Expenses per cow Lei/cow	Milk cost Lei/kg	Profit/cow Lei/cow	Profit per farm Lei/farm
F1	25	5,840	146,000	7,030	1,20	1,135	28,375
F2	30	5,950	178,500	6,696	1,13	1,505	45,150
F3	18	6,370	114,660	6,762	1,06	3,062	55,116
F4	22	6,600	145,200	7,096	1,08	3,089	67,958
F5	28	6,730	188,440	7,235	1,08	3,079	86,212
F6	34	5,500	187,000	7,034	1,28	1,089	37,026
F8	50	5,630	268,000	7,198	1,34	1,717	85,850
F9	20	5,115	102,300	7,129	1,40	900	18,000

Source: Farm bookkeeping in the Southern Romania, 2013 [22]

### The average, variance, standard deviation and variation coefficient.

**Milk yield** registered an average of 6,088.57 kg/cow with a variation from the minimum

5,115 kg/cow in case of F8 and 6,730 kg/cow in case F5. The variation coefficient was 9.24 % reflecting a low variation from a farm to another.(Table 2).

Table 2. Average and variation coefficient of each economic indicator

Indicator	MU	$\bar{X}$	S <sup>2</sup>	S	V%
Milk yield	Kg/cow/year	6,088.57	317,035.27	563.06	9.24
Milk production per farm	Kg/farm	175,400	2,718,625,421.63	52,140.44	29.72
Production expenses per cow	Lei/cow	7,007.29	38,193.14	195.43	2.78
Milk production cost	Lei/kg	1.19	0.02	0.13	11.07
Profit per cow	Lei/cow	2,096.57	938,399.14	968.71	46.20
Profit per farm	Lei/farm	57,955.29	651,221,174.13	25,519.04	44.03

Source: Own calculations

**Milk production per farm** recorded 175,400 kg in average, varying from the lowest level in case of F5, 102,300 kg, and the highest

level in case of F8, 268,000 kg. The variation of this indicator among farms was very high,

29.72 %, being determined by the number of cows raised in farms and their milk yield.

**Production expenses per cow** accounted for Lei 7,007.29 per dairy cow, ranging between Lei 6,696 in case of F2, the minimum level, and Lei 7,198 in case of F8. The variation coefficient reflected a small variation among farms regarding this economic indicator, 2.78 %.

**Milk production cost** was Lei 1.19 per milk kilogram, varying between Lei 1.06 in case of F3, the lowest level and Lei 1.40 in case of F8, the highest level. The variation of milk cost among farms was a middle one, as the variation coefficient indicated, 11.07 %.

**Profit per cow** recorded Lei 2,096.57 in average with a variation between Lei 900, the lowest level registered by F9, and Lei 3,089, the highest value registered by F4. This indicator had a very high variation from a farm to another, as the variation coefficient confirmed, 46.20%.

**Profit per farm coming from milk** was Lei 57,955.29 in average, varying between Lei 18,000 in case of F9, the lowest value, and Lei 86,212 in case of F5, the highest value. The variation regarding this indicator was very large, the coefficient of variation being 44.03 %.(Table 2)

**The the correlation coefficients** between milk yield and the other five economic indicators taken into consideration are presented in Table 3.

Table 3. Pearson product-moment correlation coefficients between milk yield and the other economic indicators

Pairs of economic indicators taken into account	PPMCC, correlation coefficient, $r_{xy}$
Milk yield x Milk production per farm	-0.020999472
Milk yield x Production expenses per cow	-0.060981647
Milk yield x Milk production cost	-0.92375365
Milk yield x Profit per cow	0.921096492
Milk yield x Profit per farm coming from milk	0.6475586

Source: Own calculations

A negative weak correlation,  $r_{xy} = -0.020$  was found between milk yield and milk production

per farm.

This could be explained by the fact that milk production is influenced by the number of dairy cows which varied from a farm to another and also by milk consumption for calves up to weaning.

Between milk yield and production expenses is was found a negative low correlation,  $r_{xy} = -0.060$ , reflecting a large variety of factors influencing production costs per cow, besides average milk production.

The correlation coefficient between milk yield and profit per cow,  $r_{xy} = 0.921$ , reflected a strong positive link between the two economic indicators. Therefore, the higher milk yield, the higher profit per cow.

Also, between milk yield and profit per farm coming from milk, it was found a positive high correlation,  $r_{xy} = 0.647$ , showing that a higher milk yield could lead to a higher profit. Taking into account that the strongest positive correlation was found between milk yield and profit per cow,  $r_{xy} = 0.921096492$ , it was considered that profit per cow is the main economic indicator which should be optimized in close relation to average milk production per cow.

**Comparative results for the linear regression and quadratic fit** regarding the formulas, the values for the parameters a, b and c and, the standard error and the R squared in case of profit per cow related to milk yield are presented in Table 4.

Table 4. Comparative analysis between linear regression and quadratic fit

	Linear regression $y = ax + b$	Quadratic Fit $y = ax^2 + bx + c$
Regression Model	$Y = 1.584x - 7,508.66$	$Y = 0.006x^2 - 5.7649 + 14,250$
Standard error	407.370428	18,786.96
Pearson product-moment correlation coefficient	0.921086315	0.936589558
$R^2$ (R squared)	0.84841848	0.8772
a coefficient	1.584693005	0.0006
b coefficient	-7,508.665076	-5.7649
c coefficient		14,250

Source: Own calculations

As one can easily see, the lowest standard error was registered in case of the linear regression model,  $S_{est} = 407.370428$  compared to  $S_{est} = 18,786.96$  recorded in case of the quadratic fit.

Therefore, only the linear regression model assures the highest accuracy in predicting the profit related to milk yield.

The graphical representation of the two regression models is shown in Fig.1. and, respectively, Fig.2.

**Forecast of profit per cow based on milk yield for a 500 kg gain.**

Taking into account the linear regression model,  $Y = 1.584x - 7,508.66$ , assuring the lowest standard error, that is the highest precision, it was estimated profit per cow for an interval of milk yield gain of 500 kg/cow. The results are presented in Table 5 and showed that for an increased milk yield by 500 kg per year, profit per cow will grow by Lei 792/year.

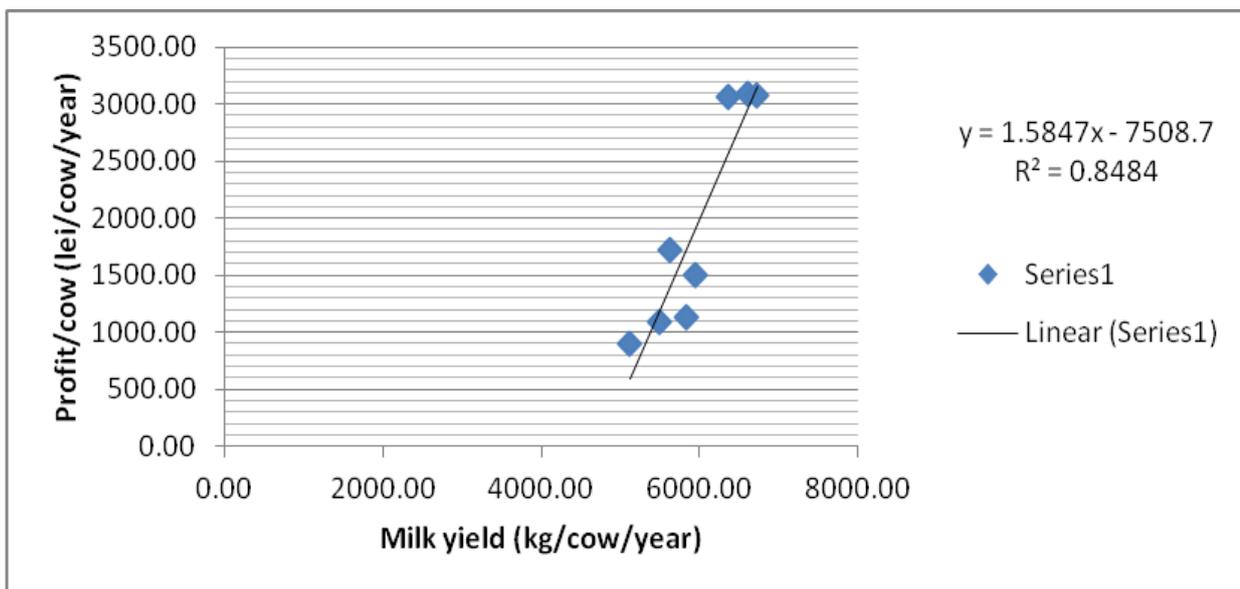


Fig.1. Linear regression between milk yield and profit per cow

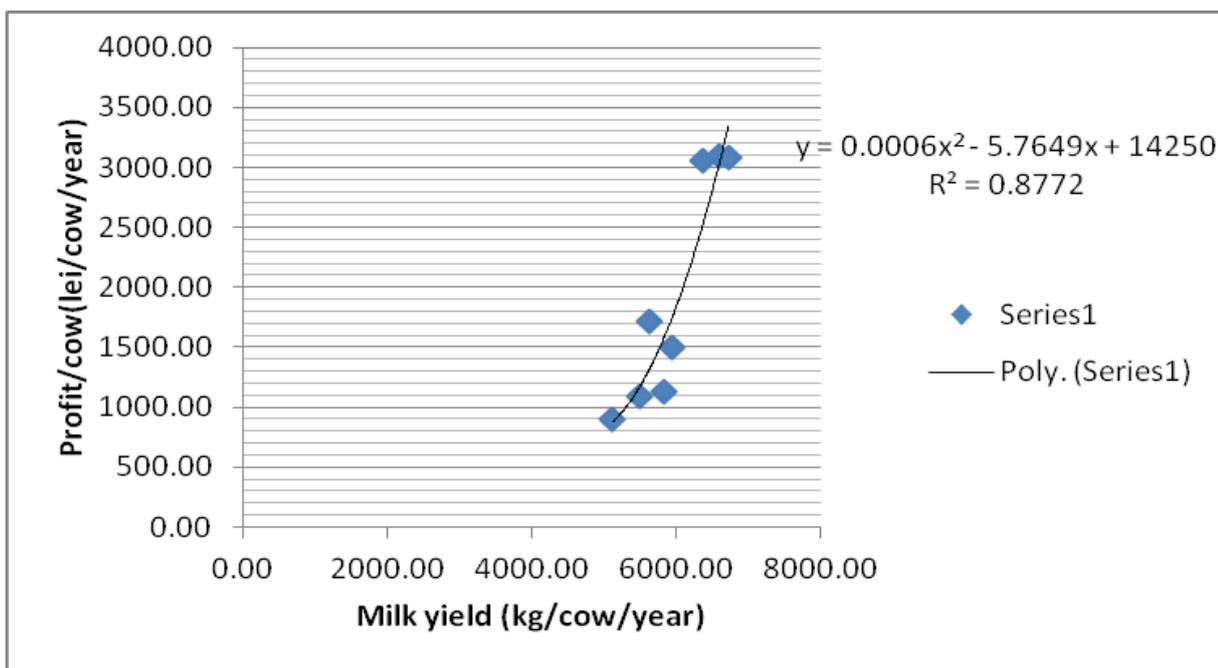


Fig.2. Parabolic fit between milk yield and profit per cow

Table 5. Estimated profit per cow based on milk yield using the linear regression model  $Y=1.584x - 7,508.66$

Milk yield, X	Estimated Profit per cow, $Y_{est}$
5.500	1,203.34
6,000	1,995.34
6,500	2,787.34
7,000	3,579.34
7,500	4,371.34
8,000	5,163.34
8,500	5,955.34
9,000	6,747.34
9,500	7,539.34
10,000	8,331.34

Source: Own calculations

## CONCLUSIONS

Average milk yield registered 6,088.57 kg/cow and had a reduced variation among farms (9.24 %).

Profit per cow recorded Lei 2,096.57 in average with a very high variation from a farm to another (46.20%).

Profit per cow is deeply influenced by milk yield as Pearson product-moment correlation coefficient proved ( $r_{xy} = 0.921$ ), existing a strong positive relationship between these two economic indicators.

The comparison between the two regression models: the linear regression and the quadratic fit had the following mathematical representation:  $Y=1.584x - 7,508.66$  with the standard error  $S_{est} = 407.370428$  and the parabolic fit was  $Y=0.006x^2 - 5.7649x + 14,250$  with the standard error  $S_{est} = 18,786.96$ .

The linear regression model proved to be the most suitable one to reflect the relationship between profit per cow and milk yield with the highest accuracy as its standard error was the lowest one.

For this reason, based on the linear regression model, it was estimated that for an increase of 500 kg in milk yield, profit per cow could grow by Lei 792 per year.

As a conclusion, the most important indicators with a deep impact on farm profitability in dairy farming are milk yield and profit per cow and the most adequate mathematical

model for reflecting the link between them is the linear regression.

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[22]Valuable bookkeeping data for the year 2013 from 8 dairy farms situated in the Southern Romania

## STUDY ON THE AVERAGE MARKETED MILK AS A MEASURE PROFITABLENESS THRESHOLD IN DAIRY FARMS

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### Abstract

*The paper purpose was to estimate the threshold of the average marketed milk as a starting point of profitableness growth using a sample of 6 dairy farms from the Southern Romania. The collected data belonged to the year 2013 and were processed using Grigoriu's method. The estimated average marketed milk threshold varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. The average level for all the six dairy farms accounted for 5,059.16 kg. All the 6 farms were profitable, because they recorded a positive difference between the real average marketed milk and the estimated profitableness threshold. The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow and year, the maximum difference, registered in case of the farm F4. Profit varied between Lei 123.2 per cow/year in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level. As a conclusion, dairy farmers could use this useful tool to determine the average marketed milk threshold where profitableness starts growing in their own farm. In this way, they could better manage resources and mainly production costs in order to increase economic efficiency in dairy farming.*

**Key words:** dairy farms, average marketed milk, profitableness, threshold

### INTRODUCTION

Marketed milk is the main source of income in dairy farms. [8] The amount of sold milk is determined by milk production of which milk consumed for calf feeding should be subtracted. [6] Also, income coming from milk is a function of milk price.

Profitableness means as income to cover production cost and assure an additional value named profit.

For this reason, it is very important as a dairy farmer to know which marketed milk production level represents the threshold of profitableness. [3]

In 2006, Grigoriu Eugen proposed a new method for establishing the threshold of average marketed milk production where profitableness starts growing in dairy farms. His method takes into account annual production cost per fed cow, average marketed milk production, average live weight of a calf at birth, a transformation

coefficient of calf in milk, average milk selling price, and birth rate in a dairy farm. [4] Kopecek in 2002 and Popescu Agatha in 2014 affirmed that profit variation depends on marketed milk and production cost [6,8]

In this context, the present paper aimed to use Grigoriu method to estimate the threshold of the average marketed milk as a starting point of profitableness growth using a sample of dairy farms from the Southern Romania.

### MATERIALS AND METHODS

In order to carry out this study, a sample of 6 dairy farms was selected from the Southern part of Romania in the year 2013.

The following technical and economical indicators were taken into considerations: average marketed milk production/cow/year,  $Q_m$ , (kg/year), annual production cost per fed cow,  $P_c$ , (Lei/cow/year), calf average live weight at birth,  $W_b$  (kg), a calf transformation index in milk ( $k=5$ ), average milk selling

price,  $P_s$  (Lei/kg), and birth rate in the dairy farm,  $B_r(\%)$ .

The calf transformation index in milk,  $k=5$ , is closely linked to Live stock units(LU) which regard cow equivalents to other animal categories. For a 0-1 month calf and weighting 0-50 kg, a live stock unit is 0.247 as mentioned by Nix in 2003 [2,7]

Birth rate is very important in a dairy farm as it has a deep impact on the replacing rate of culled cows and is also used in the design of livestock structure as Czister Ludovic affirmed in 2010 [1]

Grigoroiu method (2006) was used to estimate the threshold of average marketed milk where profitableness starts growing. [4,5]

The mathematical formula is given below:

$$Q_{M\ est} = \frac{C - W_b * k * P_s * B_r}{P_s * B_r} \quad (1)$$

In the author's opinion, the activity in the dairy farm is a profitable one when:

$$C - (Q_M * P_s + W_b * k * P_s) * B_r = 0, \quad (2)$$

meaning that at this point profitableness is equal to zero, as production cost per cow and year is equal to income coming from

marketed milk and from calf at birth transformed in marketed milk.

The estimated threshold of the average marketed milk indicates the minimum milk amount which should be delivered per cow and year. Any additional amount of milk higher than the estimated threshold means profit and any amount of marketed milk lower than the estimated threshold means loss.

The primary data were collected from farm bookkeeping.

The average of each indicator was determined using the formula:

$$\bar{X} = \frac{X_1 + X_2 + \dots X_n}{n} \quad (3)$$

Finally, the estimated value of the average marketed milk production threshold was compared with the amount of milk sold by each farm and the positive difference reflected the profit per farm and year.

## RESULTS AND DISCUSSIONS

The technical and economic indicators specific to each dairy farm are presented in Table 1.

Table 1. The primary data by farm in the year 2013

Farm	Number of dairy cows	Production cost/cow/year Lei/cow/year	Calf average live weight at birth Kg/head	Average milk price ( Lei/kg)	Birth rate (%)
F1	25	7,030	40	1.4	88
F2	30	6,696	41	1.4	84
F3	18	6,762	39	1.6	86
F4	22	7,096	42	1.6	87
F5	28	7,235	38	1.6	85
F6	50	7,198	37	1.7	88
Average/farm	28.83	7,002.83	39.5	1.55	86.33

Source: Farm bookkeeping in the Southern Romania, 2013 [9]

The 6 dairy farms from the South part of Romania were characterized by 28.83 average farm size in terms of number of dairy cows, an average production cost per fed cow per year accounting for Lei 7,002.83/cow/year, 39.5 kg average calf live weight at birth, Lei 1.55 per milk kilogram sold in the market and 86.33 % average birth rate.

The number of dairy cows per farm varied between 50, the maximum number in case of

the farm F6 and 18 the minimum farm size, in case of the farm F3.

Production cost per cow and year varied between Lei 7,235, the maximum level in case of the farm F5, and Lei 6,696 per cow and year, the minimum level in case of the farm F2.

The average live weight of the calf at birth varied between 37 kg, the minimum level in case of the farm F6 and 42 kg in case of the farm F4.

The average milk price varied between Lei 1.4 per kilogram in case of the farms F1 and F2, Lei 1.6 per kilogram in case of the farms F3, F4 and F5, and Lei 1.7 per kilogram, the maximum price, in case of the farm F6.

Birth rate varied ranged between optimum level, from 84 % in case of the farm F2 and 88 % in case of the farms F1 and F6.

The estimated average marketed milk threshold is presented by farm in Table 2. Its values varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. Its average level for all the 5 farms accounted for 5,059.16 kg.

Table 2. Estimated average marketed milk threshold by farm (kg/cow/year)

$Q_{M\ est} = \frac{C - W_b * k * P_s * B_r}{P_s * B_r}$						
	F1	F2	F3	F4	F5	F6
Average marketed milk threshold	5,506	5,488	4,719	4,887	5,129	4,626

Source: Own calculations.

Making the difference between the achieved average marketed milk and the estimated average marketed milk threshold, it was noticed that all the farms registered additional average marketed milk, that is all of them are profitable farms. The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow

and year, the maximum difference, registered in case of the farm F4.

Multiplying these differences by milk price, it resulted profit per cow and year, whose value was ranking between Lei 123.2 in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level.(Table 3).

Table 3. Comparison between the estimated average marketed milk threshold, and achieved average marketed milk, additional marketed milk and profit per cow/year by farm

Farm	Estimated average marketed milk threshold Kg/cow/year	Achieved average marketed milk Kg/cow/year	Additional average marketed milk		Profit Lei/cow/year
			Kg/year/cow	%	
F1	5,508	5,673	+167	103.03	233.8
F2	5,488	5,576	+88	101.60	123.2
F3	4,719	5,670	+951	120.15	152.1
F4	4,887	5,940	+1,053	121.54	1,684.8
F5	5,129	5,922	+793	115.46	1,268.8
F6	4,626	4,777	+144	103.11	244.8

Source: Own calculations

## CONCLUSIONS

The estimated average marketed milk threshold varied between 5,506 kg per cow and year in case of F1, the maximum level and 4,719 kg per cow and year in case of F3, the minimum level. Taking into consideration, all the six dairy farms, its average level accounted for 5,059.16 kg.

All the 6 farms recorded additional average marketed milk, that is a positive difference

between the real average marketed milk and the estimated profitableness threshold. Therefore, all of them are profitable farms.

The additional marketed milk varied between +88 kg per cow and year in case of the farm F2 and 1,053 kg per cow and year, the maximum difference, registered in case of the farm F4.

As a conclusion, profit per cow and year varied between Lei 123.2 in case of the farm F2, the lowest level and Lei 1,684.8 in case of the farm F4, the highest level.

Therefore, Grigoroiu's method could be successfully used by dairy farmers in order to determine the average marketed milk threshold where profitableness starts growing in their own farm.

This could be a useful tool for a farm management mainly regarding production costs in order to increase economic efficiency in dairy farming.

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## TRENDS IN ROMANIA'S AGRO-FOOD FOREIGN TRADE IN THE PERIOD 2007-2012

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### Abstract

*The purpose of this study was the analysis of Romania's agro-food foreign trade dynamics in the period 2007-2012 in order to identify its major trends and changes. In 2012, the agro-food export reached Euro Million 2,812, and import Euro Million 3,834. The Euro Million -1,021 balance deficit proved that Romania is still a net exporting country. The EU accounts for about 72 % in export and 70% in import value, of which agro-food trade contributes by 8.90 % and, respectively by 9.54% in Romania's import. In 2012, the agro-food export structure was the following one:Vegetable products 38.66%, Prepared foodstuffs, beverages and tobacco 36.02 %, and Live animals and animal products 18.99 %, and the agro-food import structure was: Prepared foodstuffs, beverages and tobacco 38.39 %, Vegetal products 30.89 %, and Live animals and animal products 25.62 %. The main Romania's trade partners are Italy, Bulgaria, Hungary, Spain, Germany, The Netherlands, Greece, France, Austria and United Kingdom for agro-food export (88.14 %) and Hungary, Germany, The Netherlands, Poland, Bulgaria, Italy, France, Austria, the Czech Republic and Greece for agro-food import (88.38 %). In the period 2007-2012, an improved efficiency of the agro-food trade was noticed in terms of export/import ratio, export value per GDP and per inhabitant, and lower and lower deficit of the trade balance.*

*Key words:* Romania, agro-food trade, trends

### INTRODUCTION

Romania has a high potential in agricultural production proved by the continuous growth of its value, contribution to GDP and higher agro-food export.

In the pre-accession period, Romania has intensified its trade with the EU countries. In 2007, the agro-food export with the EU accounted for about 8.7 % in Romania's export and the agro-food import for about 9 % in the country import value. The main features of the Romanian agro-food trade were the continuous increased export of cereals, meat, dairy products and eggs and increased import of meat and meat preparations, vegetables and fruit, sugar, coffee and teas as mentioned by Zahiu *et al.*(2010) [21]

After its entry into the EU, in January 2007, Romania has paid a special attention to the increase of agricultural production and also to product quality as imposed by the EU standards for goods commercialized on the common market.

Romania's export to the EU represented 72 % while its import from the EU accounted for 70 % of the agro-food trade as mentioned Pirvutoiu *et al.*(2007) [8] and Popescu Agatha (2010b) [10].

The Romanian agro-food export has constantly grown, but mainly based on low processed products. A slight change has appeared in the trade structure in favor of more processed products with high value added due to the direct investments in food industry and increased consumer demand for high quality foodstuffs as mentioned Rusali Mirela (2008) [15]

In the post-accession period, some products with potential for export have lost their importance in trade specialization. For example, live animals and animal products had a positive balance, and oilseeds, milk and dairy products as well as affirmed Rusali Mirela (2012) [16]

In the period 2006-2012, there were no changes in Romania's trade flows. Processed food products continued to dominate the agro-

food import, while the basic agricultural commodities represented over 50 % of export value as mentioned by Rusali Mirela (2014). [17]

Toma Elena *et al.*(2014) affirmed that cereal grains, milk and oleaginous seeds, fruits and tobacco, recorded a higher share both in agro-food import and export, while tobacco and meat products import declined and live livestock and vegetables export decreased their weight. [19]

In the background of the global economic recession, Romania has chosen its own development and has a specific behavior, grace to its international trade policy as affirmed Savoiu *et al.*(2012)[18]

Regarding the non European markets, Zanvetor Raffaella (2014) mentioned that Romania needs a deep promotion on the international market and it is also imposed a marketing analysis for each country group and products which are objects for export in order to balance the export/import ratio and extend the geographical area where Romanian products are sold [22]

In this context, the purpose of the paper was to analyze the dynamics Romania's agro-food in order to identify the main trends and changes in its level and structure as well as in its efficiency in the period 2007-2012.

## MATERIALS AND METHODS

In order to analyze the trends of Romania's the agro-food foreign trade, the following specific indicators have been used: the volume of export, import and balance, the share of agro-food export, import and balance in Romania's foreign trade, the value and structure of agro-food export FOB and also of agro-food import CIF by section and main chapters according to the Combined Nomenclature, CN, the market share of the top EU 10 agro-food exporting countries and also of the top 10 importing countries by product groups.

The main indicators reflecting the efficiency of agro-food trade such as: the export impact on GDP, the import coverage by export, export value per inhabitant,

export/agricultural production value were also determined using the formulas mentioned by Anghelache (1999), Popescu Agatha (2010). [1, 9]. Also the index, share and comparison methods were used as well.

The empirical data were provided by the National Institute for Statistics for the period 2007-2012 [14].

## RESULTS AND DISCUSSIONS

**Romania's agro-food trade dynamics.** In the analyzed period, *the agro-food export value* increased 3.6 times Euro Million 3,339 in the year 2007 to Euro Million 4,044 in the year 2012. *The agro-food import value* increased by 43.45%, so that in 2012, it accounted for Euro Million 4,790 compared to Euro Million 3,339 in 2007. As a consequence, *the agro-food trade balance* was a negative one. The highest deficit was recorded in 2007, Euro Million -2,217, but in the coming years the deficit decreased, reaching the lowest level in 2001, Euro Million -423, while in 2012 it increased to Euro Million -746. However, the balance have shown a continuous decreasing trend which is a positive aspect. In 2012, the agro-food deficit was by 66.36 % lower than in 2007.( Table 1).

**The share of the agro-food trade in Romania's foreign trade.** Taking into account that the agro-food trade has had a more dynamic development, the share of agro-food export in Romania's export has continuously grown from 3.79 % in 2007 to 8.97 % in the year 2012, while the share of the agro-food import in Romania's import has grown from 6.50 % in 2007 to 8.75 % in 2012. The share of agro-food trade balance in Romania's trade balance recorded the highest level of 10.18 % in the year 2007 and the lowest one, 4.37 % in the year 2011. So, the main trend is a decreasing one. (Table 2)

**The dynamics of agro-food export by product group category.** According to the Combined Nomenclature ( CN), agro-food export is divided into four sections: I Live animals and animal products, II Vegetal products, III Animal or vegetable fats and oils

and Prepared foodstuffs, beverages and tobacco.

Table 1. Agro-food export, import and trade balance, Romania, 2007-2012 ( Euro Million).

	2007	2008	2009	2010	2011	2012	2012/2007 %
Export	1,122	2,165	2,243	3,113	4,022	4,044	360.4
Import	3,339	4,346	3,823	3,919	4,445	4,790	143.4
Balance	-	-	-	-806	-423	-746	33.6
Trade value	4,461	6,511	6,066	7,032	8,467	8,834	198.0

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

Table 2. Share of agro-food trade in Romania's foreign trade, 2007-2012 (%)

	2007	2008	2009	2010	2011	2012
Foreign trade	100	100	100	100	100	100
Agro-food export	3.79	6.41	7.71	8.33	8.88	8.97
Agro-food import	6.50	7.59	9.81	8.37	8.08	8.75
Agro-food balance	10.18	9.27	16.00	8.38	4.37	7.74

Source: Own calculations.

*The value of the exported live animals and animal products* increased by 190 % from Euro Million 252 in the year 2007 to Euro

Million 731 in the year 2012. These aspect was determined mainly by the substantial growth of the export value with live animals. In 2012, it reached Euro Million 304 being by 67.95 higher compared to Euro Million 181 in the year 2007. On the 2nd position, it was placed the export value of meat and edible meat offal which registered the highest growth. In the year 2012, it accounted for Euro Million 263, being 9.74 times higher than in 2007.

On the 3rd position came the export value of milk and dairy products, eggs, honey, edible products of animal origin.

In 2012, this group of products registered Euro Million 123 export value, being 3.72 times higher than in the year 2007.

Despite that the live animals balance is a positive one, this product group is deeply imbalanced regarding various animal categories. The export with live animals is mainly supported by cattle, the other species having a slight contribution as affirmed Vlad Ionela et al. (2014). [20]

Table 3. Romania's Agrofood Export FOB by section and main chapters according to the Combined Nomenclature, CN, 2007-2012 (Euro million)

CN Code	Section/Chapter	2007	2008	2009	2010	2011	2012	2012/2007 %
<b>EXPORT Romania</b>	-	<b>29,529</b>	<b>33,725</b>	<b>29,084</b>	<b>37,360</b>	<b>45,292</b>	<b>45,070</b>	<b>152.62</b>
<b>Romania's Agrofood export</b>	-	<b>1,122</b>	<b>2,165</b>	<b>2,243</b>	<b>3,113</b>	<b>4,022</b>	<b>4,044</b>	<b>360.42</b>
<b>I</b>	<b>Live animals and animal products</b>	<b>252</b>	<b>278</b>	<b>326</b>	<b>434</b>	<b>584</b>	<b>731</b>	<b>290.07</b>
01	Live animals	181	177	173	196	234	304	167.95
02	Meat and edible meat offal	27	42	74	129	221	263	974.07
04	Milk and dairy products, eggs, honey, edible animal products	33	45	60	80	85	123	372.72
<b>II</b>	<b>Vegetal products</b>	<b>440</b>	<b>1,198</b>	<b>1,125</b>	<b>1,625</b>	<b>2,097</b>	<b>1,970</b>	<b>447.72</b>
08	Edible fruit	39	33	39	62	70	75	192.30
10	Cereals	151	638	631	893	1095	1,336	884.76
<b>III</b>	<b>Animal and vegetable fats and oils</b>	<b>68</b>	<b>106</b>	<b>88</b>	<b>164</b>	<b>242</b>	<b>183</b>	<b>269.11</b>
<b>IV</b>	<b>Prepared foodstuffs, beverages and tobacco</b>	<b>362</b>	<b>583</b>	<b>704</b>	<b>890</b>	<b>1,099</b>	<b>1,160</b>	<b>320.44</b>
16	Meat and fish preparations	28	40	37	54	69	86	307.14
22	Beverages, spirits and vinegar	55	70	57	89	90	118	214.54

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

**The export value of vegetal products** accounted for Euro Million 1,970 in 2012, being by 347.72 % higher than in 2007. Cereals are the most exported agricultural products. The cereal export value was Euro Million 1,336 in the year 2012, being 8.84 times higher compared to only Euro Million 151 in the year 2007. This was due to the continuous growth of cereal production which determined Romania's position as the most important cereal supplier in the EU. The export value of edible fruit increased by 92.30 % from Euro Million 39 registered in 2007 to Euro Million 75 in the year 2012. **The export value of Animal and vegetable fats and oils** increased by 169.11 %, accounting for Euro Million 183 in 2012 compared to only Euro Million 68 in the year 2007. Because fats and oils are much required in the EU market, Romania focused on these products and

became an important supplier of this products too. **The export value of Prepared foodstuffs, beverages and tobacco** has also recorded a continuous growth in the analyzed period. In the year 2012, it accounted for Euro Million 1,160, being by 220.44 % higher than in the year 2007. Within this group of products, the value of the exported Meat and fish preparations increased by 207.14 % from Euro Million 28 in 2007 to Euro Million 86 in the year 2012, while the export value of Beverages, spirits and vinegar increased by 114.54 % from Euro Million 55 in 2007 to Euro Million 118 in the year 2012 ( Table 3). **The dynamics of Romania's Agrofood Export structure.** Taking into account the growth of each section and agro-food product category as presented above, it was easily established the structure of Romania's agro-food export.

Table 4. Structure of Romania's Agrofood Export by section and main chapters according to the Combined Nomenclature, CN, 2007-2012 (%)

CN Code	Section/Chapter	2007	2008	2009	2010	2011	2012
<b>Romania's Agrofood export</b>	-	100.00	100.00	100.00	100.00	100.00	100.00
<b>I</b>	<b>Live animals and animal products</b>	22.45	12.84	14.53	13.94	14.52	18.07
01	Live animals	16.13	8.17	7.71	6.29	5.81	7.51
02	Meat and edible meat offal	2.40	1.93	3.29	4.04	5.49	6.50
04	Milk and dairy products, eggs, honey, edible animal products	2.94	2.07	2.67	2.56	2.11	3.04
<b>II</b>	<b>Vegetal products</b>	39.21	55.33	50.15	52.20	52.13	48.71
08	Edible fruit	3.47	1.52	1.73	1.99	1.74	1.85
10	Cereals	13.45	29.46	28.13	28.68	27.22	28.09
<b>III</b>	<b>Animal and vegetable fats and oils</b>	6.06	4.89	1.58	5.26	6.01	4.52
<b>IV</b>	<b>Prepared foodstuffs, beverages and tobacco</b>	8.18	26.92	31.38	28.58	27.32	28.68
16	Meat and fish preparations	2.49	1.84	1.64	1.73	1.71	2.12
22	Beverages, spirits and vinegar	4.90	3.23	2.54	2.85	2.23	2.91

Source: Own calculations.

**Vegetal products** were on the 1st position with a share of 39.21 % in the year 2007 and 52.13 % in the year 2012. This situation was determined by the increased contribution of cereals, 27.22 % to Romania's agro-food export in 2012 in comparison with only 13.45 % in the year 2007. Even thou Romania has a

good potential to produce wheat and wheat is one of the most important cereals in the world, Romania accounts for 1.45 % in global wheat import and for 1.23 % in wheat export as mentioned Medelete and Panzaru (2014) [6] **Prepared foodstuffs, beverages and tobacco** came on the 2nd position with a share

of 27.32 % in agro-food export value in the year 2012 compared to only 8.18 % in the year 2007. This happened because of the increased export value of foodstuffs whose share in agro-food export value accounted for 23.38 % in the year 2012 in comparison with only 0.79 % in the year 2007. *Live animals and animal products* came on the 3rd position with a share of 14.52 % in the year 2012 compared to 22.45 % in the year 2007. This situation was due to the continuous growth of the share of meat and edible offal, while the share of Live animals and Milk and dairy products etc has recorded a continuous decline. *Animal and vegetable fats and oils* were situated on the 4th position with 6% constant share in the agro-food export value, but in 2012 it declined to 4.52 % (Table 4).

**The dynamics of agro-food import by product group category.** *The value of imported Live animals and animal products* increased by 18.96 % from Euro Million 870 in 2007 to Euro Million 1,035 in the year 2012. The most dynamic growth was recorded by Live animals. In 2012, this product category accounted for Euro Million 140, being by 197.87% higher than in the year 2007. The import value of Meat and edible meat offal recorded a large variation from a year to another, but the general trend was a decreasing one, so that in 2012, this category of products accounted for Euro Million 479, being by 13.39 % lower than in 2007. The import value of Milk and dairy products, eggs, honey, edible animal products increased by 65.35% from Euro Million 153 in 2007 to Euro Million 253 in 2012.

Table 5. Romania's Agrofood Import CIF by section and main chapters according to the Combined Nomenclature, CN, 2007-2012 (Euro million)

CN Code	Section/Chapter	2007	2008	2009	2010	2011	2012	2012/2007 %
<b>IMPORT Romania</b>	-	<b>51,322</b>	<b>57,240</b>	<b>38,953</b>	<b>46,869</b>	<b>54,952</b>	<b>54,704</b>	<b>106.58</b>
<b>Romania's Agrofood import</b>	-	<b>3,339</b>	<b>4,346</b>	<b>3,823</b>	<b>3,919</b>	<b>4,445</b>	<b>4,790</b>	<b>143.45</b>
<b>I</b>	<b>Live animals and animal products</b>	<b>870</b>	<b>1,191</b>	<b>1,116</b>	<b>984</b>	<b>965</b>	<b>1,035</b>	<b>118.96</b>
01	Live animals	47	102	117	96	107	140	297.87
02	Meat and edible meat offal	553	730	642	515	457	479	86.61
04	Milk and dairy products, eggs, honey, edible animal products	153	212	217	225	255	253	165.35
<b>II</b>	<b>Vegetal products</b>	<b>1,037</b>	<b>1,259</b>	<b>1,003</b>	<b>1,141</b>	<b>1,324</b>	<b>1,416</b>	<b>136.54</b>
08	Edible fruit	246	245	176	179	185	235	95.52
10	Cereals	271	308	250	248	333	373	137.63
<b>III</b>	<b>Animal or vegetable fats and oils</b>	<b>144</b>	<b>227</b>	<b>160</b>	<b>217</b>	<b>245</b>	<b>239</b>	<b>165.97</b>
<b>IV</b>	<b>Prepared foodstuffs, beverages and tobacco</b>	<b>1,288</b>	<b>1,669</b>	<b>1,544</b>	<b>1,577</b>	<b>1,911</b>	<b>2,100</b>	<b>163.04</b>
16	Meat and fish preparations	52	69	59	61	69	91	175.00
22	Beverages, spirits and vinegar	157	209	139	144	210	228	145.22

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

*The import value of Vegetal products* increased by 36.54% from Euro Million 1,037 in 2007 to Euro Million 1,416 in 2012. This growth was positively influenced by the increased cereal import by 37.63 % from Euro Million 271 in 2007 to Euro Million

373 in 2012, and negatively influenced by the decline of about 5% for import value of Edible fruit from Euro Million 246 in 2007 to Euro Million 235 in the year 2012. *The import value of Animal or vegetable fats and oils* recorded a growth of 65.97%, in 2012 accounting for Euro Million 239 compared to

Euro Million 144 in the year 2007. *The import value Prepared foodstuffs, beverages and tobacco* increased by 63.04 % from Euro Million 1,288 in the year 2007 to Euro Million 2,100 in the year 2012. A positive influence was noticed from the increased import value of Meat and fish preparations and Beverages, spirits and vinegar. So, in 2012, the import value of Meat and fish preparations was by 75 % higher and the import value of Beverages, spirits and vinegar was by 45.22 % higher than in the year 2007.(Table 5)

**The dynamics of Romania's Agro-food Import structure.** The change in import value for various sections and product categories has had a deep impact on the agro-food import structure. *Prepared foodstuffs, beverages and tobacco* represented the most important group of imported agro-food products. Their share in the import value of agro-food trade increased from 38.57% in the year 2007 to 42.99 % in the year 2012. This happened because of the positive influence of foodstuffs whose share increased from 32.33 % in 2007 to 36.71 % in 2012. While the share of Meat and fish

preparations increased from 1.55 % to 1.89 %, the weight of Beverages, spirits and vinegar has grown from 4.70 % to 4.75% in the same period of time. *Vegetal products* were situated on the 2nd position in the agro-food import value based on their share, which accounted for 31.05 % in 2007 and 29.56 % in 2012. While the share of Edible fruit and Cereals declined within Vegetable products import value, the share of imported vegetables and fruit increased from 15.58% in 2007 to 18.13 % in the year 2012. *Live animals and animal products* came on the 3rd position with a share of 26.05 % in 2007 and 21.70 % in 2012 in the value of agro-food import. This was determined by the continuous decline of import value of meat and edible offal whose share decreased from 16.56 % in 2007 to 10 % in 2012. However, Live animals and Milk and dairy products, eggs, honey, edible animal products had a positive impact on the share of this product category weight. *Animal or vegetable fats and oils* were situated on the last position with a share of 4.31 % in 2007 and 5.51 % in 2012.(Table 6).

Table 6. Structure of Romania's Agrofood Import by section and main chapters according to the Combined Nomenclature, CN, 2007-2012 (%)

CN Code	Section/Chapter	2007	2008	2009	2010	2011	2012
<b>Romania's Agrofood import</b>	-	100.00	100.00	100.00	100.00	100.00	100.00
<b>I</b>	<b>Live animals and animal products</b>	26.05	27.40	29.19	25.10	21.70	21.60
01	Live animals	1.40	2.34	3.06	2.44	2.40	2.92
02	Meat and edible meat offal	16.56	16.79	16.79	13.14	10.28	10.00
04	Milk and dairy products, eggs, honey, edible animal products	4.58	4.87	5.67	5.74	5.73	5.28
<b>II</b>	<b>Vegetal products</b>	31.05	28.96	26.23	29.11	29.78	29.56
08	Edible fruit	7.36	5.63	4.60	4.56	4.16	4.90
10	Cereals	8.11	7.08	6.53	6.32	7.49	7.78
<b>III</b>	<b>Animal or vegetable fats and oils</b>	4.31	5.22	4.18	5.53	5.51	4.98
<b>IV</b>	<b>Prepared foodstuffs, beverages and tobacco</b>	38.57	38.40	40.38	40.23	42.99	43.84
16	Meat and fish preparations	1.55	1.58	1.54	1.55	1.56	1.89
22	Beverages, spirits and vinegar	4.70	4.80	3.63	3.67	4.72	4.75

Source: Own calculations.

**The dynamics of Romania's Agrofood Trade Balance.** The evolution of export value and import value by section and product group category has determined the statement of the evolution of the agro-food trade balance in the period 2007-2012. *The balance for Live animals and animal products* was a negative one in all the analyzed years, recording a continuous decline, which could be considered a positive aspect. So, in 2012, this section recorded Euro Million -304 deficit, being by about 50 % less than in 2007. This was influenced by the positive balance of Live animals and by the continuous decreased deficit recorded by Meat and edible meat offal ( by 59 % less in 2012 compared to 2007), and also negatively influenced by the increased negative balance of Milk and dairy

products, eggs, honey, edible animal products. *The balance of Vegetal products* was a negative one in the years 2007 and 2008, but in the following years it has become a positive one with a good impact on the agro-food trade balance. A positive influence had the cereal trade and a negative one had the balance of Edible fruit. Arghiroiu *et al.* (2013) affirmed that cereals represented an important agricultural product exported by Romania, but also imported, and even thou the trade balance has been improved from a year to another, its is still a negative one. [ 2] *The balance of Animal or vegetable fats and oil* was a negative one in all the analyzed years, but the general trend was a decreasing one having a good impact on the agro-food trade balance.

Table 7. Romania's Agrofood Trade Balance by section and main chapters according to the Combined Nomenclature, CN, 2007-2012 (Euro million)

CN Code	Section/Chapter	2007	2008	2009	2010	2011	2012	2012/2007 %
<b>Trade Balance Romania</b>	-	-21,773	-23,515	-9,869	-9,509	-9,660	-9,634	44.24
<b>Romania's Agrofood trade balance</b>	-	-2,217	-2,181	-1,580	-806	-423	-746	33.64
<b>I</b>	<b>Live animals and animal products</b>	<b>-618</b>	<b>-913</b>	<b>-790</b>	<b>-550</b>	<b>-381</b>	<b>-304</b>	<b>49.19</b>
01	Live animals	+134	+75	+56	+100	+127	+164	122.38
02	Meat and edible meat offal	-526	-688	-568	-386	-236	-216	41.06
04	Milk and dairy products, eggs, honey, edible animal products	-120	-167	-157	-145	-170	-130	108.33
<b>II</b>	<b>Vegetal products</b>	<b>-597</b>	<b>-61</b>	<b>+122</b>	<b>+484</b>	<b>+773</b>	<b>+554</b>	<b>192.79</b>
08	Edible fruit	-207	-212	-137	-117	-115	-160	77.29
10	Cereals	-120	+330	+381	+645	+762	+963	1,802.50
<b>III</b>	<b>Animal or vegetable fats and oils</b>	<b>-76</b>	<b>-121</b>	<b>-72</b>	<b>-53</b>	<b>-3</b>	<b>-56</b>	<b>73.68</b>
<b>IV</b>	<b>Prepared foodstuffs, beverages and tobacco</b>	<b>-926</b>	<b>-1,086</b>	<b>-840</b>	<b>-687</b>	<b>-812</b>	<b>-940</b>	<b>101.51</b>
16	Meat and fish preparations	-24	-29	-22	-7	0	-5	20.83
22	Beverages, spirits and vinegar	-102	-139	-82	-55	-120	-110	107.84

Source: Own calculations.

*The balance of Prepared foodstuffs, beverages and tobacco* was a negative one and taking into account the figures presented in Table 8, it has the most unfavorable influence on the agro-food trade balance. The main cause is the negative influence of

Foodstuffs balance. The high foodstuffs import compared to export value has led to a substantial negative balance for this product group. Beverages, spirits and vinegar and Meat and fish preparations have also had a negative impact on the agro-food trade

balance, but smaller compared to the impact caused by Foodstuffs balance (Table 7).

**Romania's agro-food trade with the EU countries by product category.** The main feature of its agro-food trade is the continuous development of Romania's commercial relationships with the EU countries.

Analyzing the competitiveness of Hungarian and Romanian agro-food export to the EU, Fogarasi (2008) affirmed that several groups of products have improved their competitiveness, but this was due to the growth of these products demand in the EU market. [4]

In 2012, Romania's agro-food export value accounted for Euro thousand 2,812,980 export value and import value for Euro thousand 3,834,705. As a result, the agro-food trade balance was a negative one and registered a deficit of Euro thousand -1,021,725. The shares of various items of agro-food trade in Romania's trade with the EU in the year 2012 was the following one: 8.90 % export share,

9.54% import share and 11.99 % balance share.

In 2012, the contribution of various product groups according to the Combined Nomenclature (CN) in Romania's agro-food export with the EU was the following one: Live animals and animal products 18.99 %, vegetal products 38.66 %, Animal or vegetable fats and oils 6.33 % and Prepared foodstuffs, beverages and tobacco 36.02 %.

In the same year, the share of various product groups in Romania's agro-food import with the EU was the following one: Live animals and animal products 25.62 %, Vegetal products 30.89 %, Animal or vegetable fats and oils 5.08 % and Prepared foodstuffs, beverages and tobacco 38.39 %.

The contribution of various agro-food product groups to the deficit of agro-food trade in 2012 was the following one: 43.89 % Live animals and animal products, 9.48 % Vegetal products, 1.64 % Animal or vegetable fats and oils and 44.98 % Prepared foodstuffs, beverages and tobacco ( Table 8).

Table 8. Romania's agro-food trade with the EU by product group according to the Combined Nomenclature(CN) in 2012 (Euro thousand)

	Total Romania's trade with the EU	Romania's agro-food trade with the EU, of which:	I. Live animals and animal products	II. Vegetal products	III. Animal or vegetable fats and oils	IV. Prepared foodstuffs, beverages and tobacco
Export value	31,601,953	2,812,980	534,205	1,087,776	178,319	1,012,680
Import value	40,173,153	3,834,705	982,663	1,184,645	195,139	1,472,258
Trade balance	-8,517,200	-1,021,725	-448,458	-96,869	-16,820	-459,578

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations

Table 9. The market share of the main EU partner countries in Romania's agro-food trade in 2012(%)

Export			Import		
Country	Share (%)	Position	Country	Share (%)	Position
Italy	18.96	1	Hungary	22.95	1
Bulgaria	12.74	2	Germany	16.00	2
Hungary	12.38	3	The Netherlands	11.44	3
Spain	11.85	4	Poland	8.52	4
Germany	8.95	5	Bulgaria	7.97	5
The Netherlands	7.33	6	Italy	7.60	6
Greece	6.36	7	France	4.66	7
France	4.47	8	Austria	3.68	8
Austria	2.88	9	Czech Rep.	2.84	9
United Kingdom	2.22	10	Greece	2.72	10
Total	88.14	-	Total	88.38	-

Source: Own calculations

The main EU trade partners are Italy, Bulgaria, Hungary, Spain, Germany, The Netherlands, Greece, France, Austria and United Kingdom whose share in Romania's agro-food export value totalized 88.14 %, and Hungary, Germany, The Netherlands, Poland, Bulgaria, Italy, France, Austria, Czech Rep. and Greece representing 88.38 % in Romania's agro-food import value.(Table 9).

The top 10 EU countries which imported live animals and animal products from Romania in 2012 were, in the decreasing order, Bulgaria, Hungary, Greece, Italy, The Netherlands, Germany, Spain, France, United Kingdom and Cyprus whose total share in the agro-food export of this product category

represented 91.64 % ( Table 10).

Table 10. The top 10 EU partner countries in Romania's export with Live animals and animal products in 2012

Country	Export value of Live animals and animal products (Euro thou)	Share of Export with Live animals and animal products in Agro-food export value (%)	Share of Export with Live animals and animal products in Romania's EU export with Live animals and animal products (%)	Position
Bulgaria	129,947	36.25	24.32	1
Hungary	72,663	20.85	13.60	2
Greece	69,319	38.69	12.97	3
Italy	67,033	12.57	12.55	4
The Netherlands	39,783	19.28	7.44	5
Germany	39,099	15.52	7.31	6
Spain	24,166	7.24	4.52	7
France	20,701	16.46	3.87	8
United Kingdom	16,656	26.63	3.11	9
Cyprus	10,208	33.63	1.91	10
Total	489,575	-	91.64	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The top 10 EU countries where vegetal products were exported in 2012 have been: Spain, Italy, Hungary, The Netherlands, Germany, France, Portugal, Greece, Bulgaria, and United Kingdom. Their total weight in the agro-food export accounted for 90.05 %.(Table 11).

Table 11.The top 10 EU partner countries in Romania's export with Vegetal products in 2012

Country	Export value with Vegetal products (Euro thou)	Share of Export with Vegetal products in Agro-food export value (%)	Share of Export with Vegetal products in Romania's EU export with Vegetal products (%)	Position
Spain	224,035	67.16	20.59	1
Italy	168,831	31.64	15.52	2
Hungary	143,469	41.17	13.18	3
The Netherlands	108,330	52.51	9.95	4
Germany	89,184	35.42	8.19	5
France	76,800	61.07	7.06	6
Portugal	57,057	97.45	5.24	7
Greece	50,953	28.44	4.68	8
Bulgaria	48,701	13.58	4.47	9
United Kingdom	12,819	20.50	1.17	10
Total	980,179	-	90.05	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The top 10 EU countries where Romania exported animal or vegetable fats and oils in

2012 were: Hungary, Spain, Bulgaria, Greece, Italy, Austria, France, Slovakia, Germany and Poland, having a 98.71 % total weight in the agro-food export.(Table 12)

Table 12.The top 10 EU partner countries in Romania's export with Animal or vegetable fats and oils in 2012

Country	Export value with Animal or vegetable fats and oils (Euro thou)	Share of Export with Animal or vegetable fats and oils in Agro-food export value (%)	Share of Export with Animal or vegetable fats and oils in Romania's EU export with Animal or vegetable fats and oils (%)	Position
Hungary	62,408	17.91	34.99	1
Spain	40,750	12.21	22.85	2
Bulgaria	23,373	6.52	13.10	3
Greece	17,129	9.56	9.60	4
Italy	11,013	2.06	6.17	5
Austria	8,880	10.93	4.97	6
France	4,816	3.82	2.70	7
Slovakia	3,679	7.30	2.06	8
Germany	2,834	1.12	1.58	9
Poland	1,242	3.07	0.69	10
Total	176,124	-	98.71	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

Table 13.The top 10 EU partner countries in Romania's export with Prepared foodstuffs, beverages and tobacco in 2012

Country	Export value with Prepared foodstuffs, beverages and tobacco (Euro thou)	Share of Export with Prepared foodstuffs, beverages and tobacco in Agro-food export value (%)	Share of Export with Prepared foodstuffs, beverages and tobacco in Romania's EU export with Animal or vegetable fats and oils (%)	Position
Italy	286,556	53.71	28.29	1
Bulgaria	156,366	43.63	15.44	2
Germany	120,657	47.92	11.91	3
Hungary	69,894	20.05	6.90	4
The Netherlands	56,999	27.63	5.62	5
Spain	44,604	13.37	4.40	6
Greece	41,748	23.30	4.12	7
Austria	39,518	48.64	3.90	8
United Kingdom	32,825	52.50	3.24	9
Czech Rep.	29,527	75.87	2.91	10
Total	878,694	-	86.73	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The top 10 EU countries where Romania exported Prepared foodstuffs, beverages and tobacco in 2012 were Italy, Bulgaria, Germany, Hungary, The Netherlands, Spain,

Greece, Austria, United Kingdom, the Czech Republic, which all together represented 86.73 % in the agro-food export of this product group (Table 13).

The top 10 EU countries supplying of live animals and animal products for Romania in 2012 were: Hungary, Germany, The Netherlands, Poland, Italy, Spain, Bulgaria, Austria, France and Denmark, all together having a share of 89.68 % in the agro-food import of this product (Table 14).

Table 14. The top 10 EU partner countries in Romania's import with Live animals and animal products in 2012

Country	Import value of Live animals and animal products (Euro thou)	Share of Import with Live animals and animal products in Agro-food import value (%)	Share of Import with Live animals and animal products in Romania's EU import with Live animals and animal products (%)	Position
Hungary	265,783	30.19	27.04	1
Germany	208,826	34.03	21.25	2
The Netherlands	104,363	32.40	10.62	3
Poland	71,998	22.02	7.32	4
Italy	60,660	20.79	6.17	5
Spain	40,159	39.97	4.08	6
Bulgaria	38,291	12.52	3.89	7
Austria	32,709	23.13	3.32	8
France	32,604	18.21	3.31	9
Denmark	26,406	51.17	2.68	10
Total	881,799	-	89.68	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

Table 15. The top 10 EU partner countries in Romania's import with Vegetal products in 2012

Country	Import value with Vegetal products (Euro thou)	Share of Import with Vegetal products in Agro-food import value (%)	Share of Import with Vegetal products in Romania's EU import with Vegetal products (%)	Position
Hungary	309,960	35.21	26.16	1
Bulgaria	243,032	79.50	20.51	2
Italy	117,373	40.23	9.90	3
Germany	105,261	17.15	8.88	4
The Netherlands	104,176	32.34	8.79	5
France	73,755	41.20	6.22	6
Greece	53,675	50.09	4.53	7
Poland	42,493	13.00	3.58	8
Austria	29,668	20.98	2.50	9
Czech Rep.	26,101	23.88	2.20	10
Total	1,105,494	-	93.27	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The top 10 EU countries which delivered vegetal products in Romania in 2012 were Hungary, Bulgaria, Italy, Germany, the Netherlands, France, Greece, Poland, Austria and the Czech Republic, all together accounting for 93.27 % in the agro-food import with this product category. (Table 15).

The top 10 EU countries from where Romania purchased animal or vegetable fats and oils in 2012 were Hungary, Germany, The Netherlands, Bulgaria, Italy, Sweden, Poland, Denmark and Greece, all together representing 95.61 % in the agro-food import with this product category (Table 16).

Table 16. The top 10 EU partner countries in Romania's import with Animal or vegetable fats and oils in 2012

Country	Import value with Animal or vegetable fats and oils (Euro thou)	Share of Import with Animal or vegetable fats and oils in Agro-food import value (%)	Share of Import with Animal or vegetable fats and oils in Romania's EU import with Animal or vegetable fats and oils (%)	Position
Hungary	70,497	8.00	36.12	1
Germany	28,088	4.57	14.39	2
The Netherlands	24,992	7.75	12.80	3
Bulgaria	24,362	7.96	12.48	4
Italy	12,233	4.19	6.26	5
Sweden	7,672	34.45	3.93	6
Poland	5,681	1.73	2.91	7
Denmark	5,443	10.54	2.78	8
Greece	4,824	4.50	2.47	9
Spain	2,887	2.87	1.47	10
Total	186,679	-	95.61	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The top 10 EU countries which supplied Prepared foodstuffs, beverages and tobacco in 2012 for Romania were: Germany, Hungary, Poland, Bulgaria, Italy, The Netherlands, Austria, France, the Czech Republic, and Belgium and their share in the agro-food import with this product category totalized 86.86 % (Table 17).

**The efficiency of Romania's agro-food trade.** The trade balance was a negative one, but in the last years, the deficit has a decreasing trend which is a positive aspect. As a result, the impact of agro-food trade on

GDP was also a negative one, but with lower figures from a year to another because of the GDP growth rate and the smaller and smaller trade deficit.

Table 17. The top 10 EU partner countries in Romania's import with Prepared foodstuffs, beverages and tobacco in 2012

Country	Import value with Prepared foodstuffs, beverages and tobacco (Euro thou)	Share of Import with Prepared foodstuffs, beverages and tobacco in Agro-food import value (%)	Share of Import with Prepared foodstuffs, beverages and tobacco in Romania's EU import with Animal or vegetable fats and oils (%)	Position
Germany	271,326	44.22	18.42	1
Hungary	233,940	26.57	15.88	2
Poland	206,649	63.23	14.03	3
Bulgaria	123,617	40.43	8.39	4
Italy	101,468	34.78	6.89	5
The Netherlands	88,532	27.48	6.01	6
Austria	77,798	55.01	5.28	7
France	70,577	39.42	4.79	8
Czech Rep.	57,227	52.37	3.88	9
Belgium	48,452	51.33	3.29	10
Total	1,279,586	-	86.86	-

Source: Romania's Statistical Yearbook, 2013. [14] Own calculations.

The agro-food export share in GDP increased 3.44 times from 0.89 % in 2007 to 3.07 % in 2012.

Table 18. Efficiency of Romania's agro-food- trade, 2007-2012

Indicator	MU	2007	2008	2009	2010	2011	2012	2012/2007 %
Agro-food Trade balance	Euro Million	-2,217	-2,181	-1,580	-806	-423	-746	33.64
Impact of agro-food trade balance on GDP (Trade/GDP)x 100	%	- 1.77	-1.56	-1.33	-0.64	-0.32	-0.56	31.63
Impact of agro-food trade balance on GDP created in agriculture, forestry and fishing (Trade/GDP)x 100	%	-30.87	-23.34	-20.72	-11.35	-4.93	-7.91	25.62
Agro-food Export share in GDP (E/GDP)x100	%	0.89	1.55	1.90	2.50	3.05	3.07	344.94
Agro-food Import share in GDP (I/GDP)x100	%	2.67	3.10	3.23	3.15	3.37	3.63	135.95
Agro food export share in agricultural production value (E/APV)x100	%	7.84	11.90	15.85	20.33	22.27	28.04	357.65
Agro-food Import coverage by agro-food export (E/I)x100	%	33.60	49.81	58.57	79.43	90.48	84.42	251.25
Agro-food Export/inhabitant	Euro/ capita	53.7	105.4	110.7	153.7	199.6	201.2	374.67

Source: Own calculations.

The balance with the EU countries was a negative one, mainly with the Western European countries. Important trade

operations are developed with Germany, Italy, France but also with Hungary, Bulgaria, Poland and Czech Republic as mentioned by

Despite that the agro-food import share in GDP increased only by 35.95% in the same period, the values of this ratio are higher compared to the ones recorded by export share in GDP, which reflects the low efficiency in Romania's agro-food trade.

The agro-food export share in the agricultural production value recorded an increasing trend from 7.84 % in 2007 to 28.04 % in the year 2012, being a positive aspect reflecting that more and more Romanian products are commercialized on the foreign markets.

The export/import ratio does not reflect an efficient foreign trade, as long as import value is higher than export value and Romania remains a net importing country. However, this ratio has grown from a year to another reflecting a slow improvement of agro-food trade efficiency.

The agro-food export per inhabitant increased 3.74 times in the period 2007-2012, firstly due to the continuous decline of the population and secondly due to the export growth rate. (Table 18). Romania's agro-food trade has continuously developed and is still highly increasing. Even in the period 2000-2008, Romania has proved intensified efforts to balance the export and import, but it has remained a net importing country with a negative impact on its economic development and GDP.

Popescu Agatha (2011, 2013a, 2013b) [11,12,13].

The agro-food export and import trends have to be closely connected so that the competitiveness in the market to be assured. The topic should be approached not only from a quantitative point of view, but also from the qualitative point of view, within the agricultural policy focusing on the increase of market competitiveness as affirmed by Munteanu (2013) [7].

## CONCLUSIONS

Romania has intensified its agro-food trade but it is still a net importing country. Imports are required to complete domestic offer in order to better cover consumers' needs in all seasons.

In 2012, agro-food export accounted for Euro Million 2,812 and agro-food import for Euro Million 3,834, resulting a deficit of Euro Million -1,021.

The highest share in the agro-food export belongs to Vegetable products, (38.66%), followed by Prepared foodstuffs, beverages and tobacco (36.02 %), and Live animals and animal products (18.99 %). In the agro-food import value, the highest weight belongs to Prepared foodstuffs, beverages and tobacco (38.39 %), followed by Vegetal products (30.89 %), and Live animals and animal products (25.62 %).

The main trade partner for Romania is the EU representing 70 % in its export and 72 % in its import value in 2012. Italy, Bulgaria, Hungary, Spain, Germany, The Netherlands, Greece, France, Austria and United Kingdom are the main EU countries where Romania exports its agro-food products, accounting for 88.14 % in its agro-food export value. In the same year, Hungary, Germany, The Netherlands, Poland, Bulgaria, Italy, France, Austria, the Czech Republic and Greece represented 88.38 % in Romania's agro-food import.

Romania has made important efforts during the analyzed period to improve the efficiency of the agro-food trade as shown by the improved export/import ratio, export value

per GDP and per inhabitant, and lower and lower deficit of the trade balance.

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## POSSIBILITIES OF RURAL TOURISM IN RELATION TO THE NATURAL CONDITIONS OF REGION TEKOV IN THE SLOVAK REPUBLIC

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### Abstract

*Landscape potential, reflecting the country's ability to provide some opportunities and prerequisites for the use to meet the needs of human society and long-term use along the lines of sustainable development, is considered as basic purposeful and value characteristic of the country. The aim of this paper is based on the analysis of natural conditions and landscape structure to determine the possibility of applying different forms of rural tourism in the Slovak Republic, namely the example region Tekov, which lies on the border of western and central Slovakia. Region Tekov is among the warmest regions of Slovakia. The results presented in this paper were processed using the method of scientific abstraction, landscape structure analysis methods investigated area based on the methodology of landscape-ecological planning and methods of SWOT analysis. Region Tekov occupies the territory of 48 municipalities with its total area of 776.58 km<sup>2</sup> and a population 73637. The dominant presence in the region has agricultural areas (67% of the area of the territory). This is the type of agricultural land, which their natural condition and on the basis of favourable landscape structure offers opportunities and space for application activities related to rural tourism, namely walking, cycling, water sports, agro tourism, viticulture, hunting and winter sports, especially skiing. Strengths of rural tourism in the region are heterogeneous landscape structure with the preserved natural environment and favourable climatic conditions, a strong tradition in viticulture, apiculture, horticulture and the presence of ecologically stable elements with plenty of usable water resources.*

*Key words:* natural conditions, Region, Tekov, rural tourism

### INTRODUCTION

Potential landscape is an essential utility, and value of landscape. Potential landscape reflects a country's ability to provide some opportunities and prerequisites for the use to meet the needs of human society and long-term use in the intentions of sustainable development. Potential can be natural, cultural- historical or anthropogenic. In terms of recreation, tourism and tourism development are [5] the most important natural, cultural and historical potential.

The total potential of the area is expressed through a combination of partial potentials that determine a country's eligibility for various forms of tourism. The occurrence of suitable materials, processes and energy, that

particular ecological quality of the landscape area is a prerequisite for the existence of potential [2]. A priority criterion for assessing the suitability of the location for tourism is mainly a system of individual components of the natural environment.

The most important factor affecting the country's potential for tourism is a relief. The relief is very diverse and attractive in the Slovak Republic. In addition, the climate, hydrology and flora and fauna diversity has a significant impact on tourism.

Country is able to meet the needs (demand) in terms of certain types of recreation, land capability and land use (or a combination of both) because of its diversity of habitats, wilderness, cultural heritage and various land use. To align the demand of different target

groups, offering the country and its load capacity is very important when planning a recreational area.

Rural tourism is based on the active use of the rural settlement for recreational and tourist stays. The main factor is becoming its own rural environment, which can serve as a starting point for the recreational environment, as a place of security, or of residence, destination city recreation and cognition. Rural tourism as a form of tourism is associated with residing in rural areas. In particular, the activities related to the return to nature and the use of natural heritage area. Better quality of the environment is an important motive for staying in the countryside during the holidays.

The tourism in rural areas is commonly called a rural or rural tourism [7].

The essences of rural tourism are friendly forms of tourism - agro tourism, eco agro tourism and ecotourism.

The development of tourism in a given area depends primarily on assumptions that the location has. The assumptions are expressed through attractiveness of the local nature and landscape or cultural and historical sights. Natural conditions are relatively constant in time, permanent in nature and include the determinant of the attractiveness of an area [8].

Rural tourism is one of the key forms of tourism in Slovakia. Rural tourism is in developing regions with low population density and target groups are mainly individual tourists. Almost all municipalities in Slovakia have prerequisites tourist use. Municipalities are gradually losing their economic function and have the natural and cultural potential for tourism development [3]. Key role for most destinations are natural effects [1]. People travel for rest and relaxation in an environment that with its natural character satisfies their needs.

Many rural areas are trying to integrate tourism with more traditional rural activities, such as agriculture [4]. In many rural areas, tourism is one of the few growth sectors, and although it is widely seen as one of several acceptable forms of rural development, conflicts may arise between the interests of

tourism and those that seek to preserve rural traditions of land use.

Ethnographic Atlas of Slovakia [6] outlined the regions folk culture according to the results of ethnographic research. To date, this breakdown also used in connection with the issue of rural tourism, respecting the characteristic traits to specific regions. On this basis was defined region Tekov well.

The aim of this paper is based on the analysis of natural conditions and landscape structure to determine the possibility of applying different forms of rural tourism in region Tekov as model example in the Slovak Republic.

## MATERIALS AND METHODS

### Characterization and localization the monitored area

Tekov is situated on the border of western and central Slovakia (Figure 1). Tekov takes quite a long north-south strip that is adjacent to the northern boundary Turiec and the southern boundary is near the border with Hungary. The northern part Tekov is filled with mountains Pohronský Inovec, Vtáčnik, Kremnické hills, Štiavnické Hills and southeastern slopes Trábeč.



Fig. 1. Localization of region Tekov within the territory of the Slovak Republic

Region Tekov is not significantly geographically limited, nor to culturally unified whole. Tekov region is identical with the territory of the former Tekovská county and is now divided into three Self-governing Region: Nitra, Banská Bystrica and a small part extends into the Trenčín territory.

Hron River flows through the region Tekov. The river helps to create his character to a

great extent. In some tourist publications is region known as Lower Pohronie.

Region Tekov is among the hottest areas of Slovakia, where the average annual air temperature in the long-term average here is up to 10 °C.

July is the hottest month with temperatures of 20-23 °C and the coldest January with temperatures from -2 to -4 °C.

Average annual rainfall is 600-650 mm, of which in the growing season of about 350-400 mm.

Length of sunshine is about 2100 hours, which positively affects the development of tourism in the region.

The average annual number of summer days is 67.

The region has about 34 days per year with snow cover, the amount of which is an average of 10.8 cm, which is not the best prerequisite for the development of skiing, but in the northernmost part of the region, where is slightly chilly climate, that option is.

#### Methodological procedures

The method of scientific abstraction, abstracting the essence of which is the amount of information that have a direct or indirect relationship with the solution to the problem.

Analytic-synthetic method, thought the layout of the phenomenon on different parts of the analysis.

Method of the landscape structure analysis monitored area based on the methodology of landscape-ecological planning.

Within the secondary landscape structure were analysed landscape elements, expressed empirically and processed in graphical form. As the source data were used data from the database of regional statistics Slovak Republic RegDat.

As a strategic planning tool used for assessment of the strengths, weaknesses, opportunities and threats method was used SWOT analysis.

## RESULTS AND DISCUSSIONS

Region Tekov with its natural circumstances and on the basis of favourable landscape structure offers opportunities and space for

application activities related to rural tourism. Options rural tourism following the natural conditions of region Tekov are expressed schematically on the figure 2.

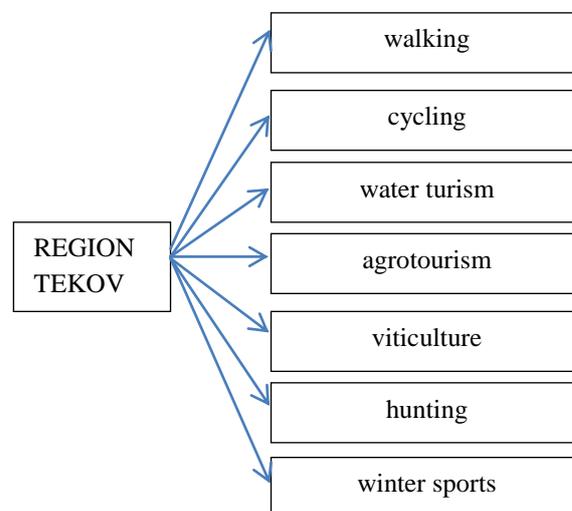


Fig. 2. Options rural tourism following the natural conditions of region Tekov in the Slovak Republic.

#### Analysis of landscape structure of region Tekov

Region Tekov is situated on the territory of 48 municipalities.

Surface area is 776.58 km<sup>2</sup>. The population of the region is the 73,637.

The agricultural area has a dominant presence in terms of land use (67% of the area of the territory).

Arable land represents 54% of the total area. Region Tekov is an agricultural landscape type.

From ecologically valuable landscape elements in the territory are forests with 24% share and grassland 9% of the area. Opportunities for tourism are also important water features with a share of 1.5%. Significant representations of landscape elements valuable for rural tourism have vineyards and gardens with a share of the total area of 1.8 and 2.2%.

The Figure 3 indicates the proportion of types of landscape element of the present landscape structure in region Tekov.

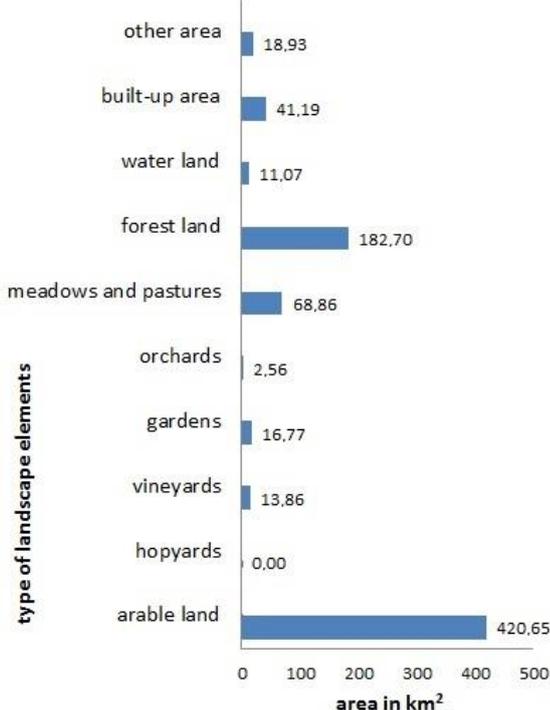


Fig. 3. Types of landscape elements of the present landscape structure in region Tekov in the territory of Slovakia in 2014

Source: Own calculation on the basis of data from Statistic Office of The Slovak Republic - RegDat (2014)

### Possibilities for rural tourism in region Tekov

On the individual localities of region Tekov applies one or more tourist-attractive activities: as walking, cycling, water sports, agro tourism, viticulture, mining, hunting, fishing, and the application of winter sports, such as skiing.

Analysis of the various options is bind to specific examples of the use of the natural environment.

Within **walking tours** among the most popular sites (attractions) include Memorial Reservation of Brhlovce and their cliff dwellings. Its establishment dates back to year 1245. It is a small village with about 400 inhabitants. This locality is searched mainly due to the cliff dwellings and also found here finds from the Bronze Age (vessel decorated with tin foil, amphol from Podolian culture). The village is tourist attraction also due craftsmen (basketry, weavers, stonemasons) and viticulture. The biggest attraction despite these facts, are cliff dwellings, some of them still inhabited. Since 1983, the Brhlovce are

the Nature reservation of folk culture and the extended exhibition of the Tekov museum. Also the village been awarded the "Europa Nostra 93" awarded by the European Committee for the countryside and small towns.

Education trail "In the footsteps of the old ore mining" in Pukanec village was established in 2005 (thanks to the Civic Association TERRA BANENSIUM – The earth miners in Pukanec). The length of the trail is 5.2 km with elevation 160 m. Number of stops – 12. This education trail is located on the protected area PLA (Protected Landscape Area) Štiavnické hills. This trail is self-service, walking, unidirectional, mining type of trail, and transient throughout the year.

Another Education trail Čajkovské Bralie formed in 2000 (thanks to the Civic Association Čajkov). The education trail is 5 km long and represents elevation 282 m. Number of stops is 5. It is located in the PLA Štiavnické hills. This is a trail that focus more science, conservation, but also historic. It is self-service, linear; part is circular and can be used as the summer, as well as in winter.

**Cycling** is a popular form of tourism in region Tekov. One of the major routes, converging region Tekov, is the international cycling route Euroregion Danube-Váh-Ipeľ. This route is based on a previous project "Walking tour of medieval castles Euroregion Váh-Danube-Ipeľ. Another important cycle route in the region is a cycle route between the villages of Starý Tekov - Kalná nad Hronom - Jur nad Hronom. The length of cycle routes is 23 km. The cycle route leads along the unpaved road, 39.41% of the route leads through forest ecosystem, 29.27% over the meadow ecosystems, the rest through built-up areas.

To **water tourism** in region Tekov can be included water tanks, swimming pools, hot springs, as well as wellness, fishing and rafting. Important destination, offering water tourism, is Thermal Baths Santovka (built in 1740). Interesting in terms of tourism seems to be the springs of the acidulous and mineral water bottling (serving since 1945). Thermal baths called Recreation area Margita-Ilona is

one of the most popular options for tourism in the region. Within the complex there is a camping area and a cottage area. Wellness Kalná nad Hronom is a year-round opened along with applicable options for sport and recreation services. For the recreation purposes is used the water reservoir Lipovina. The rafting of the Hron River is organized since 2000, with a length of 68 km rafting.

Another possibility for the development of water tourism is **fishing**. Fishing grounds which are managed by the Slovak Fishing Association are carp and includes following streams (Perec, Sikenica, Korlát, Lipník, Kozárovský stream, Rybnický stream, Teplička, Kráľovka, Čajkovský stream including tributaries, Gondovský stream, stream Kamenec including tributaries, Ďúrsky stream including tributaries, Zahajský stream), gravel water surface Mýtne Ludany, water ponds (Bátovce, Kalná nad Hronom, Pukanec, Kozárovce, Veľký Ďur, Drženice).

**Agritourism** in its broader approach offers the use of environments and activities bound to a specific area. Agrotourism includes specific activities of local agro-entrepreneurs, according to natural conditions and possibilities of the region. As an example can be introduce Demandice village. There is the farmyard with the pension Stará Lipa. In the complex there is fireplace, bower, providing the agro-tourism services (simple farm work, horse riding and others). One possibility of the agrotourism is horse riding, for example in Nový Tekov village on the Ranch Bobi with all year round services including western events.

**Vineculture** is a further, specific form of rural tourism activities. In region Tekov are 13.86 square kilometres of vineyards. The first mention of viticulture comes from 1526 in the village of Staré Levice. Strip of vineyards is typical for the region, especially in Čajkov which is still annually held event Čajkov vintage or around Pukanec. Wine, typical of this area is Pesecká Leanka from the Pesek village and Levická Lemberger.

In region Tekov can be applied activities related to **hunting**. In region Tekov operates a number of dozens of associations that manage

hunting areas. This area is characterized with small game (pheasant, bustard, rabbit), ungulates (doe, wild boar, moufflon, fallow and deer. In the region are held annually events called Levické hunting days, where are exhibited trophies for those interested, it is possible to organize future cooperation.

Northeast Region (Region Štiavnické Hills) is region with typical mining economy and **mining activities**. To date, there can be seen the preserved construction. Today the tunnels create landscaping elements. These elements are an essential part of the scenery, and it is therefore necessary to include these activities in the context of activities in the region.

Areas suitable for the use during the **winter season** in the region are Uhliská village. There is a ski resort Ski Center called Nižné Uhliská. The resort offers three tracks (main - 1400 m, the race - 700 m and the lookout - 1930 m), relaxation running track 2600 m long and two ski lifts (1350 m and 300 meters).

Based on the analysis of landscape structure and opportunities for rural tourism in region Tekov been prepared SWOT analysis in relation to rural tourism:

#### Strengths

- ✓ heterogeneous landscape structure
- ✓ preserved natural environment
- ✓ the favourable climatic conditions
- ✓ tradition in viticulture, fruit growing and beekeeping
- ✓ environmentally stable elements
- ✓ enough of usable water resources
- ✓ proximity growth poles - Bratislava, Vienna, Budapest

#### Weaknesses

- ✓ the proximity of the region to a nuclear power station
- ✓ inadequate infrastructure
- ✓ absence of tourism services
- ✓ insufficient promotion of the region
- ✓ the dominance of arable land

#### Opportunities

- ✓ development of tourism activities realized through all seasons activities
- ✓ development of educational-sightseeing trail and cycling routes
- ✓ creating projects for rural tourism

- ✓ maintaining and developing folk traditions
- ✓ natural and water potential

### Threats

- ✓ buying the land by foreign subjects
- ✓ under-use of region potential
- ✓ lack of finances in each sector
- ✓ possible pollution of environmental components

## CONCLUSIONS

From the analysis of landscape structure of region Tekov and an analysis of the possibilities for implementing rural tourism activities it can be concluded that within the region there are enough localities where can be applied one or more parallel all seasons tourist activities, developing education-cognitive nature and preserving the folk traditions. Region Tekov has typical agricultural landscape. From ecologically important landscape elements in the territory are forests with 24% share and grassland 9% share of the area. For tourism opportunities are also important water elements with a share of 1.5%. Significant representations of landscape elements valuable for rural tourism are vineyards and gardens with a share of the total area of 1.8 and 2.2%. The basic activities implemented in the territory of region Tekov include walking, cycling, water sports, agro tourism, viticulture, mining, hunting, fishing, and from winter sports, for example skiing. Equally important fact is the presence of growth poles (Bratislava, Vienna and Budapest).

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## EVALUATION OF THE IMPACT OF AGRICULTURAL ENTERPRISES ON DEVELOPMENT OF AGRICULTURAL LAND MARKET IN SLOVAKIA.

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### Abstract

*The paper focuses on the situation of the agricultural land market in Slovakia and in selected region of the SR – Nitra region, on the application and development of agricultural land prices in Slovakia and on the factors that influence the decisions of agricultural enterprises on the market with agricultural land. In this paper were used primary data obtained with interview method realized within the research of Department of European policies, Slovak University of Agriculture during the period 2012 – 2013 in all districts of region Nitra. The evaluation of the impact of agricultural subject on agricultural land market in Slovakia was realized by using the method of regression analysis. Based on the results from the research we can state that entrepreneurs still prefer more to rent land than to purchase a land. The main factors influencing the decision-making process of agricultural subjects are ownership fragmentation, the fragmentation of agricultural plots and business's financial situation and profitability of the purchase. Many entrepreneurs pointed to this indicator as one of the most influential in terms of increasing the market price, respectively as a reason for not signing the lease agreement. The agricultural land market in Slovakia is emerging but still not sufficiently transparent. Further development of the market will continue to be marked by the overall economic situation in agriculture, relatively low competitiveness of Slovak farmers in the European market and reduced profitability. Research showed that the most pronounced effect on the price of agricultural land and the amount of rent for agricultural land has the number of enterprises. Growing number of farms will increase the price or amount of rent for agricultural land.*

**Key words:** agricultural enterprises, agricultural land market, land lease, market land price, purchase of land

### INTRODUCTION

The issue of economic theories dealing with efficient land market model is processed by different authors (f.e. Swinnen, Knobs, Vranken) from different points of view [7,8]. In determining the appropriate model of the land market for Slovakia we inclined to the Dale and Baldwin thesis, who state that efficient land market affords:

- Transparency in ownership rights
- Suitable regulation and administration of ownership rights
- Minimum regulations connected to the use of agricultural land,
- Smooth transfer of ownership rights
- Availability of capital and loans for the

purchase of land.

To open land market is to meet those requirements necessary but insufficient in terms of providing an efficient agricultural land market. Market operations are conducted through market participants who buy and sell agricultural land. In order to achieve the desired degree of market efficiency market operations must be supported by the land registry office, ensuring the valuation of land and the provision of suitable loans for the purchase of agricultural land. Proper functioning of these elements is the basis of efficient markets with agricultural land. Mentioned support of market operations should be considered as regulatory pillars that are the basis for land policy. Unless the

government is able to provide and support these pillars, then the land market will represent a dynamic environment, which includes landowners and tenants, ways of using agricultural land and financial instruments [3]. Most effect according Swinnen and Vranken on the markets in the countries of Central and Eastern Europe had probably the join the EU. The combination of security rights and improving the legal framework for transactions, inflow foreign capital (direct market in the country, directly or indirectly through the agri-food industry investment), increasing prices and subsidies have a significant impact on land prices and land transactions in these countries. Properly functioning land markets are vital to the development of rural areas and agricultural growth. Land reforms in recent years have changed the structure of ownership and use of land in these countries [6]. Agricultural land market according Buday and Vilček as the property market is part of the market mechanism, which is subject to general market law with certain features. These are designed especially by natural the conditions [1].

On the market with factors of production has the land specific feature, that is the supply is inelastic and if the Slovak Republic the total acreage of agricultural land over the years 1990 - 2014 decreased with 21% at the current acreage 1 927 450 ha [5], while the largest decrease was recorded by permanent pasture and grassland and gardens.

Markets with agricultural land are significantly influenced by agricultural subjects as well as investors and with the market prices of agricultural land.

The aim of the paper is to focus on the situation of the agricultural land market in Slovakia and in selected region of the SR - Nitra, on the application and development of agricultural land prices in Slovakia and on the factors that influence the decisions of agricultural enterprises on the market with agricultural land. The research was realized in the selected region of the Slovak Republic in the Nitra region, which is characterized by a high share of agricultural land with higher soil

fertility in comparison with other regions of Slovakia.

## MATERIALS AND METHODS

The research was realized as a part result of the VEGA project n. 1/0876/11. In this paper were used primary data obtained with interview method realized within the research of Department of European policies, Slovak University of Agriculture during the period 2012 - 2013. Data included land market price, size of purchased and rented land and factors influencing decision making process of agricultural subjects. Questionnaire survey was realized in all districts of region Nitra. The evaluation of the impact of agricultural subject on agricultural land market in Slovakia was realized by using the statistical method - Method of regression analysis.

The researched question: Has the number of agricultural subjects in region Nitra influence on amount of the market land price?

To confirm the researched question were used following hypotheses:

Hypotheses 0: The number of agricultural subjects in region influences the amount of agricultural land price.

Hypotheses 1: The number of agricultural subjects in region does not influences the amount of agricultural land price

For the research question applies this formula:

$$D = \beta_0 + \beta_1 x_1 + e$$

$D$  = agricultural land price,

$\beta_0$  = constant,

$\beta_1$  = number of agricultural companies

in the district,

$E$  = standard deviation.

We have verified the hypothesis by using regression analysis.

In paper were used also qualitative methods used for the fulfillment of the research were mathematic-statistical data analysis, the method of scientific abstraction and analytic-synthetic method.

## RESULTS AND DISCUSSIONS

Situation in Slovakia in the state and use of agricultural land is not sufficiently

transparent, despite the application of the measures by the Slovak Government on settlement of ownership and user relations. This lack of transparency in the ownership structure and the structure of use of agricultural land owned by individuals and entities is given by the absence of functional statistical surveys and functional information networks. In Slovakia is very difficult to determine the situation of the agricultural land in terms of the number of changes in ownership rights (number of sale contracts and swaps contracts, where the subject is agricultural land) by agricultural land other than that which is administered by the Slovak Land Fund. Based on surveys, we can confirm that despite this situation sale and purchase of agricultural land takes place, while the majority of purchasing land area is less than 1 ha and the largest purchasing type of agricultural land is arable land. Demand for agricultural land differs according the regions in Slovakia, but is generally low. Although agricultural entities would be interested to buy land they are hindered by a number of factors. Based on the findings from the realized interview method in selected agricultural subjects, we can conclude that the interest to buy and sell land represents about 40% among the agricultural enterprises in Slovakia. One of the biggest problems in the marketing of land has been identified complexity of legal processes in the marketing of land by over 35% of subjects. This problem is based mainly in trade contracts with more co-owners of one plot, because, due to the fragmentation of land in Slovakia one plot (1 ha) is owned by more owners. Significant obstacles in Slovakia are also the high market price of agricultural land in areas with high soil fertility and also the prerequisites for the realization of investment plans, which as an obstacle indicated 26% responders. Reasons for the limited development of agricultural land market are in particular:

- Lack of financial capital and low availability of loans with reasonable interest rate,
- Low rent, typically 1% of the land
- Fragmented ownership

- Extensive administration related with the sale of land
- Uncertainty in Agribusiness

Generally, we can describe the agricultural land market in Slovakia as an emerging but still not sufficiently transparent. Further development of the market will continue to be marked by the overall economic situation in agriculture, relatively low competitiveness of Slovak farmers in the European market and reduced profitability.

By evaluation of the agricultural land market has a significant role the market price of agricultural land. Agricultural land price in Slovakia depends on different purposes:

- Sale and purchase
- Determination of land rent
- For tax purposes

In Slovak republic are valid several legal regulations for agricultural price, for this cases we are using the term administrative price. These legal regulations defer depending on the agricultural land use purposes. For determination of arable land value is used the code Nr. 582/2004 Coll., for land consolidations is valid regulation Nr.38/2005 Coll. for land exemptions purposes is used the code Nr.220/2004 Coll. about the protection and use of agricultural land. For determination of land price for expert's account is used the regulation 492/2004 Coll. As mentioned the administrative prices of agricultural land are used for given purposes and the administrative price does not reflect the market price in Slovakia in all regions with exemptions. Essential elements of the market price of agricultural land are supply and demand, quality of land (according valuated soil ecological unit), land use (arable land, permanent grassland, etc.), access and shape of the land largely affect the price as well as the lease relation. The agricultural land market price is in most productive areas of Slovakia slightly about the level of administrative land prices. Market prices of land plots in Slovakia, which are reaching lower soil fertility, are reaching in some cases, only one third of the value of administrative prices of agricultural land. Price of permanent grassland is significantly lower than the price

of arable land. In Slovakia, the land market is very unbalanced, characterized by wide supply of land large number of residents who do not intend to manage the land, land fragmentation, slow progress of land consolidation. The current agricultural land market is realized by low number of the sales and purchases of land and is limited mostly to urban areas.

As researched by Lazíková in regions Nitra and Banská Bystrica market prices are in average lower than administrative prices. In contrast, in region Trnava and Trenčín are land prices higher compared to the administrative land price. An interesting finding, however, was that with the decrease of land quality, was higher the difference between the market price and the administrative land price designated under the Ministry of Agriculture regulation no. 38/2005 Coll. For example, in the Nitra region was according the regulation 38/2005 Coll. the administrative price of land 3319 Eur.ha<sup>-1</sup>, but the market price was by almost 50% lower compared the administrative price. The highest market price was for land which administrative price was only 2 000 – 2 300 Eur.ha<sup>-1</sup>. A market price for such a land in Nitra region was 4 to 5 times higher compared to the administrative land price. A similar situation was also observed in other regions of Slovakia [4]. Based on these findings we can state that through in Slovakia are several regulation determining the administrative land price, none of these regulations is able to be fully applied by market subjects on the market with agricultural land. Based on the fact that official databases containing the agricultural land market price do not exist in Slovakia, the agricultural subject are not able to be informed about market prices and to determine the most effective market price. So the agricultural subjects do not take in account the administrative prices and nowadays they tend to pay the market price based on different factors. Identified factors influencing the current market price of land are: area, shape and position of the land, production capability based on quality of soil, climatic conditions, land location within regions in

Slovakia, land location within the districts of region, demand and supply in the given location of the land, access to land, infrastructure, business interests of the seller and the buyer, speculative effects, the possibility of using machine technology, special conditions (regional, national). Currently, the market price of agricultural land is primarily affected by the location of the land in relation to the conurbation processing industry, recreation areas, and also by the speculation effects. In a lower extent the market price of land is affected by land quality and climatic conditions. Expectations about the high increase of land market price after membership of Slovak republic in EU did not fulfil. The land market price increased slightly during the years of membership in EU. This opinion supports also Buday, Grausová and Čičová. According they research the development of the size and the number of purchased plots in the years 2007-2012 monitored in districts of SR showed trend fluctuations. Maximum purchased land area was identified in 2010. Also in 2012 was purchased a large area but was not in higher size to exceed the scope of 2010 Development of the amount of the average market price in the years 2007-2012 fluctuated and overall it can be judged as declining. Maximum average market price per ha was recorded in 2008. In the following years came to a decline in the price of agricultural land, while the largest decrease was a decline in 2012. From comparison between the years 2007-2012 comes out that an average market price of agricultural land was 1 190 EUR.ha<sup>-1</sup> and the average market price of arable land was 1 430 EUR.ha<sup>-1</sup>. Highest average market price was by vineyards reaching 2 230 EUR.ha<sup>-1</sup>. The lowest market price was identified by permanent grassland 700 EUR.ha<sup>-1</sup> and orchards achieved an average value of 1000 EUR.ha<sup>-1</sup>. [2].

#### **Evaluation of agricultural land market and its development in region Nitra**

The paper focuses also on the evaluation of agricultural land market and its development in region Nitra. Region Nitra belongs to the regions with most suitable conditions for

agricultural production, with the highest land quality, where large number of agricultural subject is realizing agricultural production compared the rest of regions in Slovakia. Region Nitra consists of 6 districts (Nitra, Levice, Komárno, Šaľa, Topoľčany and Zlaté Moravce). The utilized agricultural land represents in district Nitra 68 451 ha, Levice 112 198 ha, Komárno 86 481,4 ha, Nové Zámky 107 788,9 ha, Šaľa 29 545,4 ha, Topoľčany 37 577,9 ha and Zlaté Moravce 25 945,5 ha. As shown in figure 1 the structure of utilized agricultural land is in all districts similar, exceptions are in districts Šaľa, Topoľčany and Zlaté Moravce, where the area of utilized agricultural land is 10% lower comparing to other districts of region Nitra. In terms of the ownership relations we can state significantly higher share of rented land (by agricultural subject is the share 89%) than owned land. Agricultural subject own and rent mainly arable land and in lower extent also meadows and pastures. From the obtained research results we can state that entrepreneurs still prefer more to rent land then to buy a land.

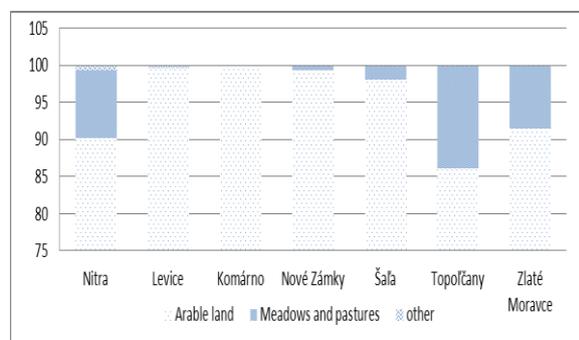


Fig.1. Structure of land holdings in districts of region Nitra according to the questionnaire survey expressed in%,2013

In districts Zlaté Moravce and Nové Zámky dominates the tendency of entrepreneurs to rent a land rather than to buy a land. Less than 20% of the surveyed entrepreneurs would refuse the offer to buy a land based on reasons, as the economic situation in the country and in Europe and opportunities to access credit. The main factors influencing the decision-making process of agricultural subjects are business's financial situation and

profitability of the purchase, resp. rent in the long term. Furthermore, entrepreneurs take into account the stability of the enterprise on market, and in particular their ability to produce or sell or export outside the region. Some entrepreneurs by decision making do consider as most important land quality and the value of the land and the land ownership. The fragmentation of land ownership often leads to failure of lease contract. The figure 2 shows the comparison of the preferences of agricultural subjects within decision making process about the purchase or rent the land based on the results of the questionnaire survey.

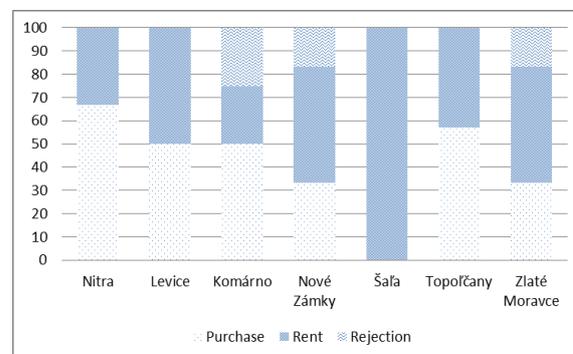


Fig.2. Comparison of preferences decision process between buying and renting farmland based on the results of the questionnaire survey in %, 2013

Entrepreneurs who would be willing to purchase the land have added that they do not consider the real purchase of land yet, but if it will be necessary they will be open to purchase the land even they would have to use loans, because according their opinion the own land is in the long run more efficient and more secure. Many agricultural entrepreneurs who would like to purchase the land prefer to rent the land. This fact is caused by the lack of own financing sources to purchase the land and today they are not willing to debit themselves with the credit.

According the realized survey on farms in the Nitra region is the market price (as shown in figure 3) paid by agricultural enterprises to purchase the agricultural land more than three times lower compared to the official (administrative) price set by law no. 582/2004 Z.z. of local taxes and fees for municipal waste and minor construction waste, which is

used to determine the value of arable land for the purpose of payment of property taxes. The highest difference between these prices is in the district Levice, where market price compared to the official price is 4.5 times lower. The smallest difference between the market price and the official in the district Topoľčany where market price compared to the official price is 2.03 times lower.

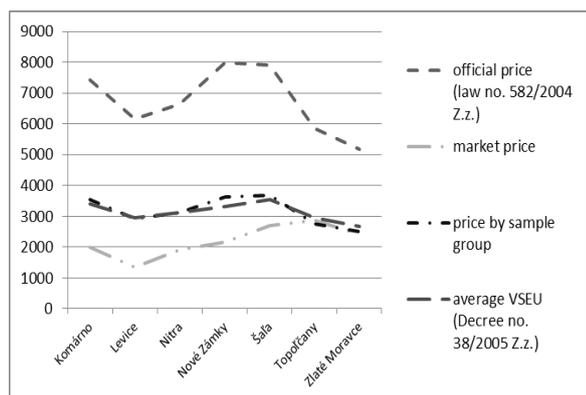


Fig.3. Comparison of official (administrative) price of agricultural land with VSEU price (valuated soil ecological unit) and market price of agricultural land in EUR. Source: www.agrofarmy.sk; Questionnaire,2013

From the comparison shown in figure 3 between land market price and VSEU price (valuated soil ecological unit ) can be seen that in district Topoľčany and Zlaté Moravce are agricultural subject purchasing the land for market price which is compared with the quality of the soil below.

To verify the accuracy of the price under valuated soil ecological unit in the sample we determined price valuated soil ecological unit for the district according to the point value assigned to each district by the Research Institute of Agriculture and Food.

As can be seen, both curves are almost identical and the value of the land sample corresponds to the value of land in its current quality.

The research observed also the impact of number of enterprises on the price of land.

For the identification of correlation between the number of enterprises in districts of Nitra region and the market land price were used hypotheses.

When verifying hypotheses (table 1), we found out that the most pronounced effect on

the price of agricultural land and the amount of rent for agricultural land has the number of enterprises, where in both cases data significance level of 0.05 the coefficient of determination reached 0.89.

It shows us that a growing number of farms will increase the price or amount of rent for agricultural land.

Table 1.Effect of the number of enterprises in different districts on the price of land

Model 2: OLS, using observations 2008-2011 (T = 4)  
Dependent variable: NSK\_cena

	Coefficien	Std. Error	t-ratio	p-value
const	451,727	384,627	1,1745	0,36112
NSK_Podn	31,5093	7,60554	4,1429	0,05362 *
Meandependent var	2044,071		S.D. dependent var	73,51863
Sumsquaredresid	1692,240		S.E. of regression	29,08814
R-squared	0,895637		AdjustedR-squared	0,843456
F(1, 2)	17,16391		P-value(F)	0,053619
Log-likelihood	-17,77078		Akaikecriterion	39,54156
Schwarz criterion	38,31415		Hannan-Quinn	36,84810
rho	-0,709684		Durbin-Watson	3,311986

### Factors influencing the decision making of enterprises on agricultural land market

The aim of the paper is also to evaluate the influence of selected factors influencing the market with agricultural land.

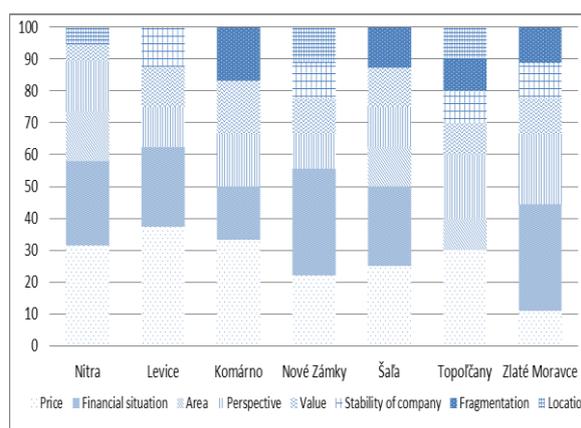


Fig.4. Factors influencing the decision making of enterprises for the purchase/lease of agricultural land based on the results of the questionnaire survey in %,2013

Based on the questionnaire results we can identify the importance of selected factors on agricultural land market in region Nitra.

Although all the districts are located within a one region with similar conditions, it can be seen a degree of differences by observed indicators (Fig.4.).

Among the indicators, which influence the decision making of agricultural enterprises is political situation where we assumed that the government can have an impact on the land market through the laws and regulations that determine the price of land for tax purposes or fix a minimum rent. Also the land market can be influenced by the possibility of additional support payments under the CAP. The second indicator, through which we examined the effect on the land market, was problem connected to fragmented ownership. Many entrepreneurs pointed to this indicator as one of the most influential in terms of increasing the market price, respectively as a reason for not signing the lease agreement because of the disagreement between two or more owners. The third researched factor was the impact of fuel prices, which have a significant impact especially in the harvest period or in the case that the agricultural land is situated at a distance of more than 30 km from the registered agricultural holdings office. The fourth factor is the regulation of land market, EU financial support and environmental constraints. Under the regulation of land market we include the legal burdens for foreign investors who are interested to purchase the agricultural land in Slovakia. EU financial support influences the inputs of agricultural enterprises, through EU funds under CAP and national support mechanisms for agriculture. Environmental constraints are associated with production methods used on the land. The fifth factor is the influence of foreign enterprises in particular through the competitiveness of domestic products. The sixth factor that affects the land market is extraction from land fund for construction purposes. This factor is particularly effective in the case of sale of agricultural land for the construction of buildings. Total inputs are increasing due the charge for set-aside of agricultural land, which was according to the law no. 376/2008 Z.z. 6-15 EUR.m<sup>2</sup>. Seventh factor was the level of built infrastructure in

the territory, whether the entrepreneur is willing to buy the land due to its preferences, such can be built road or other components of the technical infrastructure. Eighth factor was the interest rate in the case of obtaining credit in the bank, which normally fluctuates depending on the bank and the loan amount on average 3-6%. Last researched factor affecting the land market is a measure of the tax burden according to Annex 1 to the Act. 582/2004 Coll. as amended by Act no. 465/2008 Z.z.

Based on importance of researched factors by entrepreneurs in the survey, we can conclude (As Shown in Figure 5), that in Nitra region is mostly the land market influences by ownership fragmentation and unsolved land ownership rights as well as the influence of foreign businesses that rent land or impact the regional commodity markets by imports from the country of origin.

The second most influential factor is the degree of infrastructure. Moderate degree of influence on the land market has political situation, fuel prices and regulation of the land market, financial support mechanisms (EU and state support) and environmental constraints. The lowest impact on the purchasing of land has the extraction from land fund.

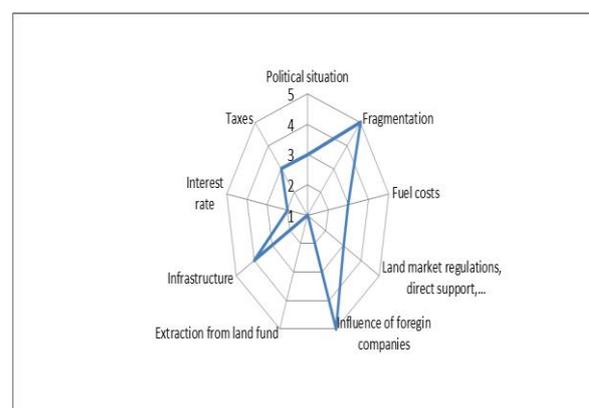


Fig.5. Influence of selected factors on the land market in the district of Nitra on the basis of the results of the questionnaire survey in the interval from 1 (lowest) to 5 (highest value)

Based on the above it can be concluded that the subsidies in the form of direct payments, not according to entrepreneurs in the Nitra district a major impact on the land market.

Important impact on the agricultural land market was the membership of the countries of Central and Eastern Europe into the European Union. Among the most significant impacts can be included the change in the legal framework, the inflow of foreign capital and the EU agricultural financial support mechanisms. Accession to the European Union included the possibility of obtaining support mechanisms for farmers, which were intended to increase their competitiveness. It was supposed that the agricultural land markets will develop during the membership in EU. But under the restricts connected the ownership rights of agricultural land by foreigners could only foreigners with a residence permit in Slovakia who rent and farm the land for at least three years after Slovakia's EU accession buy and own land in Slovakia (Foreign Exchange Act No. 312/2004 Col., Art. 19a). During the 10 years transition period were not in Slovak republic solved problems with land fragmentation and unsolved ownership rights to agricultural land. Based on this problem in Slovakia, as well as in neighboring countries, are still not properly functioning markets for agricultural land, and therefore they need to be supported and regulated.

## CONCLUSIONS

Generally, we can describe the agricultural land market in Slovakia as an emerging but still not sufficiently transparent. Further development of the market will continue to be marked by the overall economic situation in agriculture, relatively low competitiveness of Slovak farmers in the European market and reduced profitability. Agricultural land market was limited only to agricultural subject based in Slovakia for the years 2004-2014, to avoid purchasing the land by holdings from other EU countries. Based on the findings on agricultural land market we do not suppose for future a significant increase in purchasing of agricultural land by foreign entities. It is possible to conclude that purchasing of land was realizing mainly between entrepreneurs and private persons based in SR. Based on the

evaluation of the impact of selected factors in the Nitra region, we can conclude that the most important impact on the land market has ownership fragmentation and the fragmentation of agricultural plots. The second most influential factor is the activity of foreign entrepreneurs and their impact both on the land market through the purchase and lease of land and their activity in the market with agricultural products. Lower impact on the land market and land market regulation was observed by EU financial support on agricultural production and the political situation. In some districts was observed significant impact of land tax and the interest rate in banks on land market. We found out that the most pronounced effect on the price of agricultural land and the amount of rent for agricultural land has the number of enterprises. Growing number of farms will increase the price or amount of rent for agricultural land. Based on the fact that most of the land is rented, it is necessary to modify the terms of the land market by creating a support tool for purchasing the agricultural land.

## ACKNOWLEDGMENTS

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## INFLUENCE OF EUROPEAN FUNDS ON THE SECTOR OF BOVINE MILK AND MEAT IN ROMANIA IN THE PERIOD 2007-2013

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### Abstract

*This study aims to analyze the bovine meat and milk sector for the period 2007-2013. In the analyzed period, Romania has benefited from EU funding through the National Rural Development Programme 2007-2013. In this programme there were measures that addressed exclusively to the animal husbandry sector in Romania. This paper presents the results of the analysis on bovine production of meat, milk and livestock in Romania, but also on the price and impact that the European Funds implementation had on them.*

**Key words:** *European Funds, measures, bovine milk and meat sector, price, National Rural Development Programme*

### INTRODUCTION

European funds have become a significant aid to the economy and development of the member states of the European Union. Agriculture was one of the economic sectors that have directly benefited from these funds. It was supported by the European Agricultural Fund For Rural-Development (EAFRD). EAFRD for 2007-2013 received a budget of Euro Billion 96.3. Thus, through the allocation of these funds for the period 2007-2013 for agriculture, it was targeted, that - following their implementation - the member states will benefit of a significant rural development which has a positive social and economic impact. [6]

The Romanian agriculture benefited from European Funds through the National Rural Development Programme 2007-2013. Measures were created both for vegetal and animal husbandry sectors.

Globally, livestock production (and specifically beef production) plays an important role in maintaining food supply, especially supply of high-quality protein. [5]

### MATERIALS AND METHODS

In this paper, time series have been used with regard to the evolution of bovine meat and

milk sector for the period 2007-2013 provided by Ministry of Agriculture Rural Development of Romania, Funding Agency for Rural Investment in Romania and National Institute for Statistics. The study analyzes data on milk and beef production in Romania. The research shows briefly the measures of the National Rural Development Programme 2007-2013 which influenced the evolution of the sector bovine meat and milk. The analyses have been focused at regional level and national level comparative with The European Union. They have the purpose to present the level of production in Romania compared to the European Union. Livestock and both milk and meat bovine production are analyzed in the period 2007-2013.

### RESULTS AND DISCUSSIONS

#### *I. Measures of National Rural Development Programme 2007-2013*

Measures were set up for the animal husbandry sector under Axis 1 - "Improving the competitiveness of agriculture and forestry" and Axis 2 - "Improving the environment and the countryside" of the National Rural Development Programme 2007-2013. Among these measures, the measure 121 - "Modernization of agricultural holdings", measure 123 - "Adding value to

agricultural and forestry products" and measure 215 - "Animal welfare payments" addressed the animal husbandry sector.[6]

The general objective of measure 121 was to increase the competitiveness of the agricultural sector through a better use of human resources and production factors. This measure supported investments oriented towards endowment with machineries and performing equipment in relation to current agricultural structure, as well as investments on the adaptation of agricultural buildings in order to meet community standards and increase of agricultural holdings competitiveness. Under this measure, 2,092 projects were approved, of which 61.28% addressed "crop fields" with a public contribution of Euro thousand 289,918.188 and a total investment volume of Euro thousand 655,498.911. The difference of 38.72% addresses investments from other agricultural branches. The animal husbandry sector represented 23.05% of the total of 2,092 approved projects with a total investment volume of Euro thousand 835,919.853 Euros and a public contribution of Euro thousand 325,768.853. Of these approved projects, the animal husbandry sector holds the highest share of milk and dairy products sector with a public contribution of Euro thousand 65,598.755 [11]

The main objective of measure 123 was to increase the competitiveness of the agri-food and forestry processing enterprises by improving the overall performance of the enterprises in the processing and marketing sector of agricultural and forestry products through a better use of human resources and other inputs.

Under this measure were approved many projects, of which 82.8%, that is 833 projects were addressed the "food industry" sector. The total volume of investments reached a threshold of Euro thousand 160,987.672, of which Euro thousand 61,061.346 was public contribution. Of the 833 projects for the 'food industry' sector, 127 addressed milk and dairy products, meat and meat products, eggs.

These 127 projects accounted for Euro thousand 108,654. [11]

From the two measures presented it can be seen that the animal husbandry sector is very important for the gross agricultural product, but also for the food market. The animal husbandry sector has a vital contribution in generating cash flow and economic benefits. [1]

The bovine meat and milk branch contributes specifically to the growth of the agricultural sector in Romania. It is known that globally the beef meat production covers a quarter of the meat consumption. This is why one of FAO objectives is to increase cow milk and beef meat production. [9]

European funds that have directly contributed to the adaptation of the bovine meat and milk sector targeted to strengthen production and quality. The implemented measures targeted a medium and long rehabilitation and recovery meeting rural development principles. These measures comprised the following objectives for the bovine meat and milk sector:

- to cover the quantitative and qualitative meat requirement for population consumption increasing of bovine meat and milk production;

- to compile with the European Community standards based on the granting method of subsidies standards and capitalization according to quality classes regulated by EUROP classification system for carcasses;

- to offer financial support for balancing producer selling price with the EU price;

- to launch again the bovine breeding sector in order to foster cow milk production;

- to support milk production sector for its quantitative and qualitative increase, to align it with the European Community standards for quotas;

- to provide food security of milk and dairy products for the population;

- to provide financial support for milk production, for balancing producer selling price on the same criteria as those used in the EU.

These objectives could not be achieved if it is not taken into account the fact that in Romania the activity in the bovine meat and

milk sector is traditional, mainly in the mountain area.

## II. Livestock and meat production in the period 2007-2013

Table 1. Livestock and meat production in the period 2007-2013 –

Specification	Total actual bovine (thousand heads)	Total beef production (thousand tons)	The average weight at slaughter (kilogram/head)
2007	2,819	333	280
2008	2684	306	285
2009	2512	264	287
2010	1985	205	264
2011	2130	289.3	333
2012	2164	198.5	332
2013	2197	232.6	327

Source: Ministry of Agriculture and Rural Development of Romania [7]

The period shown in Table 1 coincides with the implementation period of the National Rural Development Programme 2007-2013. The bovine meat sector is dominated by small farms. This sector is fragmented and less visible. Beef represents only 10% of meat consumption in Romania, compared to 40% the average of the European Union. [10]

The statistical data of Table 1 shows that there were 2,819 million bovines in 2007 in Romania. Since 2008 there has been an ongoing increase in the total bovine livestock until 2010. After 2010, the livestock decreased by 29.59% compared to 2007. Although EU funds were absorbed in this period, the measures that would have had an immediate impact were absorbed only by large enterprises. This did not lead to the expected increase, because the livestock is grown mainly in small farms which are not affiliated to the market and do not meet the market rules. However, this is not beneficial because the decrease is quite large, being caused by animal slaughter which were not replaced.

However, starting with 2011, it can be seen a slight increase, which lasted until 2013

included. Compared to 2007, the year 2013 recorded a decrease by 22.06% against 2007. This is due to EU funds and the measures implemented in small farms which were helped to join and enter the local market and even the EU market. The total beef production, in terms of live weight, as in the case of total livestock, decreased by 38.43% in 2010 compared to 2007. In 2013, this decrease was 30.15 % against 2007, in terms of live weight meat production of 232,6 thousand tons.

The decrease of livestock and production occurred as a result of the change of rules that had to align to the regulations imposed by the European Union. This process was not easy, but it began to show its influence since 2011 when an increase was registered which lasted until 2013 inclusively, and showed a recover of this sector.

Regarding the average weight at slaughter, it can be seen that during the analyzed period there were fluctuations, but the average slaughter weight was maintained at a similar level. In 2007, the average slaughter weight was 280 kg/head, while in 2013 it was 327 kg/head, thus registering an increase by 16.78% compared to 2007. We can say that this increase was directly influenced by EU funds that have been accessed for field crops. The improvement of the cultivation process of fodder and animal food led to this increase. Basically, the funds lead to rich cultures in terms of nutritional value. Thus, the increase of slaughter weight will result in a high yield of meat in the carcass.

At European level, beef meat production in slaughtering houses reached a threshold of 7,224.38 tons in 2013, the quantity gathered from all the 27 Member States.

In Fig. 1 given below we can see that in 2013 the highest production was recorded in France, 1,477.17 thousand tons, representing 19.48% of the European Union, followed by Germany with 15.30 %. Romania accounted for 0.40% of the 27 Member States.

In our country there has been a significant decrease in terms of beef production for slaughterhouses. If in 2007, it was a production of 211,2 thousand tons, in 2013

beef production was 29,28 thousand tons. Thus, one can observe a decrease of 86% in a relatively short period of time. This decrease is due to the fact that this sector is not financially supported by State institutions; many companies were closed and there were massive slaughters and but business man have not bought new animals for slaughter. Another reason was that the production did not meet the EU standards and large part of the merchandise could not be sold. Another equally important decrease was recorded in Bulgaria where the production was by 73% lower in 2013 compared to 2007.

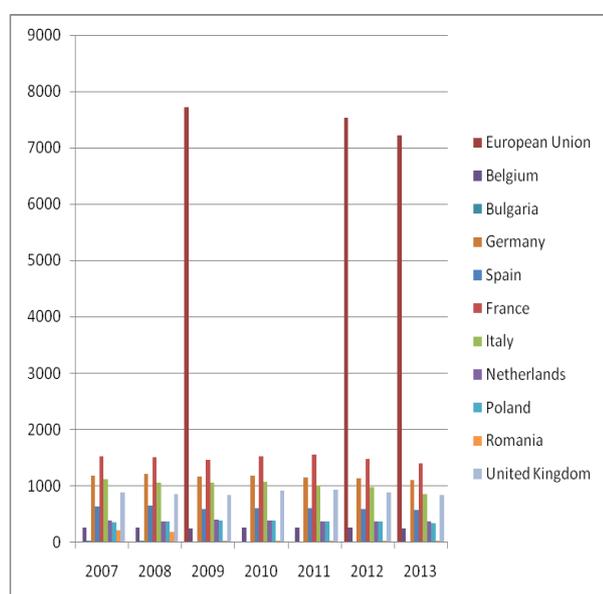


Fig.1. Slaughtering in slaughterhouses - annual data based on National Institute for Statistics, 2013 [8]

### III. Reproduction livestock and milk production

The milk sector in Romania features significant discrepancies in terms of productivity compared to EU-27. This can be explained both by the internal structure of the Romanian dairy farms (small size, high fragmentation), inadequate or defective use of production factors (human resources included), and by the current deficient institutional framework and infrastructure.[4] Similar to the meat sector, it was directly influenced by European measures. Cow milk is important because:

- it is a strategic product with special impact on children, elderly as well as on people with

various diseases rearing dairy cows, the basic occupation in the countryside and mountain areas, provides rhythmic and stable income to animal breeders;

- the support for the efficient selling of raw milk will allow investments in upgrading the technology of the activity needed to achieve verifiable high quality and high guarantee terms dairy products;

- it provides employment stability in rural and mountain areas;

- it is a certain source for trade;

- it provides for the high capitalization of fodder carried out on fodder areas in natural system (natural pastures).

Analyzing the data in Table 2, one can observe that the years analyzed resemble very much in terms of progress with the one recorded of the bovine meat sector.

The reproduction livestock recorded in 2013 a total of 1,369 thousand heads, which is actually by 20.95% smaller compared to 2007. Nevertheless, compared to 2010 a progress by 6% was recorded.

Table 2. Livestock and milk production in the period 2007-2013

SPECIFICATIO N	Unit	2007	2008	2009	2010	2011	2012	2013
Total livestock	Thousand heads	2.819	2.684	2.512	1.985	2.130	2.164	2197
Livestock birth rate		1.732	1.639	1.569	1.282	1.312	1.352	1.369
Average milk production	liters/head	3.564	3.653	3.807	2.595	3.529	3.417	3.385
Total Milk Production	thousand hectoliter	54.875	53.089	50.570	42.824	43.807	42.036	42.600
Merchandise Production	s	26.868	28.197	25.310	17.433	22.321	21.462	21.894

Source: Funding Agency for Rural Investment in Romania [3]

Regarding the average milk production, it varied from one year to another in the period 2007-2013. However, as in this case, there is an increase in the last three years, reaching in 2013 a total of 3,385 thousand liters per head and a decrease by only 5% compared to 2007, which means that the policies for milk production were assimilated more easily than compared to bovine meat.

In 2007, the total milk production was 54,875 thousand hectolitres, this year representing the maximum threshold for the period analyzed. However, in the year 2013, it decreased compared to 2007 mainly due to the decrease of total bovine livestock in Romania.

The milk price in Romania, it was quite low in 2012, the year when Eurostat identified the lowest values for our country. In the year 2012, Euro 24.89 were paid for 100 liters of milk bought from the producer, while during the same period, in Germany, the price was Euro 35.19 for 100 liters. In 2012, Romania had the lowest price in the EU.

The low price cannot bring profit to producers, moreover it hinders their ability to expand and invest in a more performing processing.[2]

## CONCLUSIONS

After Romania's accession to the European Union, it applied the market policies of the European area. At the same time, Romania benefited from EU funds through the National Rural Development Programme 2007-2013. The animal husbandry sector underwent changes that had a positive impact on the Romanian agriculture. In terms of bovine meat and milk, the effect of EU funds had no immediate impact. Only after 2010, it was noticed an increase in this sector. It was influenced by the restructuring that took place in the bovine meat and milk sector and tried to align to EU market and production standards. By implementing EU funds, Romania has tried to reduce the gap in price and production both at national level and at the EU level. In order as the funds to have even a greater impact in the bovine sector, Romania should try to make the following proposals:

- foster the organization of holdings in associations, to represent their interests in relation to input suppliers and finished goods beneficiaries;
- foster the organization of competitive and efficient holdings in the rural and mountain areas;
- increase own income and shift from self-consumption to commercial production;

- increase the reproduction livestock and birth rate in order to grow young bovine livestock for fattening and slaughter at optimal weights;
- improve heifer livestock for meat production;
- support, encourage and protect domestic product by applying the mechanisms used in the EU;

- support the balance between the processing and production sectors;

- there is the risk of livestock decrease if there is no balanced adjustment of the price ratio between the processing and production sectors;

- need for financial support in order to offset the selling price of the domestic manufacturer with the EU price;

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## STUDY ON THE ECONOMIC DEVELOPMENT OF ROMANIA'S WEST REGION

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### Abstract

*This paper highlights the economic situation of Romania's West Region for a period of five years, based on some specific indicators. The most relevant indicators which are part of the analysis of the regional economic evolution are as following: gross domestic product per capita; the turnover; the number of employees in active local units; gross and net investments. Within this scientific paper there was presented a prognosis of gross domestic product per capita, from 2015 to 2017. This macroeconomic indicator gives wide information over the economy in a region. The indicators analyzed in this study recorded oscillations from an year to another which demonstrates that the economy in the West Region is able to develop, but recording different growth rates. In comparison with other regions in Romania, the West Region will distinguish by an industrial branch that gathers almost all the areas. The development of this area is both due to direct foreign investments and qualified employees. An economic leader of the region is Timis country, followed by Arad country. West Region has a big potential of development given to the existent resources, geographic settlement and an entrepreneurial environment that is capable to transform the opportunities in profitable business.*

**Key words:** gross investments, net investments, gross domestic product per capita, West Region, turnover

### INTRODUCTION

West Region has a surface of 32034 km<sup>2</sup> which represents a percentage of 13.4% of Romania's territory. This region gathers four counties: Arad, Timiș, Caraș-Severin and Hunedoara [9, 15]. This region is remarkable because of the great number of foreign investments which had a direct contribution to regional economy development. In 2013, direct foreign investments recorded a percentage of 7.6 % in West Region, with a value of 4581 billion Euros [11]. In comparison with other developed regions, the West one had underground resources, fertile soils that contribute to a growth of agricultural production and qualified and flexible employees, being capable to adapt herself to the market's requirements [7,9,10]. The

economic and social factors as well as the geographic settlement have led to the creation of a stable and profitable business environment all over this region, as opposed to other Romanian regions [4, 6, 8].

### MATERIALS AND METHODS

In order to accomplish this study, there were obtained and processed some data from The National Institute of Statistics, The National Bank of Romania and The National Commission of Prognosis. For elaborating this paper work as realistic as possible there were consulted many studies, articles, magazines, specialized reports, mainly Romanian ones. An economic evolution within West Region was relieved through some representative indicators, as following:

gross domestic product per capita; the turnover; the number of employees in active local units; gross and net investments.

## RESULTS AND DISCUSSIONS

Macroeconomic results recorded in the West Region highlight a dynamic and attractive region for foreign investors. In table 1 is presented the evolution of GDP/capita within the West Region, during 2009–2013. The GDP/ capita report is an indicator providing probative information regarding the economic situation in a certain area [2].

Table1.Evolution of GDP/capita within the West Region, during 2009-2013 period of time (Euro/capita)

Specification	2009	2010	2011	2012	2013	2013/2009 (%)
Total Region	6042	6552	7351	7061	7617	126.0
Arad	5577	6026	6629	6448	6843	122.7
Caraş Severin	4684	5051	5752	5311	5718	122.0
Hunedoara	4724	5125	5774	5248	5686	120.3
Timiș	7906	8580	9636	9485	10276	129.9

Source: National Prognosis Commission-The projection of main economic and social indicators in Territorial Profile until 2017, November 2013; The projection of main economic and social indicators in Territorial Profile until 2015, June 2012 [12]; own calculation

In this area, the GDP/capita report recorded values higher than the national average, occupying the second place after Bucharest - Ilfov Region. In the West Region, GDP represents 50.5% of the European Union's average [16]. Analyzing the year 2013 in comparison with 2009, one could observe a growing trend of GDP/capita both at regional and county level. Counties all over the region recorded growing trends similar to this indicator, between 20.3%-29.9%. A substantial difference was recorded for GDP/capita which is expressed in Euros/capita. The highest value of GDP/capita report was in Timiș county, in 2013 (10276 Euros/capita). The growing of GDP/capita was the result of certain representative sectors that directly contribute to regional economy accession, as following: automotive industry;

services; logistics and services; agriculture [17]. In table 2 one could observe a prognosis of GDP/capita report for West Region, during 2015-2017 period of time. According to the data given by the National Commission of Prognosis, until 2017 is expected at regional level a growth of GDP/capita of 12.6%. At county level, one could observe an increasing tendency of this indicator, during the analyzed period. The growth recorded at county level will be situated between 12.2% -13.0 %. The highest values of GDP/capita are expected to be recorded in Timiș county (12739 Euros/capita) and in Arad county (8664 Euros/capita), in 2017. The lowest values are expected to be recorded in Hunedoara (7149 Euros/capita) and in Caraş-Severin (7227Euros/capita). A particular contribution to the GDP/capita growth is the one of the sectors previous specified, but one expects an expansion information technology field [17].

Table 2. Appraisals on the GDP/capita evolution within West Region, during 2015-2017 (Euro/capita)

Specification	2015	2016	2017	2015/2017 (%)
Total Region	8488	8971	9565	112.6
Arad	7661	8112	8664	113.0
Caraş Severin	6401	6774	7227	112.9
Hunedoara	6357	6719	7149	112.4
Timiș	11352	11962	12739	112.2

Source :National Prognosis Commission- The projection of main economic and social indicators in TERRITORIAL PROFILE until 2017, November 2013, www.cnp.ro [12] ;own calculation

In table 3 there could be observed the turnover's evolution in the active local units both at national and West Region level, 2008-2012. At national level, in 2012 in comparison with 2008 there was recorded a turnover of 12.3%. This indicator, during 2008-2012, recorded an oscillatory evolution. West Region, in 2012 in comparison with 2008, records a growth of 26.9% of the turnover. According to some studies given to media, in 2009, the SMEs in West Region recorded a turnover of almost 6827 billion Euros. In this region, the entrepreneurial environment was able to exploit the opportunities given by many foreign investments [16].

In this area, the turnover had a different evolution one year to another. The analysis at county level highlights that in 2012 in comparison with 2008, the turnover recorded growths with values between 3.0%- 37.5 %.

Table 3. Turnover's evolution within local active units in West Region, during 2008-2012 (RON million RON, current prices)

Specification	2008	2010	2012	2012/2008 (%)
Romania -Total	974293	922743	1094326	112.3
Macroregiune 4	134116	125285	156454	116.6
West Region, in which	75677	73221	93049	126.9
Arad	17761	18658	24425	137.5
Caraş Severin	5303	5586	6521	122.9
Hunedoara	13913	11272	14334	103.0
Timiş	36780	35270	43947	119.4

Source: National Institute of Statistics, TEMPO-Online, www.insse.ro , 2014 [14]; Highlights regional economic and social -Territorial statistics, 2010, 2012, 2013, 2014, National Institute of Statistics; own calculations

The most significant turnovers are being recorded in Timis and Arad counties where one may find numerous enterprises with foreign capital. A significant contribution to regional economy development was the one of the workforce, because it represents a high degree of specialization and flexibility. In West Region, professional qualification is assured by public educational system. It guarantees qualified people in all domains of activity [16]. It is very important to take into account the fact that within this area a great number of people who were dismissed because of the economic restructuring after 1989, were able to integrate themselves faster on labor market in comparison with other developing areas [5].

Table 4. Employees' evolution in active local units at national level and in West Region, during 2008-2012 (persons)

Specification	2008	2010	2012	2012/2008(%)
Romania -Total	4654718	3950708	4101750	88.1
Macroregiune 4	844733	717245	746019	88.3
West Region, in which	486129	417479	433597	89.1
Arad	106235	92959	97926	92.1
Caraş -Severin	46613	39035	37177	79.7
Hunedoara	106643	84888	84969	79.6
Timiş	211259	185993	196910	93.2

Source: National Institute of Statistics, Tempo-Online, www.insse.ro , 2014; National Institute of Statistics[14]; Highlights regional economic and social -Territorial statistics, 2010, 2012, 2013, 2014, National Institute of Statistics; own calculations

In table 4 is presented the employees evolution in local active units at national level and in the West Region, during 2008-2012.

In Arad and Timiş counties there were recorded the lowest decreases in 2012 in comparison with 2008: (-7.9%) as well as (-6.8%). The decrease of employees number within active local units in West Region, during 2008-2012, was the result of many causes, as following: economic crisis that led to bankruptcy of many companies; the movement of certain companies with foreign capital in other areas where the taxes are lower. The development at national and regional level could be possible thanks to private and public investments realized. Economic performance on long term is determined by capital goods acquisitions. Potential rates of growing are being directly influenced by workforce and capital [10].

In table 5 is presented the evolution of gross investments at national level and in West Region. Gross investment in 2012 in comparison with 2008 recorded a decrease both at national and regional level. A decrease at national level (-10.8%) was lower in comparison with the one recorded at regional level (-27.5%). Gross investments of active local units within this area had a different weight, one year to another, of the investments realized at national level, as following: 9.5 % (2008); 9.7%(2009); 7.3% (2010); 5.8% (2011); 7.7% (2012). The highest level of investments was recorded at regional level in 2008 (RON billion 14,189 ), and at national level in 2011 (RON billion 149,858). Within this area, the highest percentage of gross investments is the one of industrial sector, mainly auto one, followed by constructions and services ones.

Table 5. Evolution of gross investments at national level and West Region, during 2008-2012 (RON million, current prices)

Specification	2008	2010	2012	2012/2008 (%)
Romania -Total	148349	99663	132424	89.2
Macroregiune 4	23168	15221	22372	96.5
West Region, in which:	14189	7367	10289	72.5
Arad	1946	1383	1619	83.1
Caraş- Severin	1156	775	1147	99.2
Hunedoara	1681	848	1682	100.0
Timiş	7854	3748	4416	56.2

Source Highlights regional economic and social -Territorial statistics, 2010, 2012, 2013, 2014, National Institute of Statistics [14]; own calculations

In table 6 there is presented an evolution of net investments both at national level and in West Region. The analysis made during 2008-2012 highlights an oscillatory evolution of net investments at national level and West Region. At national level, in 2012 in comparison with 2008, there was recorded a decrease of 9.5% of net investments.

Table 6. Evolution of net investments at national level and West Region, during 2008-2012 (RON million, current prices)

Specification	2008	2010	2012	2012/2008(%)
Romania -Total	88279	62073	79914	90.5
Macroregiune 4	12863	9481	11956	92.9
West Region, in which	7371	4485	5870	79.6
Arad	1235	904	1114	90.2
Caras-Severin	748	450	667	89.1
Hunedoara	1084	486	638	58.8
Timiș	3681	2314	2904	78.8

Source: Highlights regional economic and social -Territorial statistics, 2010, 2012, 2013, 2014, National Institute of Statistics [14]; own calculations

At regional level, in 2012 in comparison with 2008, one could observe a significant decrease of 20.4%. This decrease is higher than the one recorded at national point, during the same period of time. In order to attract foreign investment, for increasing the economy, the legislation must be improved by offering facilities for important investors. Domestic capital should not be overlooked and in order to attract it, one should give credits and financings in proper and advantageous conditions [1].

A positive impact onto the national and regional economy is the one of direct foreign investments, type green-field. These investments were orientated, in 2013, mainly through the following activity fields: manufacturing industry (33.6%); trade (18.2 %); constructions and real estate (12.9 %); insurance and financial intermediation (11.2%). Within West Region, the percentage of these investments is 9.9 % of direct foreign investments balance [13].

## CONCLUSIONS

The economic indicator which were analyzed for the West Region of Romania led to the following conclusions:

-GDP/capita report recorded values above the national average;

-The highest value of GDP/capita report was recorded in Timiș county, in 2013 (Euro 10,276 per capita);

-The turnover recorded in 2012 in comparison with 2008, an increase of 26.9%;

-Timiș and Arad counties recorded the highest values of turnover;

-Employees from active local units had a negative evolution in 2012 in comparison with 2008. It has been recorded a decrease of 10.9%;

-Gross investments associated with active local units in the area registered a percentage that varied one year to another, of the investments realized at national level: 9.5% (2008); 9.7 % (2009); 7.3 % (2010); 5.8 % (2011); 7.7 % (2012);

-Direct foreign investments of green-field type in West Region had a contribution to the impulsion of certain activity fields.

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## RESEARCHES ON OILSEEDS MARKET IN ROMANIA

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### **Abstract**

*This scientific paper presents the evolution of oilseeds market in Romania, during the period 2008-2013. In order to show as concise as possible the reality of the oilseeds sector, the research pictures, on the one hand, an evolution of oilseeds specific indicators and on the other hand, an evolution of external trade. Romania disposes of tradition and favourable pedo-climatic conditions for cultivating the oilseeds plants. This is demonstrated by the favourable results obtained in the last years, especially concerning the sunflower crop. In 2013, Romania registered a record for sunflower, occupying the first position in the European Union for cultivated area and production. A negative aspect is represented by the fact that our country has the best conditions in Europe for soybean crop, but it is still dependent on import. Romania imports a huge quantity of soybean oilcakes for animal feeding. Nowadays, Romania is an important actor in the sunflower world market, covering almost 19% of the global demand. In perspective, one could expect significant oilseeds productions with a positive influence on the agro-food trade balance in our country.*

**Key words:** export, import, oilseeds, production, price

### **INTRODUCTION**

Oilseeds plants are those species that have seeds with significant quantities of fat of liquid form, called oils. These oils could be extracted relatively easily by industrial processes. Nowadays, worldwide we assist at a growth of global oilseeds production. This increase of production is based on the one hand on an a growth of areas cultivated with oilseeds plants, and on the one hand, on an accession of the yield per hectare due to the use of some quality hybrids. Worldwide, the most representative oilseeds producers are: the USA, China, Brazil, India, Argentina and the European Union. It is good to take into account the fact that seeds of oilseeds plants are being very good traded on the global market [10]. An important indicator that influences the world demand and supply is represented by the price over the international market. It has a strong informational consignment, being the basis of economic agents decisions [1,2,6]. Romania is an important actor over oilseeds market because it produces a significant quantity of sunflower

for export. An evaluation should be made in this context, as follows: when the domestic demand of raw materials for processing increases, exports will be reduced [10]. In this situation, one could impose an increase of yield per hectare and cultivating surfaces which are not currently being used.

### **MATERIALS AND METHODS**

In order to realize this research, there were used statistical data referring to land surfaces cultivated with oilseeds plants, their seeds productions, the average yield per hectare of oilseeds, sunflower production per capita, prices of oilseeds, import and export of oilseeds. These data were given by FOASTAT and the National Institute of Statistic. There were also consulted a series of books, magazines and speciality studies in order to show as concise as possible the evolution of domestic market of oilseeds.

### **RESULTS AND DISCUSSIONS**

In Romania, oilseeds crops register a high weight of the total cultivated area. In table

no.1 is presented the evolution of oilseeds surface in Romania, during 2008-2013. There are being analyzed three oilseeds crops, such as: sunflower; rape and soybeans. The evolution of surfaces for cultivation is surprised on three phases, as following: total; in private sector and through individual agricultural exploitations. The most widespread oilseeds surface is the sunflower one. For Romania, this crop is a traditional one and it has an important place within the European countries that cultivate sunflower. It is due, mainly, to autochthon farmers that appreciate this crop because it has a simple cultivating technology. In terms of which the market is continuous subjected to a competitive pressure, this crop corresponds to farmers' aim, as follows: cultivating certain plants with reduced costs that allow an increase of profitability [9]. One must specify that after 1989, the area cultivated with sunflower recorded a constant growth [9]. During 2008-2013, the area cultivated with sunflower varied between 766.0-1,074.5 thousands ha. The largest surface cultivated with sunflower was of 1,074.5 thousands ha, in 2013. During this year, the area cultivated with sunflower had increased with 32% than in 2008. In accordance with data given by the National Institute of Statistics, in 2013, Romania occupied the first place in European Union, concerning the surface cultivated with sunflower [20]. Romania's most favourable areas for sunflower crops are the ones in Romanian Plain, south of Dobrogea and Oltenia Plain. Within these areas, the soil is chernozem type, with high content in nutrients. Analyzing the less favourable areas, one must take into account the following: Jijiei Plain, Barladului Plateau and Transylvania Plain. Here, the soils present a reduced fertility, erosion phenomena from moderate to excessive, as well as a temporary excess or deficit of water [18].

This thing is also demonstrated by the data given by Eurostat for 2013, as following: Romania (1068.0 thousands ha); France (770.6 thousands ha); Bulgaria (751.0 thousands ha); Croatia (40.0 thousands ha); Germany (21.9 thousands ha); Austria (21.8

thousands ha); Czech Republic (21.3 thousands ha) [11]. According to statistical data for 2014, the area cultivated with sunflower has one million hectares, representing a similar level with 2013 [15]. Concerning the area cultivated with rape, it has an oscillatory evolution during the analyzed period of time. The largest surface was of 537.3 thousand ha (2010), while the smallest one was of 105.2 thousands ha (in 2012). In 2013 it had decreased over the total with 24.3% than in 2008. According to the data given by Eurostat, in 2013, the total surface cultivated with rape was of 6,732.8 thousands ha, within the European Union. Germany and France had the largest surfaces cultivated with rape [19]. There is a strong connection between the surfaces cultivated with oilseeds and the oilseeds realized production. In table 2 one could observe the evolution of oilseeds production in Romania, during 2008-2013.

In 2013, sunflower production recorded an increase with 83% than in 2008. One must present the sunflower production's evolution realized by Romania starting with 2007 when our country joined the European Union. That year, our country was on the fifth place in the top of the countries that produced sunflower, showing the tradition of sunflower crop and Romania's productive potential. In 2012, Romania had the second place after France, because it recorded a yield reduced with 18.1% than the medium one within the European Union [16]. Concerning the sunflower realized production in 2013, in accordance with the data given by Eurostat, Romania had the biggest production of the Member States. According with the data given by Eurostat, the productions realized for this year registered the following values: Romania (2,035.0 thousand tons); Bulgaria (1,802.0 thousand tons); France (1,580.1 thousand tons); Croatia (96.0 thousand tons); Austria (53.0 thousand tons); Czech Republic (49.8 thousand tons); Germany (49.4 thousand tons) [11]. The sunflower production registered in 2013 was the highest of the last three decades [15]. Sunflower supply in Romania is big, especially due to a considerable demand over

the export markets [7]. Experts draw attention on the efficiency of sunflower production in Romania: a pretty high degree it depends on the irrigation system. One could easily observe that the sunflower crop in irrigated system is more efficient than the one realized in an un-irrigated system [8]. In this case, are being advantaged the associations of agricultural producers who could support the irrigation expenditures. Small individual exploitations do not have enough money to realize some investments for the irrigation system, soil fertilization and for the application of modern technologies [4]. Rape production registered a slight decrease over fuel market.

the total, in 2013 (1.2%) in comparison with 2008. This year (2014), colza production has a value of 1.089 millions of tons, being the best harvest from 1970 to present [13]. An important aspect is represented by the fact that the colza production has an outlet market ensured, which constantly contributes to obtain positive economic-financial results among the farmers. Nowadays, worldwide, colza, corn and soybeans production surplus is used for biodiesel production, used at tractors, propelled agricultural machineries and cars. According to the 2003/30/CE EU Directive for promoting renewable fuel, until 2020 bio-fuels should cover 20% of the

Table 1. Surface evolution for the main oilseeds in Romania, during 2008-2013 (thousands ha)

Specification	2008	2009	2010	2011	2012	2013	2013/2008(%)
Sunflower	TOTAL						
	813.8	766.0	790.8	994.9	1,067.0	1,074.5	132.0
	Private sector						
	809.1	760.8	782.5	988.1	1,053.9	1,069.5	132.1
Rape	of which: Individual agricultural exploitations						
	436.3	407.3	365.6	479.3	455.1	463.6	106.2
	TOTAL						
	364.9	419.9	537.3	392.6	105.2	276.5	75.7
Soybean	Private sector						
	360.5	415.3	528.9	388.4	103.2	274.5	76.1
	of which: Individual agricultural exploitations						
	65.5	87.8	83.1	68.1	13.6	45.9	70.0
Soybean	TOTAL						
	49.8	48.8	63.9	72.0	79.7	67.6	135.7
	Private sector						
	49.4	48.1	63.0	70.6	78.3	66.7	135.0
Soybean	of which: Individual agricultural exploitations						
	10.9	13.4	14.5	14.4	32.5	28.7	263.3

Source: [ 21]; own calculations

In the field of rape crops, one should observe that it is a crop with important economic and ecological benefits [23]. The increase of oilseeds productions was also possible on the strength of supporting these crops. The main forms of support are being presented in table 3. In table 4 there is presented an evolution of medium production of oilseeds per hectare. Medium production of sunflower seeds per hectare varied between 1310-1993 kg/ha. In 2013 medium production of sunflower seeds increased over the total with 38.6% in comparison with 2008. Within the individual agricultural exploitations, the medium production of sunflower increased with 33.6% in 2013 than in 2008. In 2013, according to

the data given by Eurostat, it was obtained an yield of 1,999 kg/ha in comparison with other states in European Union that produce sunflower, such as: Austria (2,431 kg/ha); Croatia (2,400 kg/ha); Bulgaria (2,399 kg/ha); Czech Republic (2,388 kg/ha); Germany (2,256 kg/ha); France (2,050 kg/ha) [11]. Rape medium production varied between 1,357 and 2,408 kg/ha. In 2013 it recorded an increase of 30.5% than in 2013. Within the individual agricultural exploitations, medium production increased with 1.6% in 2013 in comparison with 2008. Soybean medium production varied between 1,308 and 2,345 kg/ha. The biggest production was in 2010, and the smallest, in 2012. In 2013, soybean

medium production increased with 21.9% than in 2008. Within individual agricultural exploitations, in 2013, it decreased with 16.8% than in 2008. We should remember

that Romania is the only European country that could obtain very good results for soybean crops because it has the best conditions for this plant's development [12].

Table 2. The evolution of oilseeds production in Romania, 2008-2013 (thousand tons)

Specification	2008	2009	2010	2011	2012	2013	2013/2008 (%)
Sunflower	TOTAL						
	1,169.9	1,098.0	1,262.9	1,789.3	1,398.2	2,142.0	183.0
	Private sector						
	1,163.2	1,090.0	1,248.2	1,778.0	1,379.8	2,132.0	183.2
Rape	of which: Individual agricultural exploitations						
	591.9	529.9	558.2	843.2	482.3	840.6	142.0
	TOTAL						
	673.0	569.6	943.0	738.9	157.5	666.0	98.8
Soybean	Private sector						
	663.5	563.1	925.8	730.8	153.9	661.0	99.6
	of which: Individual agricultural exploitations						
	136.8	106.5	139.3	115.6	17.8	97.5	71.2
Soybean	TOTAL						
	90.5	84.2	149.9	142.6	104.3	149.9	165.6
	Private sector						
	89.8	83.4	147.9	140.0	102.4	148.2	165.0
Soybean	of which: Individual agricultural exploitations						
	26.6	18.3	28.3	23.9	26.8	58.2	218.7

Source: [21]; own calculations

Table 3. Forms of support for oilseeds crops in Romania

Crop	Forms of support
Sunflower	-single area payment scheme (SAPS); - complementary national direct payments (CNDP); - insurance premium subsidy.
Rape	- single area payment scheme (SAPS);- complementary national direct payments (CNDP); - insurance premium subsidy.
Soybean	- single area payment scheme (SAPS); - complementary national direct payments (CNDP); - insurance premium subsidy.

Source: [22]

Table 4. The evolution of oilseeds medium production per hectare in Romania, during 2008-2013 (kg)

Specification	2008	2009	2010	2011	2012	2013	2013/2008 (%)
Sunflower	TOTAL						
	1,437	1,433	1,597	1,798	1,310	1,993	138.6
	Private sector						
	1,438	1,433	1,595	1,799	1,309	1,993	138.5
Rape	of which: Individual agricultural exploitations						
	1,357	1,301	1,527	1,759	1,060	1,813	133.6
	TOTAL						
	1,844	1,357	1,755	1,882	1,496	2,408	130.5
Soybean	Private sector						
	1,840	1,356	1,750	1,881	1,492	2,408	130.8
	of which: Individual agricultural exploitations						
	2,089	1,213	1,676	1,697	1,310	2,124	101.6
Soybean	TOTAL						
	1,817	1,726	2,345	1,980	1,308	2,216	121.9
	Private sector						
	1,817	1,733	2,349	1,983	1,308	2,220	122.1
Soybean	of which: Individual agricultural exploitations						
	2,434	1,364	1,943	1,656	822	2,027	83.2

Source: [21]; own calculations

In table 5 there is presented the evolution of sunflower seeds production per capita, in Romania. This production varied between 53.9 and 107.2 kg. The lowest production per capita was of 53.9 kg in 2009, and the highest one was of 107.2 kg, recorded in 2013.

One could observe an increase of production per capita in 2013, with 87.7% than in 2008. In table 6 there are presented the prices for the main oilseeds in Romania, during 2008-2012. The price is an important variable in forming and influencing the consumption demand, in order to establish the volume and value of sales related to agricultural producers. Within the market economy, the price could influence the qualitative nature of the market, as well as its quantitative specific dimensions [3]. Rape's price oscillated between RON 970 and 1,830/tonne. The lowest price was being recorded in 2009, and the highest one, in 2012. In 2012, the price rose by 52.5% in comparison with 2008. The price for sunflower was situated between RON 880 and 1,880 per tonne. In 2012, the price was by 57.9% higher than in 2008. The price for soybean varied between RON 960 and 1,710 per tonne. The price for soybean rose in 2012 by 76.2 % compared to 2008.

In table 7, one could observe an evolution of Romanian oilseeds export, during 2008-2012. The exported quantity of sunflower seeds varied between 471.3 and 1,182.8 thousand tons.

In terms of value, the year 2011 registered the highest income from sunflower seeds export (USD thousands 707,058). The lowest income from sunflower seeds export was recorded in 2009 (USD thousands 203,316). According to the data given by the Romanian Centre for Trade and Foreign Investment Promotion, in 2011 the value of sunflower export on the world market was Euro billion 2.7.

An important aspect is that over Euro Billion 500 represented Romania's contribution. We must specify that Romania contributed by 18.8% to the sunflower global exports. Almost 50.0% of the export global sunflower supply is assured by Romania, Bulgaria and France.

In 2011, the main outlets of Romania's sunflower production were: Holland (Euro

thousand 90,854); Turkey (Euro thousand 87,132); Pakistan (Euro thousand 74,038); France (Euro thousand 71,416); Hungary (Euro thousand 47,833); Italy (Euro thousand 28,141); Spain (Euro thousand 22,281) [14].

Rape quantitative export varied between 564.0 and 1,052.3 thousand tons. Rape value export had values situated between USD thousand 311,561- 443,233. In 2011, Romania exported rape in many countries, the most representative being: Belgium (Euro thousand 106,278); Holland (Euro thousand 56,486); Hungary (Euro thousand 35,245); Germany (Euro thousand 32,070); France (Euro thousand 23,223); Israel (Euro thousand 7,207); Slovakia (Euro thousand 4,487) [14]. Soybean quantitative export varied between 10.4 and 72.7 thousand tons.

The most significant soybean exported quantity was registered in 2011. Soybean value export had values between USD thousand 4,233- 39,524.

In 2011, global soybean exports were of almost Euro billion 33. Also, this year, the weight of Romania's soybean exports was insignificant, only 0.08%. In 2011, Romania exported soybean in many countries, such as: Syria (Euro thousand 8,586); Italy (Euro thousand 6,256); Hungary (Euro thousand 4,344); Germany (Euro thousand 3,985); Bulgaria (Euro thousand 1,988); Turkey (Euro thousand 1,050); Austria (Euro thousand 449).

One should observe that there are market that recorded important growths concerning the import demand, but Romania from various reasons, was not one of the providers. Representative markets with growths of 100% for the import demand, in 2011, were: Tunisia; Slovenia; Saudi Arabia; Belarus; Israel [14]. In table 8 it is presented the evolution of Romania's oilseeds imports, during 2008-2011. The quantitative import of sunflower varied between 89.5 and 237.3 thousand tons, and the value one oscillated between USD thousand 76,617 and 198,374. The sunflower import was smaller in comparison with the export. Rape quantitative import varied between 70.4- 241.0 thousand tons, and the value one was between USD thousand 39,205 and 116,896.

Table 5. The evolution of sunflower seeds production per capita in Romania, during 2008-2013

Specification	2008	2009	2010	2011	2012	2013	2013/2008 (%)
Sunflower	Production per capita (kg)						
	57	53,9	62,4	88.8	69.7	107.2	187.7

Source:[ 21]; own calculations

Table 6.Prices evolution at producer level for oilseeds in Romania, during 2008-2012 (RON/tonne)

Specification	2008	2009	2010	2011	2012	2012/2008 (%)
Rape	1,200	970	1,250	1,620	1,830	152.5
Sunflower	1,190	880	1,220	1,640	1,880	157.9
Soybean	970	960	1,230	1,310	1,710	176.6

Source: [21]; own calculations

Table 7. Evolution of Romania's oilseeds exports, during 2008-2011

Specification	2008		2009		2010		2011	
	Quantity (thousands tons)	Value (thousands USD)						
Sunflower	471.3	281,801	564.2	203,316	557.4	284,790	1182.8	707,058
Rape	564.0	362,014	782.1	311,561	1052.3	443,233	577.2	380,140
Soybeans	38.9	19,858	10.4	4,233	36.9	17,554	72.7	39,524

Source: [17]; own calculations

Table 8. Evolution of Romania's oilseeds imports, during 2008-2011

Specification	2008		2009		2010		2011	
	Quantity (thousands tons)	Value (thousands USD)						
Sunflower	89.5	76,617	141.0	101,330	208.2	145,553	237.3	198,374
Rape	76.3	52,701	70.4	39,205	241.0	116,896	70.6	69,842
Soybeans	94.3	55,699	20.7	10,997	15.6	7,947	34.3	18,020

Source: [17]; own calculations

The quantitative import of soybean oscillated between 15.6 and 94.3 thousand tons, and the value one was between USD thousand 7,947 and 55,699. Romania imports soybean from Brazil, Argentina and USA. We import: soybean; almost 500 thousand tons of soybean oilcakes for animal feeding; 4 thousand tons of soybean oil. In terms of value, soybean and soybean products imports have a value of over 150 million euro, as opposed to 36 million from exports [12]. A negative aspect is represented by the fact that Romania exports soybean as raw material, which leads to cashing some small amounts of money. In order to increase the competitiveness of oilseeds sector in Romania, are required the following [6]:

- The increase of yield per hectare;
- The increase oilseeds quality;

- The increase of mechanization degree for agricultural works and the increase of labour productivity;
- The increase of oilseeds processing degree;
- The increase, at national level, of oilseeds storage capacity;
- Procedure's modernization regarding oilseeds processing;
- Attracting foreign investments;
- Granting loans to producers, in favourable conditions;
- Reducing the costs for oilseeds production and processing and so on.

## CONCLUSIONS

Oilseeds market in Romania is characterized by the following tendencies:

-The increase of surfaces cultivated with sunflower on the strength of favourable pedo-climatic conditions and of global demand ones;

-The area cultivated with colza, during the analyzed period of time, had an oscillatory evolution, with a decrease of 24.3 % in 2013 than in 2008;

-The increase of surfaces cultivated with soybean, in 2013, with 35.7% than in 2008;

-Oilseeds productions registered in 2013, opposite to 2008, different evolutions, such as: sunflower (+83.0%); rape (-1.2%) and soybeans (+65.6%);

-Medium productions per hectare increased, in 2013 in comparison with 2008, for the analyzed oilseeds categories within this study;

-Prices established by producers increased for oilseeds, in 2013 than in 2008, as following: rape (+52.5%); sunflower (+57.9%); soybeans (+76.2%);

-The oilseeds export increased both from quantitative point of view and in terms of value in 2011 than in 2008;

-During the analyzed period of time, there were imported oilseeds and oilseeds products, even if our country has favourable conditions for oilseeds development.

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## ISSUES CONCERNING THE TYPOLOGY OF RURAL TOURISTIC PENSIONS FORM MARGINIMEA SIBIULUI, SIBIU COUNTY, ROMANIA

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### Abstract

*The study was conducted in May-June 2013, in two places in the tourist area called "Mărginimea Sibiului", Sibiu, Romania. The research instrument used was a questionnaire comprising 25 questions and was sent to the owners / managers of pensions (18 people) by 9 people from rural places Sibiul and 9 people from Gura Râului. According to data from Sibiu County Tourism Association, in Sibiul there are recorded 40 tourist structures, and in Gura Râului, 22. Data from the field were processed, systematized and interpreted. The overall objectives were: establishing typology of tourist structures, knowing the comfort of pensions, the average capacity of accommodation, the average length of stay. Special attention was given to the knowledge of the main sights of natural and anthropogenic existing and surrounding area. Improving in pensions an infrastructure for sport as a means of leisure was another objective of the research. We also were interested in issues related to the average age of tourists, their backgrounds, insofar there is demand for sports. We wanted to see if the pensions are serving traditional products and cuisine and their origin. Another goal pursued was related to the education level of owners / managers of pensions, their satisfaction in relation to the results achieved, difficulties encountered in the current work, and how to promote services and products. The paper presents some ways to promote rural tourism in Sibiu.*

**Key words:** agrotourism, events, traditional products, rural tourism

### INTRODUCTION

„Mărginimea Sibiului” is a unique ethnographic area in Romania comprised of 18 villages, located in the mountains. [4, 10] Localities have developed a mixed economy based on agriculture, livestock farming, traditional crafts and especially sheep breeding. With time, Mărginimea Sibiului became an important point of Romanian rural tourism, here are numerous pensions developing that can provide the conditions needed to spend a memorable stay. [1] A lot of authors consider that tourism is very closely related to the civilization, culture, economy and environment protection. [6, 7] Typical countryside atmosphere, traditions, habits and hospitality of the villagers which are kept untouched increase the attractiveness

of these places. Tourist Network consists of hotels, motels, complex, rural guesthouses, farmhouses, cottages and other utilities make these places to be searched in all seasons. [3, 9]

The pastoral economy [5], specific folk traditions, arts and cultural festivals - local, national and international-, „Mărginimea Sibiului”, Romanian costumes, hospitality, architecture and authentic cuisine Romanian make Sibiu a particular area. A rich fish and cynnetic fauna, flora nature conservation objectives are of great scientific interest for those who love.

Environmental and human tourism resources of Sibiu, as a prerequisite for the development of this field generates specific forms of tourism that completes each other in the different types of destinations: bisezonal

mountaineering; spa tourism; cultural tourism; urban tourism; rural tourism and agrotourism. [2, 8]

## MATERIALS AND METHODS

The study was conducted in May-June 2013, in two villages from Mărginimea Sibiului: Sibiul and Gura Râului. The research instrument used was a questionnaire to owners of guesthouses, which was completed by 18 people: 9 pensions owner in Sibiul and 9 owners of pensions in Gura Râului. The interview was conducted by a single interviewer. Data from the field were processed, systematized and interpreted.

General objectives: knowing the comfort of pensions, the average capacity of accommodation, average length of stay, main sights of natural and anthropogenic existing settlements, and existing infrastructure for sports.

## RESULTS AND DISCUSSIONS

From the official dates it is known that in this area there are more than 100 of rural pensions. [11, 12] Purpose of the research was to see if in rural tourist pensions and agrotourism in places in Mărginimea Sibiului exist request and demands on sport activities and leisure.

After processing and systematization of data from sociological survey conducted in 2013 in 18 pensions in the localities Sibiul and Gura Râului, Sibiu, was performed following interpretation of the results:

Most of the villages in the area have retained strong spiritual traditions and ethno-folk.

Although progressive modern buildings have replaced the old traditional, atmosphere in Mărginimea Sibiului remained unchanged.

Based on the natural and human tourism resources in Sibiu were developed following forms of tourism: mountain bisezonal, spa, cultural, urban, rural tourism and agrotourism. In Sibiu there are five ethno-folk areas.

There is an extensive ongoing program of sustainable tourism development in Sibiu, short and medium term. Doing the careful exploration, specialized socio-economic

effects and ecological tourism phenomenon was elaborated optimal strategy and viable which gives the guarantee of a real and a revival benefit of all types of tourism of Sibiu. Due to the complexity of strategies and programs set, we summarize only to review those measures, actions and targets aimed at Mărginimea Sibiului, as a prerequisite for continuous improvement of rural tourism.

The main objectives of this program are to develop and upgrade tourism offer represented by natural and human resources; promotion of tourist product of Sibiu domestic and international; providing skilled labor; increasing the quality of tourism services; establish and promote active collaborative relationships with related sectors.

Summary of processed data in a study of pensions in localities Sibiul and Gura Râului in 2013:

-Related to initiate tourism both Sibiul and Gura Râului most pensions owners have completed a course in tourism (> 77,7%);

-On motivation and maturity of this activity is noted the tradition for this occupation for owners from Sibiul, having a seniority, while in Gura Râului this occupation is more recent, most owners practicing this craft with passion.

-Comfort level of pensions included in this study is higher in Gura Râului, where only 22,2% of them are classified 2 daisies, the remaining 77,8% having 3 daisies or 4 stars compared to pensions from Sibiul where 66,6% of pensions in the study were classified with 2 daisies;

-Average of available accommodation places is close to the 2 locations in the study giving an average of about 17 seats available for accommodation / tourist structure;

-The typical length of stay in Sibiul is 2-3 days while in Gura Râului the typical length ranges from 2-3 days for the 36,4% of pensions to 7 days in 9,1% of tourist structures, where the main activity is the tourism school and during the summer season being carried out numerous camps for school;

-Predominant age category is 35-50 years, so if Sibiul village and commune Gura Râului;

-For both area, natural resources are most prevalent, but the two cities and tourist presents anthropogenic resources (cultural and historical).

-Location in the mountains of the two towns offer tourists the opportunity to explore so closely mountain areas by organizing hiking and recreation opportunity or recovery from stress accumulated in the urban area for tourists seeking rest;

-Most popular 3 tourist attractions in Sibiel, according to pension owners are Museum of icons on glass "Pr Zosim Oancea "Salgo, Castle and Hermitage" Sibiel", and in Gura Râului the most popular attractions are the dam and lake situated on river Cibin, Natural Reserve "Iezerele Cindrelului" and Cheile Cibinului. Also important in this localities are the two churches: small church dedicated to the venerable "Mother Paraskeva" church dedicated to "St. Archangels Michael and Gabriel", also called "Gura Râului cathedral";

-Regarding the relationship between Romanian and foreign tourists in Sibiel are more foreign tourists (in 55,6% of pensions) and in Gura Râului 88,8% of owners surveyed stated that the balance tilts in favor of Romanian tourists;

-From the point of view of local events in Gura Râului stands out an activity more intense; in the village there are two festivals already well known, "Peony mountain" and „Fusion Festival”, followed by Day of popular costumes, while Sibiel are popular local events like holidays - Feast offering, winter holidays, celebration of Midsummer and traditional wedding event organized on request;

-In Sibiel only 33,3% of owners believe that local events attract more visitors in pensions, while in Gura Râului the owners - 88,8% - consider that the local events attract visitors all the time. They consider that this is also a good way for the promotion of the area;

-Regarding the existence of craftsmen in these localities are found painted glass icons workshops, craft which is prevailing in Sibiel, there are also weavers in both Sibiel and Gura Râului, a forge who still works in Gura Râului, a woman who performs arrangements

with feathers for young men, a small bakery where they make traditional bread both in Gura Râului, a pumpkin seed mill for oil that works in some periods of the year, but this workshops are not visited very often. A large part of Gura Râului owners do not consider that they are sufficiently developed and that would have great impact on tourists, instead in Sibiel, all owners of pensions organize such visits for tourists;

-Leisure possibilities are very similar for the two cities included in the study, both offering guests the opportunity to hike in the mountains, carriage rides/sledge, equitation - better represented in Sibiel - cycling, table tennis, rummy, chess and backgammon. People can meet Romanian evenings with local band and dancers or opportunity to know the different habits of Mărginimea Sibiului. They make visits to artisan workshops, picnics, campfires, ATV rental;

-Regarding the demand for sports tourists, 66,6% of the owners of pensions in Gura Râului states that there is demand, particularly from the Romanian tourists and in Sibiel 44,5% of them stated that there is demand for such activities. The same percentage of owners in both areas – 88,8% offers the possibility of practicing sport activities in the pensions; the most popular activities are walking with the cart / carriage / sleigh, in both locations, followed by hiking;

-In Gura Râului there are land sports opportunities, billiard game, archery and also there is the possibility of access to swimming pool, jacuzzi and massage, and at Sibiel, horse riding and cycling tourism are better represented and may climbing performance;

-In Gura Râului 66,6% of the pensions have dedicated facilities for sporting activities: tennis sports (tennis/ football / volleyball, etc..), swimming pool, jacuzzi, billiards, table tennis, dedicated space in the garden for shooting with spring. Sibiel has the same percentage of 66,6%, which designate the pensions without special places for play and the only sort of space is arranged for tennis tables;

-As age group, 55,5% of tourists who prefer sports activities fall within 20-35 years in

Sibiel, and in Gura Râului the most represented category is 35-50 years, who prefer such activities in a proportion of 42,8%;

-Products and traditional cuisine offer is wide, so if Sibiel pensions and in the case of the Gura Râului. Thus, 88,8% of pensions offer tourists traditional products such as dairy and meats of the region. Vegetables or fruit from traditional varieties and preparations such as fruit jam, pickles or vegetable stew or compote are offered to a lesser extend;

-Most owners of pensions are supplying these products from local producers and a smaller percentage of producers in other areas and shops;

-Regarding the opportunity to expand, a significant percentage of owners said they did not want to even expand: 54,5% - in Sibiel, 33,3% - in Gura Râului;

-The best ways of expansion are represented by organizing local events, increasing the number of seats available for agrotourism accommodation or orientation - when we talk about Sibiel.

-For the owners of pensions from Gura Râului the main possibilities of extending are: the arrangement of pools or a spa center, arrangement of green spaces, the building of larger dining rooms, followed by increasing the number of seats available for agrotourism accommodation and orientation;

So are Sibiel pensions and those in Gura Râului. The most common way of promoting products and services is the Internet, followed by working with travel agencies. A smaller number of pensions use leaflets, brochures, flyers, advertising space in magazines and tourist guides. It is particularly popular a kind of advertising "word of mouth" as a way to promote;

-Satisfaction of the owners of pensions is high both for the Sibiel – 88,8% and in the case of the Gura Râului – 7,7%;

-The main difficulties faced by owners of pensions are: very demanding tourist in terms of accommodation conditions; irresponsible tourists, especially younger ones; unpaved portions of the village that make access difficult or due to excess dust that rises

compel owners to numerous action cleaning windows, doors exposed to road; lack of support from the state; lack of a common strategy in the ministry to the level of pensions to attract foreign tourists, there is no collaboration with the municipality; too short tourist season: from May to September; low level of awareness of Romanian tourists bound for genuine values; insufficient promotion zones; long and steady effort from the owners; lack of free time; lack of reliable peoples among employees.

## CONCLUSIONS

To better promote tourism in Sibiu, rural tourism and agrotourism, we believe the following:

-Develop new promotional material for the media (articles, radio and TV), web pages, editing of brochures, booklets, catalogs, brochures, posters for the tourist offer in the mountainous area of the county, rural tourism and agrotourism in Marginimea Sibiului. Organize in Sibiu a Tourism Fair for Transylvanian area and attending to domestic and international tourism fairs.

-Involving students from Sibiu faculties in promotional activities by specialty practice, rural tourism, ecotourism and agrotourism.

-Arranging exhibitions themed tourist (of all types) in educational institutions at all levels in Sibiu.

-Organizing camps for students to practice ecological tourism with maximum benefits for both humans and for nature, not only in Mărginimea Sibiului, but in all tourist areas of the county.

-Support establishment of micro private farms of the pupils and students in the purpose of tourism and environmental education.

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## ECONOMIC TOURS IN ISRAEL

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### *Abstract*

*The purpose of this paper is the economic promotion of tourism circuit between Romania (Bucharest) and Israel (Tel Aviv and Jerusalem), unique and blessed area in the world because here was born the Lord Jesus Christ and also our religion: Christianity. It wants also presenting significant sights in Israel which, financially, would be visited at very competitive rates for Romanian tourists, making, in this way, important discounts.*

*Key words:* economy, financial, promotion, tourism, tourists

### INTRODUCTION

Israel, officially *the State of Israel*, is a country in Western Asia, situated at the southeastern shore of the Mediterranean Sea. It shares land borders with Lebanon to the north, Syria in the northeast, Jordan on the east, the Palestinian territories comprising the West Bank and Gaza Strip [17] on the east and southwest, respectively, and Egypt and the Gulf of Aqaba in the Red Sea to the south. It contains geographically diverse features within its relatively small area. [7][8] Israel's financial center is Tel Aviv, [11] while Jerusalem is the country's most populous city and its designated capital, although Israeli sovereignty over Jerusalem is not recognized internationally. [10]

On 29 November 1947, the United Nations General Assembly recommended the adoption and implementation of the Partition Plan for Mandatory Palestine. The end of the British Mandate for Palestine was set for midnight on 14 May 1948. That day, David Ben-Gurion, the Executive Head of the Zionist Organization and president of the Jewish Agency for Palestine, declared "the establishment of a Jewish state in *Eretz - Israel*, to be known as the State of Israel," which would start to function from the termination of the mandate.[11][12][13] The borders of the new state were not specified.

Neighboring Arab armies invaded the former Palestinian mandate on the next day and fought the Israeli forces.[14][15] Israel has since fought several wars with neighboring Arab states,[11] in the course of which it has occupied the West Bank, Sinai Peninsula (1956–1957, 1967–1982), part of South Lebanon (1982–2000), Gaza Strip and the Golan Heights. It annexed portions of these territories, including East Jerusalem, but the border with the West Bank is disputed. [17][18][19] Israel has signed peace treaties with Egypt and with Jordan, but efforts to resolve the Israeli–Palestinian conflict have so far not resulted in peace. [6]

The population of Israel, as defined by the Israel Central Bureau of Statistics, was estimated in 2014 to be 8,904,373 people. It is the world's only Jewish-majority state; 6,110,600 citizens, or 75.3% of Israelis, are Jewish. The country's second largest group of citizens are designated as Arabs, with 1,686,000 people (including the Druze and most East Jerusalem Arabs).[21][22] The great majority of Israeli Arabs are settled Muslims, with smaller but significant numbers of semi-settled Negev Bedouins; the rest are Christians and Druze. Other minorities include Maronites, Samaritans, Dom people, Black Hebrew Israelites, other Sub-Saharan Africans, [23] Armenians, Circassians, Roma and others. Israel also

hosts a significant population of non-citizen foreign workers and asylum seekers from Africa and Asia.

In its Basic Laws, Israel defines itself as a Jewish and Democratic State. [3] Israel is a representative democracy with a parliamentary system, proportional representation and universal suffrage. [2] The Prime Minister serves as head of government and the Knesset serves as Israel's legislative body. Israel is a developed country and an OECD member, [24] with the 43rd-largest economy in the world by nominal gross domestic product as of 2012. The country has the highest standard of living in the Middle East and the fifth highest in Asia, [24] and has one of the highest life expectancies in the world. [1][9]

## MATERIALS AND METHODS

Israel is considered one of the most advanced countries in Southwest Asia in economic and industrial development. In 2010, it joined the OECD. [26] The country is ranked 3rd in the region and 38th worldwide on the World Bank's Ease of Doing Business Index as well as in the World Economic Forum's Global Competitiveness Report. [24] It has the second-largest number of startup companies in the world (after the United States) and the largest number of NASDAQ-listed companies outside North America. [23]

In 2010, Israel ranked 17th among the world's most economically developed nations, according to IMD's World Competitiveness Yearbook. The Israeli economy was ranked as the world's most durable economy in the face of crises, and was also ranked first in the rate of research and development center investments. [24]

The Bank of Israel was ranked first among central banks for its efficient functioning, up from 8th place in 2009. Israel was also ranked as the worldwide leader in its supply of skilled manpower. The Bank of Israel holds \$78 billion of foreign-exchange reserves. [24] Despite limited natural resources, intensive development of the agricultural and industrial sectors over the past decades has made Israel

largely self-sufficient in food production, apart from grains and beef. Imports to Israel, totaling \$77.59 billion in 2012, include raw materials, military equipment, investment goods, rough diamonds, fuels, grain, consumer goods. Leading exports include electronics, software, computerized systems, communications technology, medical equipment, pharmaceuticals, fruits, chemicals, military technology, and cut diamonds. In 2012, Israeli exports reached \$64.74 billion. [24]

- ITINERARY: Bucharest - Tel Aviv - Haifa - Caan – Tiberias - Nazareth - Capernaum - Tabgha – Tiberias - River Jordan - Bethlehem - Jerihon - Dead Sea - Ein Karem - Jerusalem - Bucharest
- Price: from 500 euros/ person
- Duration: 7 days
- Departures: 13.06.2014, 10.10.2014.
- Total distance traveled by plane: 3191km

Visit Stella Maris Monastery, the altar above the cave lie Tishbite prophet. We look Bahai Temple Cult, church sits on the site of the house of Simon the Zealot, where he spent the miracle of transforming water into wine. Nazareth. We visit *Mount of Beatitudes*, the Catholic Church where Jesus made *multiplication of loaves and fishes miracles* [20].



Fig. 1. Israel map

## RESULTS AND DISCUSSIONS

### *Price Analysis*

#### *Services included (for 500 euro/person).*

- Transport tickets Bucharest - Tel Aviv - Bucharest with the company El Al;
- Assistance (Tel Aviv) at the airport on arrival;
- 6 nights' accommodation with breakfast at 3 and 4 stars hotels: 2 nights in Tiberias, 2 nights in Bethlehem, 2 nights in Jerusalem;
- Modern bus transportation (air conditioning) for execution of the program;
- Inputs to the objectives specified in the program;
- Local guides - Romanian speaking the main objectives in Bethlehem and

#### *Services not included*

- Airport taxes (obligatory): 145 Euro / person (subject to change)
- Shuttle bus Mount Tabor (required): 5 EURO/person
- Tips (compulsory in Israel): 30 EURO / person (for local guides, drivers, restaurants and hotels) are paid on the spot local agency representative,
- Medical insurance: 10-20 EURO
- Cancellation insurance (optional end with signing the package holiday trading)

#### *Total approximate price: 695 EURO/person.*

To qualify for discounts, trip must be paid in full upon registration [28].

#### *Overview itinerary*

*Day 1:* Bucharest - Tel Aviv - Haifa - Caan – Tiberias.

Meeting at Otopeni International Airport “Henri Coanda” at 8 o'clock with attendant group. After customs formalities, boarding the El Al flight bound for Tel Aviv, departing at 10:45; landing at Ben Gurion Airport at 1:20 p.m. Continue on the shore of the Mediterranean to Haifa, splendid port city, located in a large bay at the foot of Mount Carmel. Visitation Monastery Stella Maris (Star Sea), the altar lie above the cave Proorocului Tishbite . We look Bahai Temple Cult, with garden terraces suspended. Arrive at Tiberias, dinner and overnight at Hotel Baal four.

*Day 2:* Tiberias - Nazareth - Capernaum -

Tabgha - Tiberias

After breakfast, Departure to Cana, where we will visit the church sits on the site of the house of Simon the Zealot, where he spent the miracle of transforming water into wine. Nazareth. Visit the Orthodox Church of St. Gabriel the source of Mary, painted in 1977 by brothers Morosanu Annunciation Catholic Church, the largest religious building in the Middle East. Mount Tabor. Visiting Greek Orthodox Church, built on the site where it happened Transfiguration (minibus transfer: 5 Euro/ person, to be paid to the agency). Departure to Capernaum - called City of God. Visit the famous place where Jesus preached, the Holy House. Peter, Tabgha, where Jesus multiplying the loaves and fishes and made in this way a miracles. Mount of Blessing, visit the Catholic Church. Depending on time and temperature, optional ride - Cruising with a copy of "Jesus boat" on the waters of Galilee (target price: 10 EUR/ person) and visit Capris - factory gold and diamonds. Overnight at hotel with 4\* in Tiberias.

*Day 3:* Tiberias - River Jordan - Bethlehem

Breakfast. Descend on the river Jordan to the Yarden, arranged place of Baptism. We enter in the future Palestinian state, visiting in Bethlehem Nativity Church and Crypt “where God became man” for our salvation (here is an icon of the Virgin Mary "guard Bethlehem" miracle). Continue to St. Catherine Roman Catholic Church (where the Christmas Liturgy officiate, which airs on the plateau in front of the church and around the world on TV) and the Milk Grotto where the Holy Family to Egypt stopped running. Optionally, continue in the wilderness of Judea to the monastery of nuns of St. Theodosius (sec.VI), shuttle buses Arab in the "heart" of the desert to visit the impressive Monastery of St. Sabbas the Sanctified (IV) consider to be among the oldest in the world with a continuous monastic life, where for centuries women have access. Target price: 10 EUR / person. Go to Jerusalem. Visit Mount Zion, to Church of the Assumption Virgin, Tower “Last Supper” (where it was built the first Christian church in the world), Tomb of the Great King David. Visit the Jewish holy

city, the Cardo ("Boulevard" novel) and the Western Wall. Overnight at Hotel Shepard 4\* in Bethlehem.

*Day 4: Bethlehem - Jerusalem - Bethlehem*  
Breakfast. Climb on Mount Scopus to see the top view of the Holy City and the Citadel. *Mount of Olives*. Visit Pater Noster Church ("Our Father"), the Garden of Gethsemane Nations Church, Church of the *Virgin Tomb* and the Cave of Gethsemane. We enter in the city through the Gate of St. Stephen. Scroll down Avie Dolorosa with the 14 stations where Jesus stopped on the Way of the Cross, to the Holy Sepulchre. Climb to Calvary Anointing Stone, visiting holy chapels. Visiting the Romanian church in Jerusalem. Overnight at hotel in Bethlehem (optional 18 € - payment on the trip, gala dinner buffet with drinks and music).

*Day 5: Bethlehem - Jerihon - Great Marta*  
Breakfast. Go to town Jerihon, the oldest city in the world with the opportunity reenter the area "West Bank", the future Palestinian state. Visit the Church and Romanian Hous. Carantania on the Moun, where Jesus was tempted by the devil. Down to Jordan, visit the Greek Orthodox Monastery of St. Gerasimos of Jordan (sec.VI). Continue to the Dead Sea (- 400 m above sea level), the lowest over the world, and we arrive at Qumran (the old center of the Essenes). Short stop at cosmetics shop and restaurant cafeteria. Depending on time, stop at the Dead Sea (30 minutes). Overnight at Hotel Jerusalem Gate 4 in Jerusalem.

*Day 6: Ein Karem - Jerusalem*  
Breakfast. Visit Ein Karem - home of St. John the Baptist. Visitation Church and the crypt where he was born "the greatest man born of a woman". Fountain of the Virgin Mary, the place of meeting his cousin Lady Elizabeth. Tel Aviv, visit the historical area of the city of Jaffa, Greek Orthodox Church of St. Michael and St. Peter Catholic Church. Short walk to the Mediterranean Sea. Return to Jerusalem. Overnight hotel in Jerusalem: *Jerusalem Gate 4*.

*Day 7: Jerusalem - Bucharest*  
Breakfast. Farewell visit to the Church of the Holy Sepulchre. Free program by the holy

city. Go to Lud, ancient Lydda visit the Church of St. Gheorghe, where the relics belt and chain that was linked. Continue to Ben Gourion Airport for departure formality for the country. Boarding the El Al flight to Tel Aviv, departing at 18:10. Arrival in Bucharest at 21:00.

#### *Jerusalem*

Jerusalem is the most-visited city with 3.5 million tourist arrivals annually. One of the oldest cities in the world, it is the proclaimed capital and largest city of Israel, if the area and population of East Jerusalem are included. It is a holy city to the three major Abrahamic religions-Judaism, Christianity and Islam, and hosts a myriad of historical, archaeological, religious and sundry other attractions. [27]

*East Jerusalem* was captured by Israel in the 1967 *Six-day War* and considered by the international community as being under Israeli occupation, although it was annexed in 1980 under the Jerusalem Law. It is the location of:

- *The Old City of Jerusalem*, traditionally divided into four quarters: Armenian Quarter, Christian Quarter, Muslim Quarter and Jewish Quarter. Most importantly, the Temple Mount (known in Arabic as Haram ash-sharīf, the Noble Sanctuary), site of the ancient Temple in Jerusalem with only the Western Wall at its foot remaining, and now with the Dome of the Rock and Al-Aqsa Mosque.
- *The Mount of Olives and Kidron Valley*: with its lookout point, Tomb of Absalom, and other Jewish tombs and burial grounds dating back 3000 years, and churches, Gethsemane, church of all nations, Dominus Flevit, and the Church of Maria Magdalene (Russian orthodox church). Various locations have been proposed as the Tomb of Jesus, traditionally identified as where the Church of the Holy Sepulchre stands. Nor has Golgotha, the nearby hill where he was crucified been located. Immediately south of the Jewish Quarter lies the City of David with archaeological digs including Hezekiah's Tunnel. [24]

West Jerusalem was built mainly after the creation of Israel in 1948. Selected tourist attractions within this area are:

- *The German Colony*, a Temple Society settlement, with a colorful mix of architectural styles.
- *Mea Shearim*, established in the nineteenth century and inhabited largely by ultra-Orthodox Haredi Jews.
- *Yad Vashem Holocaust memorial museum*.
- *Ein Karem*, the traditional birthplace of John the Baptist, is one of the four most visited Christian pilgrimage sites in Israel.[11]
- *Mt. Zion*, the traditional resting place of King David.
- *Mt. Scopus*, site of the Hebrew University and standing at 2710 feet above sea level, offers a panoramic view of the city. Both the Temple Mount and the Dead Sea are visible from this location.

*Tel Aviv*

With 2.7 million tourist arrivals in 2011, Tel Aviv is Israel's second-largest city, and a cosmopolitan, cultural and financial global city. [21] The city's greater area is the largest with 3 million inhabitants. Tel Aviv exhibits a UNESCO world heritage area of Bauhaus architecture. The nearby historical city of Jaffa is experiencing a touristic boom. In 2010, National Geographic ranked Tel Aviv as one of the world's ten best beach cities.

Tel Aviv is called the "city that never sleeps" by the locals because of its vibrant nightlife scene. Tel Aviv was named "the gay capital of the Middle East" by the Out magazine.

*Safed* is one of the four holy cities in Judaism, where much of the Jerusalem Talmud was written and kabbalah (Jewish mysticism) was developed. Famous for its artisans. The grave of Rabbi Shimon bar Yochai is in nearby Meron. [4]

*Akko*- Old City and its Knights Hall Place of Bahá'u'lláh as well as a UNESCO world heritage historical town.

*Haifa*- its terraces, and the World Centre and the buildings (a UNESCO world heritage).

*Tiberias* - is one of the four holy cities in Judaism, overlooking the Sea of Galilee.

Saint Peter's house at Capernaum, Tabgha and the Mount of Beatitudes.

*Nazareth* - is known as the 'Arab capital of Israel'. Visit: Nazareth's old city and historical sites around the city; Jesus's hometown and the site of many of his reported acts and miracles; many churches, including The Church of the Annunciation, the largest Christian church building in the Middle East. In Roman Catholic tradition, it marks the site where the Archangel Gabriel announced the future birth of Jesus to the Virgin Mary (Luke 1:26-31).

Table 1. The most visited sites

Listing	Site	2008 Visitors <sup>[5]</sup>	2012 Visitors <sup>[52]</sup>
1	Jerusalem Biblical Zoo	687,647	752,000
2	Masada	721,915	724,000
3	Zoological Center of Tel Aviv-Ramat Gan	581,800	713,000
4	Caesarea	713,648	670,000
5	Banias	430,531	561,000
6	Ein Gedi		471,000
7	Hamat Gader	500,000	440,000
8	Yamit 2000 in Holon	412,533	431,000
9	Coral World Underwater Observatory in Eilat	458,000	423,000
10	Qumran	389,291	377,000

*Beersheba*. Settlement of Beersheba attributed to the patriarch Abraham; regional capital of the Negev desert. It serves as a starting point for exploring such sites as the Ramon Crater or the UNESCO world.

*Eilat* - Israel's southernmost city, located on the Red Sea coast, is a hot, sunny year-round travel destination. Popular destination for skin and scuba diving, with equipment for hire on or near all major beaches, the Eilat Mountains

are similar to those in Sinai and there are trail roads for hiking, you can also find animals like: Dorcas Gazelle, Rock Hyrax, Stripped Hyena and Nubian Ibex. Eilat has big hotels and various attractions such as camel riding, Kings City and the Eilat's Underwater Observatory Marine Park.

*Ashkelon* is a city between Gaza City in the Gaza Strip and Ashdod, the city offers many some hotels and Mizrahi Jewish restaurants, there is also a local Arak drink called Arak Ashkelon, pretty famous around Israel.

Tel Ashkelon is a big archaeological site, includes ruins from many different periods such as Canaanites, Philistines, Persians, Phoenicians, Greeks, Romans, Byzantines, Muslims and Crusaders.

The sand dunes between Ashkelon to Ashdod and between Ashkelon to the Gaza Strip are popular attractions on this area of the sea coast. [24]

## CONCLUSIONS

Tourism, especially religious tourism, is an important industry [5] in Israel, with the country's temperate climate, beaches, archaeological, other historical and biblical sites, and unique geography also drawing tourists. Israel's security problems have taken their toll on the industry, but the number of incoming tourists is on the rebound. [24] In 2013, a record of 3.54 million tourists visited Israel with the most popular site of attraction being the Western Wall with 68% of tourists visiting there. [23]

Israel has the highest number of museums per capita in the world. [25]

A travel agency should always know what are the tourists' *orders* and to create an offer of products and services to be consistent to the tourist market. [16]

So either way planned trip or just weekend, long term or tourist circuit, as in our case, travelers should have as much information about offers and locations to which their attention.

A package tour to Israel can be achieved constantly at good prices for both, tourists and companies promoting this kind of tourism.

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## ANALYSIS OF THE SERVICES ROLE IN THE RURAL DEVELOPMENT OF ROMANIA

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### *Abstract*

*Services include a highly heterogeneous range of economic activities which are characterized by different manufacturing processes, different delivery modalities, service providers and consumers with different behaviors, various market structures. The main characteristic features of the service are: immateriality and intangibility; unable to be stored; simultaneity of production and consumption; inability to be sustainable; inseparability of the services provider and the person of the user; heterogeneity; lack of properties. The study of various classification systems is particularly interesting for understanding the nature and diversity for services, analysis of different systems applicable to services and their evolution over time, and the correlations between services and other economic activities they serve. The market has very different characteristics depending on the type of service, level of competition, and the state can intervene in the market for the normal conduct of market mechanisms. Regulation can take three forms: technical regulations, administrative and price controls. It was also treated the issue service in rural areas by providing classification and analysis in some ways.*

**Key words:** activities, rural development, labor productivity growth of economy, indicators, services

### INTRODUCTION

Services development in recent decades has imposed an intensification of theoretical and practical concerns in this area in an effort to help understand the most efficient services in both urban and rural environments. Currently the economy of services is still regarded as a further pioneering research space incompletely explored territories. In an effort to help understand the issues more efficient services in general and their application in rural areas, was born the idea of this research content of services, while evolution researchers thought the services, the role and actions of services in the contemporary economy, demand service and quality.

### MATERIALS AND METHODS

As research methods, we used documentation, the analysis and data processing from a secondary analysis. These methods are based on the synthesis processes, induction and deduction, analogy and comparative analysis. Once the information was defined, known and

interpreted, the next step was the detailed documentation of the interest area. In the analysis activity, the study of the documentation available for the area or for the analysed system is a starting point. This allows in the analysis to obtain the first knowledge and information. The documentation implied also the analysis of the legislation or the compared analysis of the various specialised sources.

### RESULTS AND DISCUSSIONS

Due to the development of services, especially in recent decades, it requires more theoretical concerns in this area. The concept of services is surprisingly complex, raising issues arising mainly from their intangibility; measurement of output and value added relative pricing, intermediate consumption and final determination and related services that benefit and its outcome are unrepeatably and service consumer is actively involved in the production process [2]. The researches of the economists in modern economy concluded that the service is no longer considered an

unproductive activity. The production of one service involves conducting a production process involving resources (human, material, financial and informational), the quantities

produced ( $q$ ) depending on the quantity and quality of economic factors involved (in the most general expression - labor factor  $L$  and capital  $K$  factor).



Figure 1.1. - Services, the result of a production process

The researchers concluded that services are the result of a production process, this is achieved by the intervention of inputs in the production process according to the technology adopted and output of the process that are different categories and types of services.

The researchers tried to find a way of defining the concept of service as a high degree of validity.

This resulted in a number of definitions which, although perfectly valid for certain categories of services, presents essences for other categories of services.

This is not because of economists inability to find a “gold” definition generally valid, but the diversity and heterogeneity of classes, fields, formula and procedures under which the services occurs in economic universe [7].

The main characteristic features of the service are: immateriality and intangibility; unable to be stored; simultaneity of production and

consumption; inability to be sustainable; inseparability of the services provider and the person of the user; heterogeneity; lack of properties.

The services include an extremely heterogeneous range of economic activities, which are characterized by different production processes, different delivery methods, providers and consumers with different behaviors, different market structures.

The characteristics of services have implications for their economic properties. Miles [5] used the term "features" to distinguish them. Some of the peculiarities of the service sector are summarized in Table 1. The classification distinguishes between products, services, production processes, markets and producer-consumer relations.

Table 1. Services particularities

Product-service	Immaterial/intangible; Intensive in information; Difficult to store and transport; Great diversity; Perfectly adapted to customer needs; Input value is given by labor; Not compete each other; Product quality depends on the quality of the consumer; Processes and products are difficult to be distinguished; Is difficult to protect the intellectual property; are easily imitated; Reputation is crucial.
Production services	Immaterial; Similar craft; Intensive to working; “Custom made”; Economies of scale low, intermediate materials Input a lot or very little; Included in other productions, apparently without motivation for change / transformation; intensive involvement of the user - heterogeneity.
Market services	The services have use value, but not for exchange; Co-production producer-consumer, trading and consumption can not be separated; distribution in closed networks; You cannot transport; The difficulty of ownership; Perishable, easy to copy; negligible marginal cost of production; Without market price; Price is direct compensation for labor input; Public and Professional Regulation.
Service consumption	Trust in user-producer relationship; Simultaneous production and consumption; Consumption and production in the same place; Utility of the consumer; Satisfy desires psychological.

Source: adapted from Miles (1995) [2] and Sundbo(1994) [4]

The researches of economists have shown that not exist a single definition but regard them as system utilities, in which the beneficiary buys or uses one product and a certain utility that gives them certain benefits or satisfactions, not materialized, in most cases as material and designed to meet personal and social needs.

American Marketing Association defines services as follows: "Services are activities, benefits or utilities that are offered on the market or provided in association with the sale of a good material" [7].

Philip Kotler [3] specialist in marketing offers in turn meaning that "the service is any activity or benefit that one side can offer to another, which is generally the result of which intangible and does not require ownership of a material good."

In past it was said that the services are an obstacle to economic growth, being an inflation factor since higher wages and profits would not correspond to an increase in productivity.

New economic theories reconsidering the role of services in economic development, reviewing the conception of economic growth. Thus, some countries have begun to focus on the service sector, such as Switzerland case that does not invest in industry (except dairy industry, watches and sweets) because it is more expensive and the amortization is slow, and increase service quality. Research undertaken in doctoral thesis sought to highlight the role of services in the Romanian economy in the last 3-4 years (2009-2012). In the absence of a synthetic indicator capable of expressing activity in the sector and enable comparability with other sectors or countries resorted to approach from different angles and that the contribution of employability services to the global effort of economic development. I took care to: employment in services by activities; the labor productivity per person and economic activities; their contribution to the creation of gross domestic product (GDP) and gross and net investments in this dynamic field, and the place over other branches.

The analysis of total population indicators in the economy, the employment in services and its share of the total economy and

modification time allowed correlating human efforts with a number of economic indicators synthetic economy (GDP Total and GDP of Services). Thus mentioned are reflected in data calculated and interpreted in Table 2.

In the analyzed period 2010-2012, the employment in services increased from 3.766 thousand persons in 2010, in 2011 to 4.364 thousand persons and for the year 2012- 4.486 thousand persons. The increase had a significant dynamics of 15.8% in 2011 and 19.1% in 2012 compared to 2010, resulting that only in three years the employments in services increased by 20%, which is explained by the appearance of small firms occurred in all services.

The share of services in total employment in the economy increased from 44.9% in 2010 at 52.1% in 2011 and 52.3% in 2012, representing an annual growth rate of 1% to 7%. It appears that to all service activities (Table 1) it was recorded a continuous employment growth. Exceptions are following services: service production and supply of electricity, thermal energy, gas and air conditioning that decreased by 7%, financial and insurance service decreased by 4.3% and health and social service decreased by 7.9% of total employment.

An increase of 15 % was registered by the employment in services in the field of information and communication, hotels and restaurants in the analyzed period.

The share of employment in services in the employment in the economy increased from 44.9% in 2010 to 52.1% in 2011 and 52.3% in 2012. This reflects the fact that since 2011 the employment in services exceeded by 52% the employment in the national economy, reflecting the role and size influence on employment services in these activities. Employment structure looks as follows: trade 13.8%, transportation and warehousing 5%, education 4.6% and health and social assistance 4.4%.

Other services contributed by 2.5 to 1.4% to the employment in the economy.

Labour productivity per employed person by economic activity increased from Lei 48,958/person in 2008 to Lei 53,370/person in 2011.

Compared to 2008, the annual labor productivity increased by 0.3% in 2009, 4.2% in 2010 and 5.4% in 2011. In 2010, the labor productivity in the economy was Lei 50,934 per person. Particularly suggestive is labor

productivity growth by sector. In the primary sector (raw materials) of economy, labor productivity was 20.2%, five times smaller than in the economy as a whole.

Table 2. The number of employed people in the national economic activity( end of year)(thousands people)

No.	Activity (CAEN Rev.2.Section)	Year			Dynamics (%)			Structure(%)		
		2010	2011	2012	2010	2011	2012	2010	2011	2012
	Total	8,371	8,366	8,570	100	99.9	102.3	100	100	100
1	Agriculture, feorestry, fishing	2,440	2,442	2,510	100	100	102.8	29.1	29.1	29.2
2	Industry	1,537	949	968	100	61.7	62.9	20.7	20.9	20.5
3	Extractive industry	(65)	(65)	(65)	100	100	100	0.7	0.7	0.7
4	Manufacturing industry	(1,472)	(884)	(903)	100	101.5	96.4	17.5	17.8	17.6
5	Constructions	628	611	606	100	97.2	96.4	7.5	7.3	7.0
<b>SERVICES</b>										
6	Production and supply of electricity, gas, steam and air conditioning	73	61	68	100	97.2	93.1	0.8	0.8	0.8
7	Water distribution: salubrity, waste management and decontamination activities	123	123	123	100	100	100	1.4	1.4	1.4
8	Whole sale and retail trade;repair of motor vehicles and motorcycles	1,140	1,157	1,178	100	101.4	103.3	13.8	13.6	13.7
9	Transport and storage	426	434	447	100	101.8	104.9	5.0	5.1	5.2
10	Hotels and restaurants	133	138	154	100	103	115.7	1.5	1.6	1.7
11	Information and communication	134	136	153	100	101.4	114.1	1.6	1.6	1.7
12	Financial and insurance	133	130	114	100	99.7	85.7	1.5	1.5	1.3
13	Real estate	31	30	32	100	97.6	106.6	0.3	0.3	0.3
14	Professional, scientific and technical	156	161	166	100	100	100	1.8	1.9	1.9
15	Activities of administrative services and support services	204	228	258	100	111.7	126.4	2.4	2.7	3.0
16	Public administration and defence; social insurance of public	204	197	192	100	96.5	94.1	2.4	2.3	2.2
17	Education	390	385	391	100	98.7	100.2	4.6	4.6	4.5
18	Health and social care	406	374	374	100	92.1	92.1	4.8	4.4	4.3
19	Arts, entertainment and recreation	63	59	62	100	93.6	98.4	0.7	0.7	0.7
20	Other service activities	150	130	168	100	86.6	112	1.7	1.5	1.9
21	Employment in services	3,766	4,364	4,486	100	115.8	119.1	-	-	-
22	Percentage of population employed in the economy	44.9	52.1	52.3	-	-	-	-	-	-

Source:National Institute of Statistics.Own processing.

In the **secondary sector** (manufacturing industries) labor productivity was 42.3% higher than the total economy. In the **tertiary sector** (services) labor productivity was 4.7 times higher than the level achieved throughout the economy. The increase is significant for the services sector, the result of several factors: the development of private property, the potential for small and medium enterprises (SMEs) that can be placed in all cities, villages investment requiring much lower than in the secondary sector. Essentially, the data presented reflect the net superiority of labor productivity in the service sector, which influences importance of

work productivity in the economy. If at the level of economy productivity was Lei 50,934 per person, in the service sector was Lei 239,143 per person.

Tabel 3. Labour productivity per person employed by economic activities

(Year)	Measurement units	Total economy	Primary sector	Secondary sector	Tertiary sector
	2010	Lei/ pers	50,934	10,315	72,491
	%	100	20.2	142.3	469.5

Source: National Institute of Statistics CAEN REV 2. 2010 and own processing

Macroeconomic dimensions of the services sector can be reflected out of employment and

structure of service contribution to the creation of GDP in Table 4.

In the period 2008-2012, it is found that to all services recorded an increased value and percentage contribution to GDP, except trade services whose contribution to GDP fell from Million 99,593.8 in 2008 to Million 68,757.6 in 2012, meaning a decrease by 31%. Information and communication services have increased by 4% in the analyzed period. The largest increases in GDP value had real estate transactions by 51% and, respectively, 83%, followed by the professional services activities of administrative services. Gross domestic product including all the services increased from Lei Million 306,204 million in 2008 to Lei Million 342,073 in 2012, respectively 11.7% of GDP compared to the first year of the analysis. The statistics showed a very high relatively stable share of services in GDP as follows: 59.4% in 2008; 58.9% in 2009; 56.8% in 2010; 56.5% in 2011; 58.2% in 2012.

It was concluded that the population employed in the service indicators and GDP of service exceeded by 50% in 2012. Employment in services exceeded by 52% in 2012 as a share of total economy and participation in services GDP reached 58.2%.

Statistics on global economy showed that one country which has a higher level of development, the most significant part of employment is in the field of the services. For examples: in the U.S.A, Canada, Switzerland, employment in services represents up to 73% of total employment in the economy.

There are other elements which contribute to some sensitive differences due to the internal structure of the economy and structure of the tertiary sector.

In Romania, the increase of services volume provided for population responds to the dynamic objectives of the new requirements on the reproduction of labor. The scope of services must adapt flexibly to the progress taking place in accordance with the different consumption needs at different stages in the development of our society.

Modern economic theories have returned to the role of services in economic growth,

recognizing the key role that they play today in achieving economic and social progress.

Thus, the service functions fall between the activities of the most important creative material and spiritual wealth. Among these the following functions are observed: research and development, education (professional training), maintenance (maintenance), supply and storage, distribution, use potentiation product management and recycling. These functions includes, with differences depending on the nature of the products up to 80% of their total costs.

On the other hand, heterogeneity makes different services benefits not just contribute to economic growth, dividing services from this point of view: labor intensive (staff) and intensive knowledge (intelligence).

Consumption of services is an important indicator of life quality, there are significant differences about budget coefficients services (which expresses the share of expenditure on services in total household consumption expenditure) among different countries and socio-professional categories, determined by differences in terms of real income of the population.

The network services – leisure aimed in the both sides to use the services being involved in both leisure's growth and to create conditions for leisure and spending it.

The relations services - environment is reflected both in damage (through various forms of pollution) and to the protection of them by: land reclamation, forest furnishings, cleaning services, sanitation etc. and last but not least, the productive and ecological education of end users. The service sector consists of a wide variety of activities that are found in all economical and social sectors, bearing the imprint of their specificity. Due to the heterogeneity of services is necessary to classify them.

Enrolling in one expression of both the provision of services to industrial and non-industrial, a phenomenon frequently encountered in the literature, complicating the delimitation of rural industry activities from other activities.

Table 4. Analysis of gross domestic product by category of resources ( Lei Million / current prices)

No	Indicators	GDP					Dynamics %				
		2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
1	Agriculture, forestry and fishing	34126.4	32297.8	29874.2	36341.6	28638.1	100	94.4	87.3	106.4	83.8
2	Extractive industry; manufacturing industry; production and supply of electricity, water distribution; salubrity, waste management, decontamination activities	118239.8	120637.4	148553.1	160643.4	165747.0	100	101.6	125.4	135.5	139.8
3	Construction	56130.6	52809.4	47762.3	44950.3	50292.5	100	94.1	85.0	80.0	89.4
	<b>SERVICES</b>										
4	Wholesale and retail trade; repair of motor vehicles and motorcycles Transportation and storage; hotels and restaurants	99593.8	94359.5	69740.4	63038.1	68757.6	100	94.7	70.0	63.3	69.0
5	Informations and communications	20047.9	19520.6	17811.8	18975.9	20821.9	100	97.5	89	94.5	104
6	Financial and insurance	11407.3	11250.1	11681.0	14010.7	14390.6	100	98.2	101.7	122.8	125.4
7	Real Estate	31671.5	32699.0	46250.9	46888.8	48057.4	100	103.1	146.2	148.1	151.8
8	Professional, scientific and technical services; activities of administrative services and support services	19739.5	20044.0	24716.8	31050.5	36239.5	100	101.5	125.3	157.3	183.7
9	Public administration and defense; social security insurance; education, health and social care	55789.9	55668.2	56607.7	55872.5	61473.0	100	99.8	101.6	100.1	110.2
10	Entertainment, cultural and recreation activities; repair of household goods and other services	11788.8	11693.1	13398.8	15961.4	17694.6	100	99.1	113.6	135.8	150.4
11	Gross value added	458535.5	450979.1	466397.0	487733.2	512112.2	100	98.2	101.7	106.3	111.7
12	Taxes on products	56415.6	50442.9	57516.7	67503.5	72082.7	100	89.3	101.9	119.6	127.6
13	Duties on imports of duty	1192.3	923.2	1958.6	2678.4	2878.9	100	77.4	172.7	236.3	254.5
14	Subsidies on products	-1443.4	-1205.8	-2179.0	-566.9	-323.9	100	-85.7	-150	-39.2	-22.3
15	Gross domestic product	514700.0	501139.4	523693.3	557348.2	586749.9	100	97.4	101.7	108.3	114
16	Gross domestic product per capita (lei)	25061.0	24604.9	25865.5	27663.2	29197.4	100	98.4	103.2	110.4	116.4
17	Gross national income	499783.1	494328.7	517278.7	550058.4	576205.6	100	99.7	103.6	110.2	115.4
18	Gross Domestic Product - Services	306204.0	295395.0	297504.0	315414.0	342073.0	100	96.4	97.1	103.0	111.7
	The share of services in total GDP in the economy	59.4	58.9	56.8	56.5	58.2	-	-	-	-	-

Source: National Institute of Statistics.

Own processing.

This allows us to make delimitation and formation of homogeneous groups with specific characteristics. From this point of view there are three main groups:

**-Provision of industrial services** which are included in the scope of rural industry;

**-Provision of services for agriculture** including those provided by the owners of tractors and agricultural machines to the third parties, specialized technical assistance;

**-Provision of services for rural population** which include: human dispensary work,

passenger transport, energy distribution for domestic consumption etc.

## CONCLUSIONS

Desiring to further the understanding better how the whole service area arose the idea of this research on the role of services in rural development of our country.

Services include an extremely heterogeneous range of economic activities, which are characterized by different production processes, different delivery methods,

providers and consumers with different behaviors, different market structures.

Developments in recent decades justify characterizing the economies of developed countries such "economies to the services". Researches undertaken in this paper have tried to highlight the role of services in the Romanian economy in the last six years. In the absence of a synthetic indicator capable of expressing activity in the sector and enable comparability with other sectors or countries resorted to approach the contribution from different angles and that the degree of engagement of services in the global effort of economic development.

There were taken into consideration:

-employment in services activities, which increased its share in the national economy from 44.9 to 52.3% in 2010-2012. Analyzed in dynamic, population services increased in the last 3 years from 15.8 to 20% in the analyzed period;

-their contribution of services to the creation of gross domestic product (GDP) showed significant variations, ranging between 59.4 and 58.2%. The analysis revealed major changes to some services.

Their share fell slightly in the period 2008-2011, characterized by global economic crisis. However, during this period there noticed structural changes between services of the main sectors, in favor of professional, scientific and technical activities, the administrative and the support services.

The analyses of scientific research revealed the other three relationships: service consumption is an important indicator of life quality; the relationships services - leisure; relationship between services and the environment through damage of him (with various forms of pollution and protecting him), by land reclamation, forestry facilities, cleaning services, salubrity and not least ecological education for service users.

Continuous increase of services quality is a goal, an essential condition of existence in markets with strong competition. Continuing emphasis on competition raises special problems to producers of services and fast adaptation to new conditions is vital.

Provisions of services in rural areas are divided into: industrial service, services for agriculture and rural population service.

Supplies of services for the rural population include: water distribution, exhaust of wastewater, distribution of natural gas, distribution of thermal/electric energy, transport and communications (in various forms - telephone, internet, mail, TV), health services, education, tourism (the accommodation, food, entertainment, hunting, cultural, information, intermediation).

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## WAYS FOR DEVELOPMENT OF RURAL COMMUNITIES IN VALCEA COUNTY

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### *Abstract*

*Compilation of the ways for developing a county level, helps to: create a vision about community that we want in the future, provide a complete picture of how the economy, environment, infrastructure can improve the county to set development goals and priorities that are reflected in measures to achieve the objectives. Also, the development of these paths of development may underlie a guide for improving community life and to reduce disparities. In this work we performed analysis of investment programs that benefit local communities in Valcea County in the period 2008-2016. Finally, the County development strategy based on RDP measures was set up for the period 2014-2020.*

**Key words:** rural development, paths, services, development strategies

### INTRODUCTION

At the macroeconomic level (national, regional, county, municipal) and microeconomic level (economic agents with and without legal personality), establishment of socio-economic development pathways is required for different time horizons.

It should be noted that the development of socio-economic ways for Valcea county aimed at maximizing resource efficiency and local communities to develop a vision of the future in the sense of helping them in guiding economic and social development [4].

Starting from the Romanian rural settlements need to adapt to EU requirements, by promoting efficient sectors in rural and economically viable and socially strategies established the main directions for development of rural infrastructure.

### MATERIALS AND METHODS

As research methods, we used documentation, the analysis and data processing from a secondary analysis.

Once the information was defined, known and interpreted, the next step was the detailed documentation of the interest area. In the analysis activity, the study of the

documentation available for the area or for the analysed system is a starting point. This allows in the analysis to obtain the first knowledge and information. The documentation implied also the analysis of the legislation or the compared analysis of the various specialised sources.

### RESULTS AND DISCUSSIONS

The ways of development at county level for the next period (2014 - 2020) is based on RDP measures, conditions in the county in early 2014, the use of available resources and attracted (projects from European funds) to reach the destination set. It is a condition of action and effective involvement of all stakeholders at all levels of Romanian society. The ways of development and development strategy of Valcea county must respond effectively and promptly to the increasingly rapid changes in the economic environment to internal and external circumstances, the constraints generated by EU Member. Thus, the visions are built for short and medium term (annual) which harmonize the requirements with the development of Euro-Atlantic integration of Romania. Economic and social development of Valcea county to increase living standards

and conditions of the entire population of the county is a priority of the current round. Major directions for achieving this objective is reflected in the development and modernization programs, especially in rural areas of Valcea county, road infrastructure and technical improvements in the education system, social services, health and other services at both qualitative and quantitative level [4].

The principles of sustainable development strategy refers to:

Sustainability in the sense of better living conditions for the population in general and especially for the disadvantaged population and minimum conditions for a decent life, health and welfare of all;

Competitiveness which involves developing their economy Valcea county in the regional, national and even international, promoting a competitive private sector. Competitiveness is achieved by several factors: quantity (output per hectare), quality (healthy and uniformity), production cost, effective marketing.

Financial support to facilitate access to a variety of financial resources to meet the needs investment and development;

Good governance through efficient and effective response to issues and empowering local communities and partnership with civil society [5].

The overall objectives [3] sustainable development strategy of rural communities in Valcea aims:

-improved quality of life and diversification of the rural economy;

-strengthening rural households;

-increasing the competitiveness of the food;

-improve the environment and the countryside;

Specific objectives are following:

1.European Integration - embodied in increasing absorption of grants to local councils in Valcea county, through measures:

-corresponding improvement project portfolio development priorities of projects;

-grant co-financing projects and ongoing;

-improvement of qualifications for civil servants in order to establish sustainable funding application.

2.Entrepreneurial environment - objective resulted in the continuation of facilities to investors in terms of its benefits to the local budget and the nature of the work (exemption from taxes on legal grounds, land concessions).

3.Development of one diversified agricultural sector and performance (quantity, quality, sales price) through measures to support agricultural extension services, technical and logistic support for farmers to achieve viable projects to obtain grants leading to the modernization of farms; measures to enable land consolidation; prevention and combating soil degradation sources and the environment.

4.Sustainable management of forest since the county forestry holds 52.5% of the total Valcea county. This can be achieved by monitoring forest logging activities, measures to encourage traditional industrial processing but wood; measures to increase forest areas and improve forest management.

5.Promoting tourism services and tourism given the outstanding natural resources for spa tourism. Applying this measure is based on the existence of a potential tourist attractiveness that aims to encourage and foster the integration in the county and on the market of tourist-oriented businesses for domestic and international tourism circuits and allowing it reasonable accommodation. For Romania a largely agricultural country, but with a diverse cultural and natural heritage, rural tourism is a viable alternative in Valcea, still underexploited. Linked to the development of rural crafts of the region will allow for additional income for the rural population. The last two decades have emerged and developed two popular tourist category Leisure in the countryside: rural tourism and ecotourism.

The Agritourism help highlight the availability of accommodation of the homestead prepared and arranged suitable for receiving guests; dining services and other complementary activities dependent on natural and economic context of the homestead (for leisure activities, teaching in

traditional occupations, horse riding, fishing, therapeutic cures ionizing etc.).

The Ecotourism is becoming more evident a type of tourism appreciated natural areas of local communities. This form of tourism can provide much needed revenue for the protection of national parks and other natural areas and generating additional revenue for part of the rural population with low incomes.

6. Promoting local industry and crafts by: supporting the small industry, encouraging craft activities (crafts of pottery, making of traditional and folk).

Their implementation will allow the development of employment in rural areas and population growth rate employment.

At Valcea County level, after the trends of guidelines rural development plan 2004-2013, in terms of synthesis investment projects and external funding for analyzed period in our research is 2010 - 2013. Most of the projects have set deadlines for completion by the year 2016, resulting in the designation of the project, program type and stage of the project document (approved, implemented, completed evaluation). Economic indicators show refers to the total project value, the total eligible project, the eligible reimbursable structural funds/cohesion, payments and implementation period [4].

Table 1. Classification and investment programs in urban and rural areas in Valcea County between 2008 - 2016

No	Environment Action urban rural	Type of program	Number of projects	%	Of the total county %	Total value of project lei	% of total	Grant eligible amount of Structural Funds Cohesion lei	% of total
1	URBAN-	POR	41	87,2		641.705.116		454.095.698	
2		PNDR	-	-		-		-	
3		POSM	1	2,1		303.001.790		122.328.782	
4		POSDRU	-	-		-		-	
5		PODCA	3	6,4		1.322.418		1.124.054	
6		POSCCE	1	2,1		17.467.814		12.477.009	
7		Cross-border cooperation	1	2,1		300.150		255.127	
<b>TOTAL</b>			<b>47</b>	<b>100</b>	<b>46,2</b>	<b>963.797.288</b>	<b>59,4</b>	<b>590.280.670</b>	<b>54,3</b>
8	RURAL	POR	10	19,2		254.295.365		177.542.280	
9		PNDR	34	65,3		210.391.593		204.290.041	
10		POSM	1	1,9		7.676.120		-	
11		POSDRU	5	9,6		5.406.399		4.481.437	
12		PODCA	2	3,8		1.450.766		1.238.567	
13		POSCCE	-	-		-		-	
14		Cross-border cooperation	-	-		-		-	
<b>TOTAL</b>			<b>52</b>	<b>100</b>	<b>50,9</b>	<b>479.220.243</b>	<b>29,5</b>	<b>387.552.325</b>	<b>35,6</b>
15	URBAN RURAL	POR	2	0,6		1.829.991		1.177.031	
16		PNDR	-	-		-		-	
17		POSM	1	0,4		177.618.128		108.007.960	
18		POSDRU	-	-		-		-	
19		PODCA	-	-		-		-	
20		POSCCE	-	-		-		-	
21		Cross-border cooperation	-	-		-		-	
<b>TOTAL</b>			<b>3</b>	<b>100</b>	<b>2,9</b>	<b>179.448.119</b>	<b>11,1</b>	<b>109.184.991</b>	<b>10,1</b>
<b>GRAND TOTAL</b>			<b>102</b>	<b>100</b>	<b>100</b>	<b>1.625.465.640</b>	<b>100</b>	<b>1.087.017.986</b>	<b>100</b>

Source: National Institute of Statistics [1, 3] and own processing

The analysis of these indicators was done through a series of classifications based on certain criteria. Classification of foreign funds investment programs in Table 1 was made by

grouping them by areas: urban, rural, urban/rural in their types of programs. Of the 102 projects, 46.2% were allocated to urban areas, totalizing Lei 963,792,288 representing

59.4% of the total projects. For rural area the programs accounted for 50.9% of the county, with a total of Lei 479,220,243 which represents 29.5% of the total value of projects in the county, which shows that projects with lower values are due work to be done.

The 102 projects made in the period 2008-2016 are at various stages (Table 2) -7

approved projects (6.8% of all projects); in evaluation - 2 projects (1.9%); in implementation - 49 projects (48%); completed - 44 projects (which SAGEM 43.1% of the total of 102 projects) that over 90% of Valcea county projects are completed and implementation stages.

Tabel 2. Projects classification after program stage

No	Approved		In evaluation		In implementation		Completed	
	Number of programs	%	Number of programs	%	Number of programs	%	Number of programs	%
1	7	6,8	2	1,9	49	48,0	44	43,1

Source: own processing

Classification of investments after the completion - Shows that the total number of projects, 2.9% were set to be completed in 2010, 12.7% in 2011, 11.7% in 2012, 17.6% in 2013, 18.6 % in 2014, 20.5% in 2015, 0.9% in 2016, 16 projects did not specify the year of completion.

As a result of investigations carried out in the county Valcea found to be necessary to achieve a balance between the different dimensions of sustainable development: environmental protection, human and social development, economic development. Various improvements in the quality of life are the only achievements of the projects that have been accessed by local leaders and rural entrepreneurs may risk social dysfunctions. The human and social development in rural communities ensures improvement of living conditions, the accessibility to social services and public goods, social and physical capacity transmission to future generations. Human development is based on 5 projects for rural POSDRU all to prepare some additional activities to develop new, easier labor employment, inclusion and economic development in mountain and foothill areas.

Estimation and evaluation of completed projects presented is based on the specific measures implemented in rural communities in Valcea and characterized by: local specific natural conditions, social and citizens' own needs; social specificity resulting from the

collaboration of key institutions rural; evaluation of projects implemented.

Was concluded by the importance of modernizing rural infrastructure projects resulted in:

- a)road infrastructure upgrading and expanding the road network in communes and municipalities, execute a lateral water collection system, asphaltting the main roads in the village, the execution of farm roads;
- b)urban infrastructure: water supply network to almost all households in the village, sewerage system and water treatment, landfills, waste collection services, rehabilitation of street lighting;
- c)communication infrastructure: evaluation of current public transport system and increasing the number of vehicles according to needs and opportunities for student transportation;
- d)educational infrastructure: especially by improving the quality of buildings, halls and energy resources through proper planning of the amounts required in the municipalities; number is seven projects with a value of 3% of the total and 6.6% of the eligible amount;
- e)health infrastructure modernized through qualitative improvements needed hospitals, medical facilities and staffing and auxiliary;
- f)social infrastructure is achieved by upgrading the educational system has adequate space for social activities (nursing homes, orphanages, social support awareness organizations and companies in organizing charitable activities) socially vulnerable;

g)infrastructure and public order and civil protection by increasing the efficiency and quality of public relations, joint activities with the local police station to prevent and detect crime;

h)reducing and preventing pollution are based on a number of issues and standards established and harmonized with those of Europe, were aware of the problems and environmental education primarily educational institution;

i)public administration reform that although it is a secondary objective must at all times maintain the materialized in upgrading relations between the mayor and citizens through training of officials to increase the capacity to manage the funds.

From these elements on the achievements of the previous period and current programs, Valcea county level strategy must consider "Socio-economic rural development perspective for 2014-2020" by the managing authority of the Ministry of Agriculture and Development Rural planned for the National Rural Development Programme (RDP).

The contribution of the present and future development of services to increase the standard of living and quality of life in rural areas. Rural development can be achieved through the development of services and their contribution to the possibility of the development of micro, small and medium enterprises. They have an important role in maintaining and strengthening the economy by creating new industries or market niches by increasing employment opportunities by encouraging competition in the market and vitalize economies at regional or local level. Number of business development possibilities in the Valcea county and the municipalities are provided by the diversity of natural resources (agricultural land, 52.5% of the county forests, rivers and lakes, diverse flora and fauna), human resources (availability of labor and low cost thereof), cultural resources, well-known spa resources, tourism resources. It requires quantitative rural development services, improving their quality and appearance of the development of new

services (Internet, mobile telephony, sanitation, etc.)

For this purpose must overcome major obstacles in opening and development of micro-enterprises in non-agricultural areas, especially the services of rural area: lack of specific entrepreneurial culture; lack of capital needed to open a business; issue of financing and small business lending capital needed in rural areas; reluctance due to lack of knowledge strict banking; fears of risk in business and personal guarantees required.

To address these obstacles in terms to credit non-agricultural activities and services have identified a number of problems related to high interest rates charged by commercial banks to grant loans and the system of taxes and fees for various services provided by banks (opening accounts, lending, the cost of financial transactions). Of great importance is here partnership between the beneficiary and bank credit, the latter having the role of information on existing funding lines, credit conditions in support to real and effective business plan development and construction of the credit file.

## CONCLUSIONS

The development of ways of socio-economic development in the county Valcea aimed at maximizing resource efficiency and local communities to develop a vision of the future in the sense of helping them in guiding economic and social development. Starting from the Romanian rural settlements need to adapt to EU requirements by promoting efficient sectors in rural and economically viable and socially strategies established the main directions for development of rural infrastructure. The existence of these paths of development helps us to: create a vision of community that we want in the future, we provide a complete picture of how the economy, environment, infrastructure can be improved; establishes development objectives and measures and priorities are reflected in the goals; is a guide to improve community life and to reduce disparities. The county development strategy for the next period

(2014-2020) is based on RDP measures, conditions in the county in early 2014, the use of available resources and attracted (projects from European funds) to reach the destination set. It is a condition of action and effective involvement of all stakeholders at all levels of Romanian society. Vâlcea County Development Strategy must respond effectively and promptly to the increasingly rapid changes in the economic environment to internal and external circumstances, the constraints arising from EU membership.

The ways for sustainable development of rural communities in Valcea aims: improving quality of life and diversification of the rural economy; strengthening rural households; increasing the competitiveness of food; improve the environment and the countryside.

Specific objectives aim: European integration manifested in increased absorption of grants to local councils in Valcea county by improving project portfolio priorities accordingly. Thus, it should be consider the following development paths can support improve the situation currently existing in Valcea:

- maintain and develop economic activities in rural areas by restructuring semi-subsistence farms on the principle of efficiency;
- setting goals for development and realization of measures, priority objectives for improving community life and reduce disparities, given the need to adapt rural settlements Romanian and EU requirements;
- increasing the capacity of absorption of structural funds by consulting projects contributing to sustainable services Valcea;
- development of entrepreneurial spirit and support for the development of a formal education in this field, setting up business courses in rural areas;
- setting up of rural credit available to farms of any profile;
- attract investments in agricultural holdings for the introduction of new technologies (new varieties, certified seeds, irrigation, plant protection treatments);
- agricultural policies to ensure occupancy optimization of manpower in agriculture and related services;

-increasing the access to financial resources and cooperative rural banking system, contributing to the creation of SMEs, improving quality of life and the attractiveness of rural environment;

-adoption of measures that contribute to improve the quality of services.

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## IMPORTANCE OF THE AGRICULTURAL SECTOR AS A BRANCH OF THE NATIONAL ECONOMY

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### *Abstract*

*Agriculture is an important branch of the national economy, with various functions such as: main source of business activity that uses the workforce, ecological factor for the protection of the environment, technical and cultural tradition, representing a civilization in itself. This paper shows that, in Romania, agriculture has an extremely special position, being one of the primary branches of material production, taking into account that the economic and social growth of the contemporary world is in close connection with the level of accomplishments in agriculture and it cannot exist outside a strong development of this production branch. Because the agricultural sector is currently growing, now, in 2014, we can see a considerably large migration from the urban area to the rural area. Young people choose villages and not cities being influenced also by the agricultural schemes offered by the European Union, schemes that support the needs of the agricultural field.*

*Key words:* competitive agriculture, migration, economic progress

### INTRODUCTION

Within the entire Romanian economy, agriculture represents one of the most important branches, aimed to contribute highly to the recovery of the economic growth of our country. Fundamental transformations in the agricultural structure, in the technical and material resources, in the farm set-up are necessary in order to ensure a modern agriculture and its enrollment in the general strategy for the transition of the entire Romanian economy to the market economy [1].

As regards the weight of the workforce in agriculture, meaning 27.1 %, Romania may be considered the first ranking country not only in the European Union, but also in Europe. This feature is stressed by some countries with large agricultural areas, such as Russia and Ukraine, with lower weight of people employed in agriculture (14.8 % in Ukraine and 8.4 % in Russia). In this case, we are highly influenced by the ratio of large cultivated areas/small country area. In Bulgaria, the population weight for this sector

is of only 7.1 %. Turkey has a higher weight of people employed in agriculture, meaning 21 %. From this regard, the situation in Serbia is similar to the one in Turkey, with a weight of people employed in agriculture of 20 %. The highly developed countries, irrespective of the high weight of arable land, have a very low weight of people employed in agriculture. Their economies are definitely superior to the post-transition economies and their focus is on engineering, IT and service sector [2].

Within the EU countries, the highest weights of people employed in agriculture (although lower than in Romania) have Poland, with 12.3 %, Portugal, with 10.8 %, and Greece, with 10.5 %. On the other side of the globe, the weight of people employed in agriculture in South America is lower, especially in Brazil, with a weight of 10.8 %. In case of the United States, the weight of people employed in agriculture is of only 1.4 %, similar with the one in Great Britain, also 1.4 %, Germany, 2.1 %, France, 2.8 % (the country with the highest agricultural production in Europe and the first country at the international level in the field of winegrowing). Italy, Japan, the

Netherlands or Switzerland has a weight of less than 4 % of the people employed in agriculture. Among the former socialist countries that are EU member states, Check Republic has the lowest weight of people, 3.2 % [9].

Although the productivity of the agricultural sector has been continuously increasing compared with the productivity of other economy branches, it is still much lower. Therefore, the countries with the highest weight of people employed in agriculture have a much lower GDP per capita. India is an example, with a weight of people employed in agriculture of 52.6 % and a GDP per capita of merely \$ 1,340 per capita. In Indonesia, the weight of people employed in agriculture is 36.9 %, with a GDP of \$ 2,580 per capita. This relevant branch of the economy is and will represent a strategic economic sector in any country of the world. Not even the highly developed countries, where the weight of agriculture in the total GDP is relatively low, can afford to satisfy the demand of food consumption as imports only. Therefore, in order to offset the decreasing of people employed in agriculture, the highly developed countries have increased the productivity of this sector, by upgrading the agricultural works and also by selecting the grain and vegetable varieties, by using different types of fertilizers, pesticides that could influence the product quality, and by diminishing the dependency of production on the weather conditions.

These methods of increasing the labor productivity were supplemented, in case of agriculture, with subsidies for the agricultural production in order to level the agricultural incomes with those obtained in other sectors and thus to diminish the migration trends of people employed in agriculture toward other economic sectors with higher incomes [3].

## **MATERIALS AND METHODS**

Although the Romanian migration, as we know it today, is relatively a recent one, it managed to have an increasing influence on the current Romanian society. Whether it has

positive or negative influence, the concept tends to become widespread both at the level of perception and of experience. Today, the international migration is a phenomenon which takes several forms, which has impact and shapes national societies.

The main type of mobility was the labour circulation, especially towards the main industrial centres.

The current paper performs a quantitative analysis, using the method of analysing social documents, i.e. statistical yearbooks, reports related to workforce and other documents regarding mediation/placement, career information and counselling, financial support, contributions to employment and labour market policy making in Romania.

These indicators have been analysed in close connection to the main demographic evolutions, registered in the same social space.

## **RESULTS AND DISCUSSIONS**

We consider that the Romanian agricultural sector has a potential for development in the following years, by amending several metrics, such as: the lower productivity compared with that of the European Union countries. Romania has a very low average level of productivity compared with the EU (almost twice less than other post-transition countries, except Bulgaria, and much lower than the Western countries, exempt Luxemburg); the high difference between agriculture (the productivity of which is of 20.6 % of the national average level) on the one hand and industry and services (where the productivity represents 116.3 % and 144.6 % respectively of the national average), on the other hand; the people employed in agriculture is aging, the weight of people aged 54 years and more in this sector being of 33.6 % in 2012. At the same time, 27.9 % represent young workforce, under 35 years of age, with a low level of education and training, thus with weak chances to adapt to the market requirements.

In the French economy, the productivity per each person employed in agriculture is of

approximately 61.5 %. French agriculture is the first in Europe, with 19 % of the total production of the European Union, being represented by cereal and industrial crops, animal farming and winegrowing [8]. Here, there are approximately 500,000 farms. A high agricultural productivity is accomplished in Germany also, even if its weight per worker is lower than in France, meaning 50.1 %. According to Index Mundi, the German agriculture stands for only 0.8 % of GDP, but it is an extremely productive sector managing to cover 90 % of the food demand of the country with the domestic production. Higher agricultural productivities are also obtained in Poland, where the weight of productivity in the total of economy is of 45.2 %, and in Hungary is of 42.14 %. A lower productivity is registered in Greece, its weight being close to the Romanian one, meaning 30 %.

The only country in the world where the labor productivity in agriculture is higher than that of the entire economy is New Zealand. Even if in the agriculture of this country work almost 7 % of the active population, GDP of this sector is of 7.4 % [8]. Austria, the number 1 country in Europe as regards the organic farming, has an intensive farming sector which covers almost the entire domestic demand of products and participates to the GDP with approximately 2 %.

#### **Agriculture in the European Community**

The most important contribution to the GDP increase in 2013 compared to 2012 was of the industry (+2.3 %), with a weight of 30.0% in GDP and with a volume of activity which was increased with 8.1% [5], and agriculture, forestry and fishing (+1.1%), with a lower weight in the GDP (5.6 %) and with a volume of activity which was increased with 23.4% [6].

In the near future, the organic farming has to be prioritized because it may generate a higher added value and products that are maintained in the domestic market, but that may be also exported.

The significant increase of agriculture in 2013 resulted mainly from its weather-dependent nature, because in the previous year the weather conditions were good. This year, the

same progress will be hard to obtain taking into account the first two quarters with important changes as regards the weather conditions. This year, the economic growth will probably be resulted mainly from the exchange rate and from economic and social movements specific to an electoral year. 2012 showed an economic growth of 0.3 % compared to the previous year, in the context of a contraction with 21.2 % of the gross value added in agriculture and of a diminishing of industry with 2.1 %, according to INS (*National Institute of Statistics*). Therefore, the growth was determined, mainly, by the increase of the activity volume and, as a result, of the gross value added in Information Technology and Communications (+29.4 %), professional, scientific and technical activities; administrative services and support services (+8.4 %). The economic growth of 2.5 % in 2011 was supported mainly by the agricultural trend, plus 11.3 %, and by industry, registering a raise of 5 %. The growth was determined, significantly, by the increase of the activity volume and, as a result, of the gross value added in agriculture, forestry and fishing (+11.3 %), industry (+5.0 %) and shows, cultural and entertainment activities; repairs of household products and other services (4.8%). [8]

In 2010, constructions represented the sector with one of the highest increase of the activity volume, 5.7 %, followed by agriculture, forestry and fishing (+3.1 %) and industry (+2 %).

In 2009, the Romanian agriculture decreased with 0.8 % compared to the previous year, as shown in the following tables. But first, we will analyze a group of European agricultural regions and we will try to outline a comparison with our country, especially as regards the economic trends.

The European area is covered mainly by intermediary and rural regions. Romania has mainly rural regions, with more than 50 % of the population, the rest being distributed in intermediary regions. The only important urban cluster is the capital and the adjacent areas, fact that is generally valid in all the countries. Bulgaria and Greece have larger

weights of rural regions that, as seen above, do not have a productivity correlated with their amount.

In Spain, Great Britain and Germany, the urban areas are predominant, and in Ireland, Northern countries, Italy and France, the rural areas. Other population clusters in urban areas, other than capitals are found in the Mediterranean cities and inland, in Great Britain.

In 2013, in EU27, the highest weight from the total incomes was of the services. They are predominant in all the member states. The cross-country differences are given by the sectors showing economic progress, such as agriculture and industry. Agriculture has an important weight in Romania, 11 %, with approximately 3 percentage points more than the constructions sector, and it is exceeded by industry, with a three times higher percent [7]. The region with the highest added value for agriculture was Ialomița County and the adjacent areas. The numbers for Bulgaria and Hungary are similar. [10]

#### **2014 - The year of migration of young people from urban areas to rural areas**

In 2014, it seems that there are many young people from the urban area who want to settle in the rural area, more than 22,000 applications for the setting up measure (measure 112 - Setting up of young farmers) being registered, according the minister of Agriculture. In EU, only 6 % of the young people have started businesses in the agricultural field. The New Common Agricultural Policy is aimed to support these actions by funds, one of the objectives being the increase of the number of young people in this sector. Another important objective is the increase of subsidies, together with the diminishing of the gaps between the EU regions as regards the subsidies. The increase of the number of applications could be a result of the fact that people from urban areas realized the necessity of the employment in agriculture, and the low offer of qualified jobs in this field or the increase of the support received by young people for setting up, meaning Euro 40,000. The first session of project requests related to Measure 112 -

"Setting up of young farmers" was opened in December 2008.

In November 2012, the Paying Agency for Rural Development and Fisheries (PARDF) announced that more than 9,000 young people, out of which 4,000 are women, started a country farm in the last years, for which they received non-refundable funds of more than Euro 200 million.

As regards the internal migration, between 1970 and 1990, its predominant direction was from rural areas to urban areas. Starting with 1992, the number of those moving from rural areas to urban centers has started to diminish, and the mobility towards the opposite direction, from urban areas to rural areas has increased. This fact was due, mainly to the economic transition and to the decrease of employment opportunities in the cities. Big cities have faced with a deficit of new jobs created, especially as the number of inhabitants was increasing continuously. After 1997, the migration from the urban area to the rural area exceeded the number of those who moved from the villages to the urban centers, which, partially, is due to the suburbanization phenomenon.

The emigration and internal migration phenomena are outlined in the context of highly pronounced development gaps between the different regions in the country, and between the rural and the urban areas. The Romanian regions, which are characterized by an increased loss due to the internal migration, are, at the same time, origin regions for the considerable flows of external migration [4]. The three regions with the highest net loss of population due to migration are North-East, South-East and South. These are predominantly rural regions, characterized by high rates of employment in the agricultural field, relatively high poverty rates (including those active on the labor market), regions that are threatened by the rapid aging of population. They generally have a lower level of infrastructure development and GDP per capita below the national average.

Migration represents the major cause of the accelerated aging of population and of the depopulation of the rural areas. It generates

the qualified human capital deficit, and, in general, the deficit of workforce, that starts to be seen in some specific sectors and regions [4]. Especially the massive exodus of physicians, nurses, and of teaching personnel has resulted in the deterioration of the quality of medical assistance and education, affecting, mainly in the rural areas, the access to those services and contributing to the choice of the inhabitants to change their domicile in order to have a better and safer life.[11]

In the period 2006 - 2008, the evolution of the number of persons moving to the rural area was positive, with a slight decrease in 2009, a year with a dip recession. A high increase was registered in 2010. Non-official sources indicate that years 2012 and 2013 have an ascending trend.

Table 1.Number of young people who arrived in the rural areas, 2006-2011

Age group	2006	2007	2008	2009	2010	2011
< 15 years	30576	36678	38333	37221	52189	38537
15-19 years	13432	15968	14739	12893	18676	12698
20-24 years	20906	25834	25580	23279	31081	22130
25-29 years	18712	22559	22089	17702	24126	17498
30-34 years	16776	20107	21418	17421	23375	16671
35-39 years	12829	15388	15500	11791	16317	11841

Source: www.insse.ro

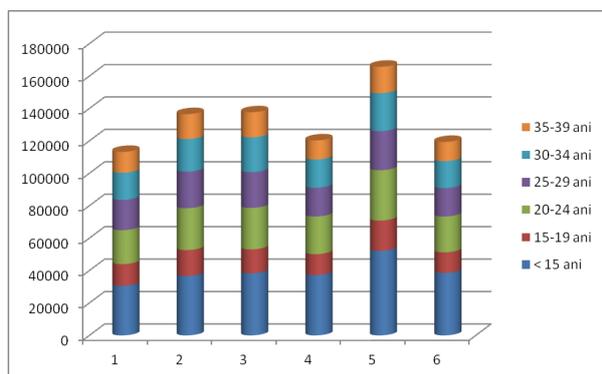


Fig.1. Young people arrived in the urban area in the period 2006-2011

Source: Personal interpretation of the data found on www.eurostat.ro

These statistics are directly proportionate with the number of persons leaving the urban area, out of which men have influenced the above-

mentioned trends, being the first to adapt to the economic and social conditions (see Table 1 and Figure 1).

The highest weight of the young people set up in the rural area was registered, for all the analyzed age groups, in 2010. These data have the same trends as the number of young people leaving the urban area, the number of this is the highest, as it could be seen in the figure above, for 2010 also. Among the age groups of the people at working age, the young people of 20 - 24 years of age have the highest weight from the total of young people arrived in the urban area (see Table and Figure 2).

Table 2.Number of young people who left the urban area, 2006-2011

Age group	2006	2007	2008	2009	2010	2011
< 15 years	26494	28329	32902	32586	46342	34262
15-19 years	11628	11861	11656	9700	14730	10050
20-24 years	25341	26608	28588	26749	36159	24450
25-29 years	31535	32613	34637	29535	42406	29029
30-34 years	23165	25258	29480	25554	36681	25873
35-39 years	17614	18378	19232	15141	22485	16351

Source: Personal interpretation of data according to INS

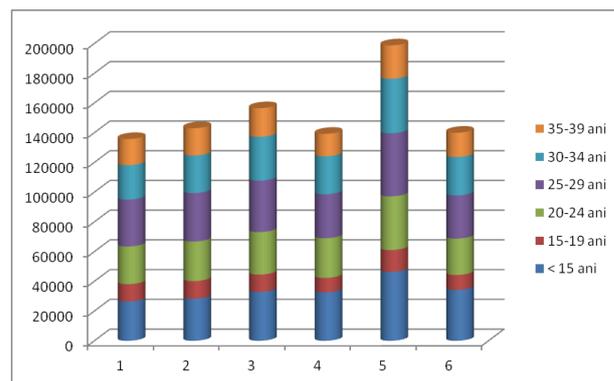


Fig.2. Number of young people who left from the urban area to the rural area in the period 2006-2011

Source: Personal interpretation of the date found on www.eurostat.ro

The number of the people who left the urban area is higher than the number of those arrived in the rural areas, especially in case of those of 20-24 years of age. If only a small percent of those have higher education or

education in the field of agriculture, they can push the rural areas towards development, from an economic, social and cultural point of view. These data may be closely connected to the award of start-up funding in the respective sector.

## CONCLUSIONS

Over time, Romanian agriculture has followed the trend of the economy. In the periods of economic progress, it was prolific, and in recession periods, the production was diminished. These facts show the interdependency between the economic and agricultural sector. A main segment of agriculture is the self-consumption. It has a positive side because it maintains the customs and generates incomes for the minimum living expenses of the farmers and a negative one because it is not reflected in the economic growth. There are countries such as Austria, with small regions as regards their size and dispersion, which can be exploited in such a way, but with an increased productivity due to the involvement of investments in the organic farming. It is aimed to be the future of this field, due to the role it plays for people health and security and for its importance in the growth of national incomes, as regards the increase of consumption and exports. Still far away from the organic farming, Romania has to implement the irrigation system infrastructure, the increase of productivity, the stimulation of education in the agricultural field. The service segment (the highest weight in GDP) and constructions are self-developed, and that is why the priority of our country should be the agriculture.

Romania may be seen as a special case among the former communist countries, as regards the transition of agriculture towards the market economy, without coherent long term policies and, usually, lacking special policies for land consolidation. The regulations suggested for the New Common Agricultural Policy take into account the EU territorial and structural realities and offer the member states more flexibility in choosing the type of policy that is proper to each state. The aim of the

rural development funds has to be the solving of some key restrictions of the Romanian rural area, so that, beyond the degree of absorption, important has to be the efficiency of their use

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