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**ULOGA ZNANJA, INOVACIJA I HUMANOG KAPITALA
U MULTIFUNKCIONALNOJ POLJOPRIVREDI
I TERITORIJALNOM RURALNOM RAZVOJU**

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**THE ROLE OF KNOWLEDGE, INNOVATION AND
HUMAN CAPITAL IN MULTIFUNCTIONAL
AGRICULTURE AND TERRITORIAL
RURAL DEVELOPMENT**

- selected and unpublished works -

REGIONAL ASPECTS OF AGRICULTURAL INCOME LEVEL IN VOJVODINA PROVINCE IN FUNCTION OF BASIC PRODUCTION FACTORS

Katarina Čobanović¹, Emilija Nikolić-Đorić¹, Beba Mutavdžić¹

Abstract

In the present research the analysis of the level of national income in agriculture was done for different districts and municipalities of the Province of Vojvodina.

The analysis of the achieved level of national income in agriculture in function of the most important factors was performed on the base of classical form the traditional non-linear regression model of Cobb-Douglas production function with labour and capital as predictors and on the extended form of Cobb-Douglas function which in addition includes the arable areas.

Key words: National income in agriculture, Cobb-Douglas production function, investments in agriculture, agricultural population

Introduction

During the 80s of XX century, European Union countries were closely focused on enhancing development of rural areas aiming to achieve a coherent economic development. The tendencies were to diminish the differences between the city and the country (urban vs. rural), as well as to replacing the activities in agriculture by activities related to agriculture, etc (Stojanović, 2006). European Union Countries have been actively engaged with fostering development of rural regions and establishing rural development policies, as well as deciding on and improving the list of rural development indicators (Bryden, 2003). Defining the

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basic indicators of rural development is one of the essential requirements for international comparison (Stojiljković, Bošković, 2008). International organizations, such as OECD, EU and others, make remarkable effort to establish the list of indicators of rural development.

The level of development of municipalities in Serbia was measured on the basis of several indicators. In this paper, the indicator for determining municipality development was the corrected national income per capita in 2005. The correction of the national income was provided by two-year average of the national income of agriculture from 2004 and 2005. Ranking of the municipalities was conducted according to the value of indexes of the national income per capita with the level of the Republic of Serbia taken as the basis for comparison (Municipalities in Serbia, 2006, 2007). On the basis of such ranking of Serbian municipalities – according to the above stated indicator – only one municipality in Vojvodina (the place of Zitište, rank 47) belongs to the group of underdeveloped municipalities. There is no Vojvodinian municipality belonging to the group of the most undeveloped municipalities. Regarding other municipalities, 8 municipalities from Vojvodina are ranked in the top 20 Serbian municipalities. These are the following ones: Apatin (rank 13), Bačka Palanka (rank 16), Bela Crkva (rank 8), Beočin (rank 6), Vršac (rank 10), Kikinda (rank 15), Novi Sad – city (rank 7) and Senta (rank 19). The highest ranks are occupied by municipalities of the city of Belgrade. In 2005, total number of municipalities of Serbia was 162, while Vojvodina Province had 45 municipalities.

The above presented indicators of the level of development of Serbian municipalities suggest that Vojvodina, as one of the three regions in Serbia, belong to the group of developed regions. Serbia is divided into the following regions: Region 1 (the lowland region) includes the regions of Bačka, Srem, Banat and a part of Mačva; Region 2 covers the northern part of central Serbia (Šumadija, part of Mačva and Stig); Region 3 (the mountainous and highland region) includes the eastern, southern and western parts of Serbia (Bogdanov, 2007). Regarding the development of the Vojvodinian regions, it is pointed out in the literature that from the 90s the western part of the Province, i.e. Bačka and Srem, is generally speaking more developed compared to the eastern part, i.e. Banat (Bogdanov, 2007). This paper shall compare the level of development of these 3 regions – Bačka, Banat and Srem – at the level of the Autonomous Province. It would certainly be far more suitable for the analysis if the level of development could be measured at the level of settlements or municipalities or counties. However, the availability of the published statistical data is restricted and, therefore, these three regions are compared.

The aim of this paper is comparison of these Vojvodinian regions according to the share of rural population in the total population, the share of national income

from agriculture in the total national income and according to estimated models of Cobb-Douglas production function.

Data and methods

The paper uses the data provided for municipalities and districts of Vojvodina on the national income from agriculture in 2005. The recorded data on investments in agriculture in 2004 in municipalities and districts of Vojvodina are to show whether there is an effect of the investments from the preceding year in terms of the achieved income level from agriculture in the following year. Furthermore, the study uses the data on active agricultural population, as well as the data on cultivable land, on arable land and gardens. Regression analysis is employed here in order to determine the behavior of dependent variable (national income from agriculture) in relation to the combinations of two independent variables (agricultural population and investments in agriculture, active agricultural population and investments in agriculture). The national income from agriculture and investments in agriculture are given in thousands of Serbian diner currency (RSD).

The research uses the model of multiple linear regression with two independent variables and the model of curvilinear regression of Cobb-Douglas function type with two independent variables. The general form of Cobb-Douglas function is the following: $Y = AL^\alpha K^\beta e^\varepsilon$, where Y is the dependent variable (production), L represents the labour input (the first independent variable), K represents the capital input (the second independent variable), and $\eta = e^\varepsilon$ is a random variable with log-normal distribution. The parameters α and β are indicators of elasticity of labour and capital (<http://en.wikipedia.org/wiki/Cobb-Douglas>). Since the results of χ^2 test prove that the distribution of the dependent variable Y statistically has no significant deviation from log-normal distribution, the model of Cobb-Douglas function is by logarithmic transformation turned into multiple linear regression with two independent variables in which the random errors have normal distribution: $\ln Y = \ln A + \alpha \ln L + \beta \ln K + \varepsilon$.

The adequacy of the model is determined by application of residual tests: Lagrange Multiplier Test (LM) which examines the presence of serial residual correlation, ARCH LM, and White Test for determining conditional heteroskedasticity of residuals (Gujarati, 1995). The calculations were conducted by applying **STATISTICA 8.0** and Eviews 3.1 programmes (Asteriou, 2007).

Research results

According to OECD criterion, the regions are divided into three types: predominantly rural regions if more than 50% of population live in rural communities; intermediate (or mixed) if 15-50% of population live in rural communities; and predominantly urban regions if less than 15% of population live in rural communities (Bryden, 2003).

The classification of the districts of Vojvodina according to the share of rural population in municipalities indicates that in the majority of districts predominantly rural or mixed regions dominate. Only in the northern Banat district and the south Bačka district there are municipalities that are characterized as extremely urban. The northern Bačka district, the middle Banat, the south Banat and Srem districts have more rural than intermediate municipalities. The northern Banat and western Bačka districts have more intermediate than predominantly rural municipalities. The southern Bačka district has the same number of predominantly rural and intermediate municipalities.

In 2005 in Vojvodina only 3 municipalities were predominantly urban, 22 were predominantly rural, while 20 municipalities are characterized as belonging to the mixed type of rurality. Accordingly, Vojvodina and its regions have the profile of an extremely rural area (Table 1).

Table 1 Classification of the municipalities of Vojvodina according to the share of rural population

DISTRICT	Rural	Intermediate	Urban	Total
Northern Bačka	2	1	0	3
Middle Banat	3	2	0	5
Northern Banat	2	3	1	6
Southern Banat	5	3	0	8
Western Bačka	1	3	0	4
Southern Bačka	5	5	2	12
Srem	4	3	0	7
Total	22	20	3	45

The share of the national income from agriculture in the overall national income (%) in 2005 is high and it is the highest in the middle Banat district (47.5%). It is followed by the southern Banat district (45.4%), Srem (44.4%), northern Bačka (41.3%), northern Banat (35.6%), southern Bačka (34.3%), and finally the western Bačka district (28.9%) presented in Table 2.

Table 2 Share of the national income from agriculture in the total national income (%) in the districts of Vojvodina

Districts		$\bar{X}$	$C_V (\%)$	$X_{\min}$	$X_{\max}$
Northern Bačka	1997	34.64	39.21	18.97	43.07
	2002	38.60	55.70	15.90	58.60
	2005	41.30	51.50	17.90	59.40
Middle Banat	1997	55.60	41.48	20.80	74.00
	2002	45.10	45.31	17.71	66.45
	2005	47.49	36.76	17.20	61.75
Northern Banat	1997	36.91	25.23	22.81	47.62
	2002	30.96	39.09	19.05	52.11
	2005	35.56	36.47	18.50	54.80
Southern Banat	1997	49.88	46.59	14.37	79.28
	2002	47.52	44.29	13.22	69.44
	2005	45.40	43.84	13.99	68.33
Western Bačka	1997	28.64	36.45	14.10	65.72
	2002	27.99	52.20	7.87	41.42
	2005	28.86	30.87	18.07	38.88
Southern Bačka	1997	40.32	46.45	14.10	65.72
	2002	37.34	53.23	9.71	72.48
	2005	34.30	64.89	4.87	77.51
Srem	1997	50.11	40.07	32.43	81.27
	2002	48.20	38.64	24.13	74.92
	2005	44.43	45.00	22.43	82.37

Applied model of Cobb-Douglas function in double logarithmic form for Vojvodina was

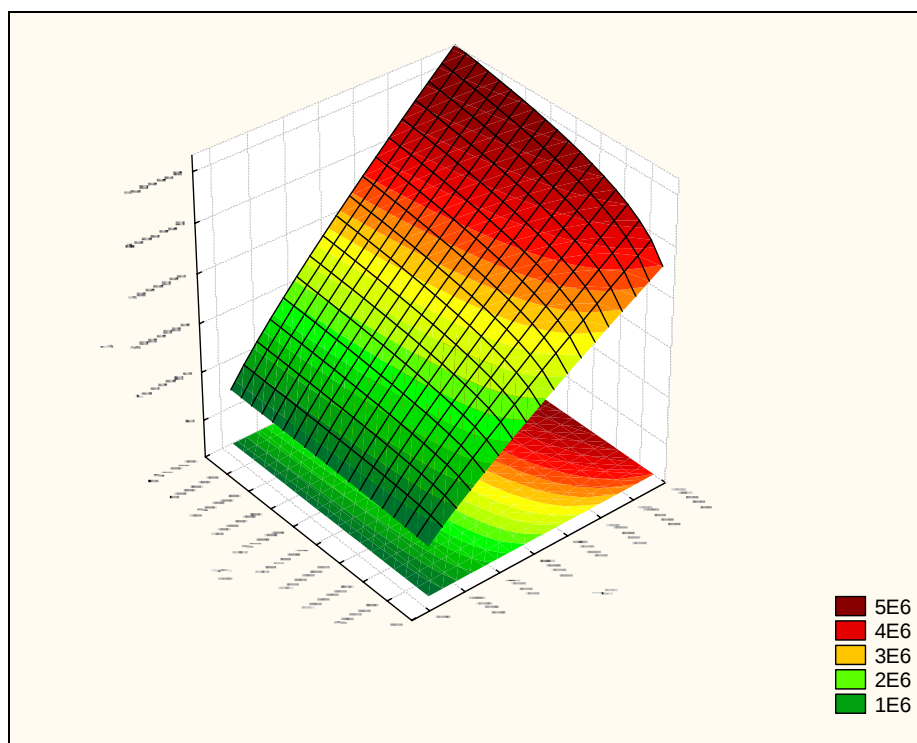
$$\ln \hat{Y} = 5.599013 + 0.841785 \cdot \ln X_1 + 0.1412163 \cdot \ln X_2,$$

$$R^2 = 0.8321, \bar{R}^2 = 0.8233, (9.40^{**}), (4.42^{**})$$

The specified model of Cobb-Douglas function indicates that the achieved national income from agriculture of Vojvodina in 2005 (Y) is strongly influenced by the both analyzed variables: agricultural population (X_1) and investments in agriculture (X_2). By applying the Wald test the hypothesis on homogeneity of the parameters of ($F = 0.040571$, $p = 0.8414$) model has been confirmed.

Graphical presentation in three-dimensional space illustrates the relation of the dependent variable and independent variables (Figure1):

Figure 1 Applied model of Cobb-Douglas function



$$\hat{Y} = 270.15063X_1^{0.84178}X_2^{0.14216}$$

In order to determine whether there are regional differences in the degree of influence of the analyzed factors on the national income from agriculture, the regression models of the same form were applied for Bačka, Banat and Srem:

$$\ln \hat{Y} = 5.47089 + 0.886188 \cdot \ln X_1 + 0.125807 \cdot \ln X_2,$$

$$R^2 = 0.8790, \bar{R}^2 = 0.8629, (7.02^{**}), (2.36^*)$$

$$\ln \hat{Y} = 4.162296 + 1.073061 \cdot \ln X_1 + 0.078459 \cdot \ln X_2,$$

$$R^2 = 0.7834, \bar{R}^2 = 0.7524, (4.67^{**}), (1.28)$$

$$\ln \hat{Y} = 6.354630 + 0.816372 \cdot \ln X_1 + 0.088164 \cdot \ln X_2,$$

$$R^2 = 0.9112, \bar{R}^2 = 0.8520, (4.47^*), (0.81)$$

The values of Wald statistics for Bačka $F = 0.012946$ ($p = 0.9109$), for Banat $F = 0.589772$ ($p = 0.4553$) and Srem $F = 0.342771$ ($p = 0.5994$) suggest that the null hypothesis on restrictions of parameters $\alpha + \beta = 1$ can be accepted and the homogeneous Cobb-Douglas model can be applied..

The influence of first variable (agricultural population) is determined by higher partial regression coefficient in Banat region than in Bačka and Srem regions. In the same time the degree of influence of second variable (investments in agriculture) is higher in Bačka region than in Banat and Srem regions.

The similar conclusions were obtained if the influence of the combination of active agricultural population (X_3) and investment in agriculture (X_2) on the achieved national income from agriculture, was considered.

The paper also considers the extended form of Cobb-Douglas function, which includes the arable areas, X_4 , as well. The estimated extended model of Cobb-Douglas function in double logarithmic form for Vojvodina was:

$$\ln \hat{Y} = 5.201357 + 0.562476 \cdot \ln X_3 + 0.292956 \cdot \ln X_4 + 0.142536 \ln X_2,$$

(4.40^{**}) (2.05^{*}) (4.27^{**})

$$R^2 = 0.8340, \bar{R}^2 = 0.8205.$$

On the base of nonlinear model of Cobb-Douglas function

$$\hat{Y} = 181.518395 \cdot X_3^{0.562476} \cdot X_4^{0.292956} \cdot X_2^{0.142536}$$

it may be concluded that the highest contribution to the growth of national income had agricultural population and the investment in agriculture the least.

Conclusion

Based on the indicators of the level of development (corrected national income per capita) of Serbian municipalities in 2005, it was concluded that Vojvodina, as one of three regions in Serbia, can be included in developed regions.

Grouping districts according to the share of rural population in municipalities showed that rural and mixed regions are dominant in Vojvodina.

The share of national income from agriculture in the overall national income in 2005, analyzed for the districts of Vojvodina, is high and it ranges from 29 (%) to 48 (%). For example, the share is the highest in the middle Banat district

(47.5%), while it is the lowest in the western Bačka district (28.9%). In all districts except Northern and Western Bačka in the period 1997-2005 the share of national income from agriculture in the overall national income decreased.

The paper examines the influence of the number of agricultural population, active agricultural population, investments and arable area on the national income from agriculture, both for Vojvodina as a whole, and for its separate regions: Bačka, Banat and Srem.

The model of Cobb-Douglas production function, formulated by American economist Paul Douglas and mathematician Charles Cobb in 1928, was employed in this paper. This is a simple model which can be used to successfully model the influence of labour and capital on the achieved production, as was also confirmed by this research. In all the instances, it was determined that the influence of the demographic factors is higher compared to the analyzed economic factors.

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Literature

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LITHUANIAN DIAGNOSTICS OF LAGGING TERRITORIES: EVALUATION AND INSIGHTS

William H. Meyers¹, Emilija Kairytė², Erika Ribašauskienė³

Abstract

During the period 2006-2007 diagnostics were conducted on territorial aspects of rural Lithuania with a special focus on the rural areas lagging behind. The study includes analysis of economic, demographic and social indicators of rural areas at a disaggregated level and a methodology enabling the assessment of opportunities and constraints and the comparisons of rural areas in various territories. The study objective is an improved set of diagnostics that captures territorial differences, improves the targeting of RDP measures and strengthens the framework for allocation and access to structural and rural development funds. The paper discusses diagnostic methods by reviewing concepts of rurality and presenting methods used for identifying and ranking leading and lagging territories. We use selected socio-economic indicators to describe differences among municipalities in Lithuania and identify the key factors that indicate more and less successful areas. These are then used to identify and rank leading and lagging municipalities with a development index.

Key words: investment, rural development, lagging rural areas, economic structure, competitiveness, social well-being, development indices, funding envelopes.

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Introduction

EU and Lithuanian policy include as goals the increased cohesion of territories and reduction of socio-economic disparities and governments take seriously the difficult task of slowing the growth of inequalities and especially the growth of inequities in opportunity across different territories.

The objective of this study is to develop an improved set of diagnostics that:

1. Capture local territorial differences in opportunities and constraints and improve the targeting and qualities of RDP measures,
2. Strengthen the framework for allocation and access to structural and rural development funds.

This paper explains how the indicators are selected and used and how different indices can be obtained from these indicators and used for decision making. It forms the basis to discuss with decision makers and analysts in Government the choices that must be made in developing and using such indices, which are:

- What indicators to use
- What weights to use in forming thematic indices
- What weights to use in forming combined rural development indices
- Where and when to apply indices for program design and implementation.

The paper discusses diagnostic methods by reviewing concepts of rurality in Europe and presenting methods to be used for identifying and ranking leading and lagging territories in Lithuania. Next, we use selected socio-economic indicators to describe differences among municipalities in Lithuania and identify the key factors that indicate more and less successful areas. In section 3 we present the thematic indices which are calculated from the selected indicators for each municipality and used to rank municipalities according to different criteria. These are then used to identify and rank leading and lagging municipalities with a combined rural development index. Finally, we draw conclusions from the analyses and make recommendations on how these results could be useful in better targeting the measures and funding of the RDP 2007-2013.

Methodology

In order to properly identify and characterize lagging rural regions, it was necessary to first decide on indicators of rurality, and then to decide on which indicators of social and economic well being or disadvantage should be used. Coming up with indicators of rurality was particularly challenging due to the

disconnect between the definitions used by the Government of Lithuania, The European Commission, other New Member States and centers of expertise such as the OECD.

The OECD typology was chosen due to its simplicity and widespread use. According to this classification, local communities (NUTS 5) are considered rural if they have a population density below 150 inhabitants per square kilometer. This allows us to classify regions (NUTS 3&4) as being predominantly rural (over 50% of population living in rural communities), significantly rural (15% to 50% of population living in rural communities) or predominantly urbanized (less than 15% of population living in rural communities).

Currently, the Government of Lithuania uses two different sets of indicators to classify lagging territories – problematic areas and less favored areas: (i) Problematic areas are those municipalities where either proportion of registered unemployed and employable age population is 60% and more above the national average, or the proportion of the population receiving social allowances and other population is 60% and more above the national average; (ii) Less Favored Areas are agricultural areas where characteristics include cereal yields lower than 80% of national average, value of total agricultural production per capita is lower than 80% of national average, population density is less than 50% of the national average, the percentage of the active population engaged in agriculture is more than 15%, the rate of population decline is 0.5% or more per year, or the territory is classed as a Karst area or covered by NATURA 2000.

This study is focused on developing a comprehensive typology that could address multiple aspects of area based socio-economic disadvantage. After an extensive review of different methodologies and indicators for characterizing lagging rural regions, it was decided to use those indicators suggested by Bryden and colleagues¹. These indicators were combined with those recommended in a guidance note produced by the European Commission². It was then determined which of these indicators were available at the NUTS 3 level (Counties), and at the NUTS 4 level (Municipalities). Because there is often a mix of leading and lagging municipalities which are hidden in the NUTS 3 aggregation, it was decided to focus on the data available at the NUTS 4 level. This allows for a more detailed comparison between levels of socio-economic well being in different parts of the country. The indicators selected are grouped according to the following themes: demographic, social well-being, investment and business, and agriculture.

¹ Bryden, J. M., Copus, A. and MacLeod. 2002. "Rural Development Indicators" in the Report of the PASI project, Phase 1. Report for Eurostat with LANDSIS, Luxembourg.

² European Commission - Directorate General for Agriculture. 2006. Guidance note G – Baseline Data. (Preliminary document under negotiation with member states).

By some measures there is convergence among regions in Lithuania over time and by other measures there is growing disparity. This is described by using a few of the indicators. For example, over the period 2003 to 2005, unemployment dropped more quickly in the highest unemployment regions, so the gap between the highest and lowest among municipalities narrowed by that measure. Similar convergence could be seen in social payments and average population change. By contrast, monthly earnings per capita grew in general; but the gap between the highest and lowest among municipalities also increased slightly. By far the largest disparity was in the comparison of investment in tangible fixed assets per capita, which moved up and down, but the gap between highest and lowest remained large and was about 25 percent higher in 2005 compared with 2003. It was also noticeable that municipalities with higher investment levels also tended to have higher earnings per capita, and those with higher dependency ratios tended to have lower earnings per capita. These correlations are not at all surprising and merely confirm the importance of these indicators.

Table 1 Indicators used to construct the combined rural development index

Demographic status	Social well being	Business and investment	Agricultural
- % of population over working age Jan 06 (-) - Average annual population change 04/03 to 06/05(+)	- Unemployment rate 05 (-) - Average earnings per capita 05 (+)	- New business formation, average 03/02 to 05/04(+) - Investment per capita in tangible fixed assets, average 03 to 05(+) - FDI per capita, average 03-05 (+)	- Ave farm size (+) - Ag Land Quality (+) - % of agricultural employment (-) - Holdings as % of agr land (+) - LFA as % agr land (-)

+ positive indicator, - negative indicator

The indicators identified were further used to construct indices which could then be added together in order to rank Lithuanian municipalities using a combined “rural development index”. The indicators which were used to construct this index are presented in Table 1, and are grouped according to four different dimensions of socio-economic well being for Lithuanian municipalities. These dimensions represent the data available at the municipal (NUTS 4) level on socio-economic well being in Lithuania. The thematic groups were demographic status, social well being, business and investment, and agricultural. In each case, we usually had

several indicators in each category and used principle component analysis to select the more important of these and avoid using indicators that were highly correlated with each other.

Since these indicators were expressed in different forms such as percentages, hectares, liters per capita etc, they needed to be standardized so a composite index could be constructed.

The formula used for indicators where *high values are considered good* (e.g. average earnings, new business formation, land quality etc) is as follows:

$$F = (\text{variable } X \text{ minus mean of } X) / (\text{standard deviation of } X).$$

For indicators where *high values are considered bad*, the formula used was the following:

$$F = (\text{mean of } X \text{ minus variable } X) / (\text{standard deviation of } X).$$

Each thematic index is formed by giving the same weight to each of the indicators within that theme. For example, unemployment and average earnings per capita each have a 50 % weight in the Social Well-being index. For the purpose of constructing a composite rural development index it was decided to add the four thematic components together with equal weights (though they could as well be given different weights depending on priorities of policy makers). This index was used to create five categories of territories: (i) leading, (ii) promising, (iii) intermediate, (iv) lagging, and (v) severely lagging. Cities are outside as an additional non-ranked category.

Key Findings

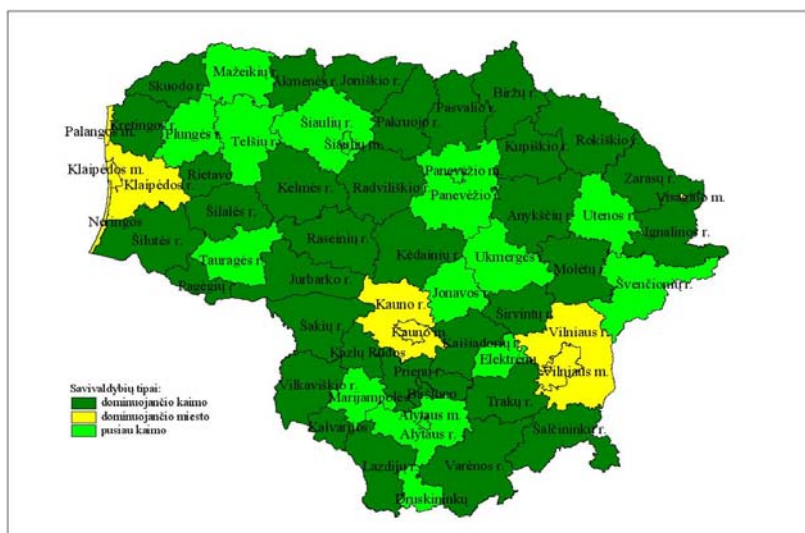
The map below (Figure 1) shows that most of the municipalities in Lithuania are predominantly rural. Over 50% of the population lives in ‘predominantly rural’ communities’ (dark green), and much of the remaining territory is significantly rural (light green). While it is important to identify rural areas, it is also important to look beyond this classification in order to understand the spatial distribution of social and economic well being in rural Lithuania.

There are two official classifications of disadvantaged rural territories in Lithuania. One is the Less Favored Area classification, which is based on indicators of agricultural performance and potential. The other category is “problematic” areas which are based on a limited set of indicators of social disadvantage. Overall, less favored areas, problematic areas, as well as territories where less favored areas and problematic areas overlap tend to be disbursed throughout the country, except in the more productive central area and near the larger cities in the East and West. However, there is some clustering of

‘problematic’ areas along the borders with Belarus, Poland, and Russia. Again, these classifications are not sufficiently specific to separate the lagging from the developing regions.

While the problematic area approach represents a useful starting point for understanding the spatial distribution of socio-economic well being in Lithuania, it relies on a limited set of indicators. What follows is a discussion of the results from the set of indicators chosen according to the recommendations of Bryden and colleagues¹ and the European Commission². These include indicators of demographic status, social well-being, business and investment, and agricultural performance and potential (presented above in table 1). Each of these categories represents a separate index of socio-economic well being in Lithuania. The following are the main findings of the analysis of the spatial distribution of each of these indices:

Figure 1 Rural Lithuanian typology according to OECD methodology



1. *The spatial distribution of the index of demographic status suggests that the leading regions (which have low levels of retired population and high levels of population increase) tend to be clustered around Lithuania's cities. On the other hand, municipalities which are lagging demographically are clustered in North East and South of the Country (with the exception of Kelmes and Sakiu).*

2. *According to the social well-being index, there is a cluster of lagging municipalities along the border regions, while other lagging municipalities tend to be dispersed throughout the country. There are two major groups of leading*

municipalities, one clustered in the center of the country in close proximity to the urban areas of Vilnius and Kaunas, while the other cluster is along the coast and Northwest in proximity to the port city of Klaipeda, resort city of Palanga and the industrial town of Mazeikiai. The indicators used for this index included unemployment and average earnings per capita.

3. ***The distribution of lagging and leading municipalities according to business formation and investment follows a pattern with leading municipalities tending to be in close proximity to major urban areas, resorts and industrial towns***, while lagging municipalities are more remote from these economic activity poles and/or clustered along the borders with Russia, Poland, and Belarus.

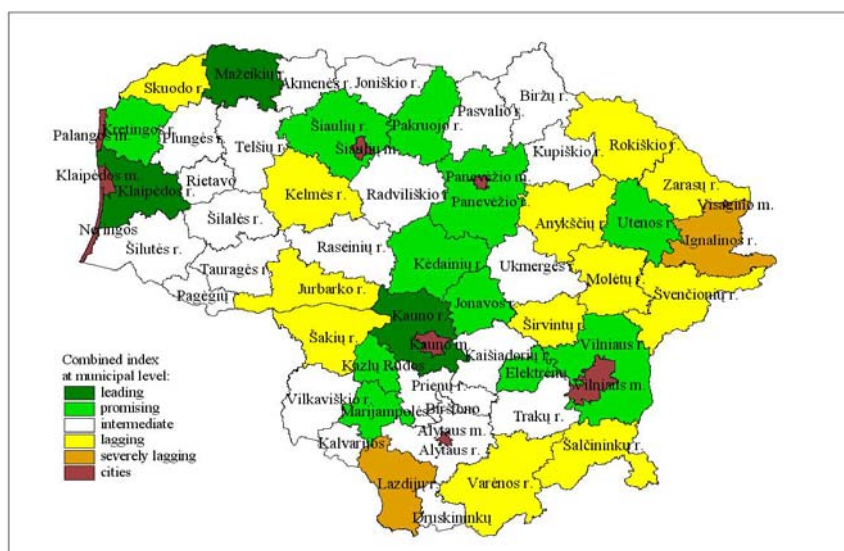
4. ***According to the index of agricultural performance and structure both lagging and leading municipalities form distinct clusters that appear unrelated to urban proximity but rather to land resources and productivity***. Accordingly, leading agricultural municipalities are clustered in the center of the Country, while lagging areas are clustered in the East, South East and South West, where soils and land productivity are lower. This is somewhat different to the spatial distribution of other indices.

The final element of the analysis is the combined rural development index, which merely combines all four thematic indices into one, with equal weights given to each of them to create a measure for classifying lagging rural areas in Lithuania. Five categories of municipality are designated – leading, promising, intermediate, lagging, severely lagging, and cities.

The map in Figure 2 shows that most municipalities are in the intermediate to leading categories. Those which fall into the lagging or severely lagging categories tend to be more remote from urban or industrial centers and/or located on the border with Russia, Poland or Belarus. It is also the case that no lagging or severely lagging municipality is adjacent to or contains a city.

These territorial rankings can be used to ***select appropriate measures and/or develop mechanisms to increase project or program funding*** for lagging areas and thereby shift development resources from leading to lagging areas. Thus, it is useful to state a rationale for such targeting. First, it is clear that investment is critical to increased development and well-being of any territory, so greater access to such investment opportunities clearly means improved development potential. Second, there are direct and indirect benefits of developing rural places. Direct benefits are the effect of solving equity issues and increasing social cohesion. The indirect one is the potential reduction in the budgetary cost of various social and safety net programs. If lagging regions develop faster, the need for government spending on social cohesion and equity programs will be reduced.

Figure 2 Distribution of municipalities according to combined rural development index



It has been shown that lagging areas in Lithuania are not concentrated in one part of the country but are often in border regions and peripheral areas. The reasons for lagging may differ in different municipalities, so different measures or remedies may be implied for different areas. Also, this more scattered distribution of Lithuania's lagging territories generates an opportunity for "growth pole" effects of regional cities and municipal centers.

Lagging conditions are in part due to fixed resource endowments and location that clearly cannot be changed. However, they can also be due to limited access to human and financial resources to enhance labour and capital productivity. This aspect of the lagging condition can be changed, and part of the remedy may be in the **design and funding** of public investment programs.

There are several means to enhance targeting to promote development of lagging regions. A main principal is to design and implement programs so as to ensure sufficient access for those regions and those entrepreneurs that may be disadvantaged by location or knowledge. Among the means that can be used are:

1. Regionalization – territorial (place-based) approach to allocation of funds
2. Set maximum grant size to broaden opportunities for participation (smaller grant % for bigger projects)

3. Technical assistance to improve capacity of lagging areas to participate, since they are less well prepared to compete at a national level

4. Give priority funding - does not mean accepting bad investment projects, but rather to ensure access and a level playing field for lagging municipalities.

Generally, lagging regions have had constrained access to development programs. They are less well prepared to compete at a national level and are often crowded out by quicker and better informed applicants in prosperous areas. It must also be recognized that envelopes are not the only remedy. Capacity building in these lagging regions is also necessary, so they improve ability to compete for program resources.

An allocation index can be calculated that could be used in combination with other factors to make a funding envelope for each municipality that includes some consideration of the combined rural development index (CRDI). We suggest an allocation based on three variables – rural population, average income, and CRDI, though other combinations are also valid. The CRDI functions as an allocation index, with higher allocations going to those municipalities with the lower index scores.

One mechanism for ensuring that such funds are fully and productively utilized, is to provide indicative allocations which would be subject to periodic review, and possible reallocation if the local authority (or local action group in the case of LEADER) is not able to develop viable projects within the appropriate time frame. These reallocation decisions would be made on the basis of successful absorption of the funds allocated, along with other region's performance indicators (Saktina et al).

Conclusions and Recommendations

The extended process of collecting data and comparing characteristics of different municipalities has clearly demonstrated the importance of abundant and high quality data at the most detailed possible level. This is especially a problem in rural territories, where there is less data available. Separating rural territories from urban areas is practically impossible except for the major cities. In general, there is a need for more years of data and more recent data for some factors. NUTS 3 level data are not very helpful because they are too aggregate to identify territorial differences, but data for NUTS 4 and NUTS 5 levels is rather limited.

Diagnostics will be improved if better data is available, and it would help to improve program design and implementation too. Improved data should include more indicators reported by Department of Statistics, increasing coverage of existing data for rural area, and possibly surveys to gauge the attitudes and

behavior of the rural population. Among the most important data that were not available at the NUTS 4 level were GDP per capita and the education levels of the population (which would reflect the quality of labor).

A well organized and detailed monitoring system would be of great value in tracking the improvements or deterioration of conditions in different communities and regions. It would be a way to institutionalize the type of analysis of territorial characteristics that has been reported here.

In order to improve access of disadvantaged or lagging areas to the programs and development resources of EU and National programs, it is important to take a place-based approach to evaluation of needs and the development of solutions. This includes building the capacity of peripheral and lagging areas through training and bottom-up approaches to local development, designing and managing programs so that there is wide access available, and using regional envelopes to prevent project resources from being dominated by a few large projects in prosperous regions.

It is important to solve co-financing problems of EU supported projects for eligible applicants who lack the personal financial requirements. Possible mechanisms and measures providing exemptions or increasing the grant share of projects should be considered in order to increase absorption of project funding in lagging areas where access to co-financing is constrained.

This study has demonstrated how to use socio-economic indicators to identify lagging areas and to develop envelopes as indicative funding levels to encourage broader participation and prevent resources from being monopolized by a few, prosperous areas and entrepreneurs. Such an allocation approach could be designed for specific measures or a broader range of activities or programs. There is not only one way of making such allocation computations. Important policy decisions on such envelopes are where and when to apply them, what factors to include in them, what weights to use if more than one indicator would be needed for that, and finally a mechanism for reallocation of funding resources if a region is not able to use it.

Finally, there are different problematic areas with potentially different criteria for support during the 2007-13 programming period, but it could be useful to consider all the lists of lagging areas in applying measures to different territories. For example, the Lithuanian Ministry of Interior (MoI) is looking only at their list of two indicators, which, as this study showed, are not correlated with income and investment disadvantages. So, while some of their lagging areas are the same as in this study, some of the lagging ones identified in this study are not included in the MoI list. Also, some of their “disadvantaged areas” are not disadvantaged ones according to other indicators. So the method of this study with a broader list of indicators could be helpful in reassessing the ranking of assistance receivers.

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PARTIAL PRODUCTIVITY OF AGRICULTURE IN THE WESTERN BALKAN COUNTRIES – IMPLICATION FOR COMPETITIVENESS OF THE RURAL ECONOMY¹

Stanislav Zekić, Milivoj Gajić, Koviljko Lovre²

Abstract

The process of transition and, within it, the agricultural transformation in the Western Balkan countries resulted, in the first phase, in the weakening of the developmental performances in agriculture. Such tendencies widened the gap between the countries of the Western Balkans and the EU countries, which continued their steady increase in agricultural productivity. Unfavorable tendencies in agricultural productivity adversely affected its competitiveness, and, consequently, the competitiveness of the rural economy as a whole. The effect of the low agricultural competitiveness on the competitiveness of the rural economy is determined by the importance of agriculture in the rural economy, which is substantial in the West Balkan countries.

Key words: Productivity, Agriculture, Competitiveness, Rural Development, the West Balkans, Transition.

Introductory Notes

The Western Balkan countries - Albania, Bosnia and Herzegovina, Montenegro, Croatia, Macedonia and Serbia represent the "un acceded" area of the South East Europe, and have, to a greater or lesser extent, come closer to the EU accession. During the process of accession, agriculture will certainly be one of the

¹ This paper represents a part of the research on the project of the Ministry of Science and Technological Development, Republic of Serbia., entitled: Multifunctional Agriculture and Rural Development towards the Accession of the Republic of Serbia to the European Union– 149007.

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key issues in negotiations, due to the role the agrarian sector plays in these countries, and more importantly, its low competitiveness. In other words, agriculture in the Western Balkan countries is characterized by the predominance of small, individual farms which increasingly use semi-natural production methods. Such structure of the agrarian sector causes the unsuitable ratio of the number of active farmers to the area of land (expressed in *ha*) which consequently leads to a low level of agricultural partial productivity - especially labor productivity. The low level of agricultural competitiveness influences the competitiveness of the whole rural sector, where agriculture represents the dominant economic activity.

The Processes of Transformation and the Structure of Agriculture and Rural Areas

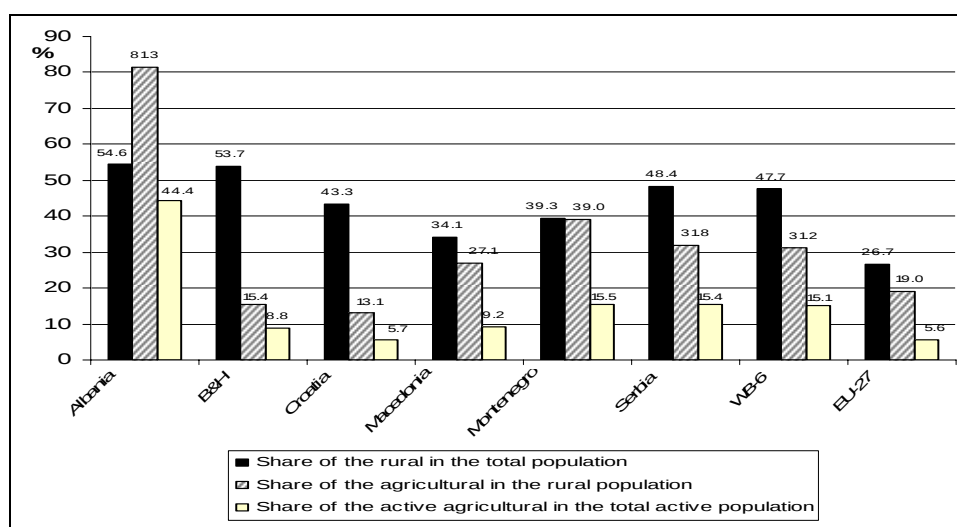
On one hand, the Western Balkan countries were characterized by large public/state firms; while on the other hand, there were small individual farms, which occupied most of the land area, with the exception of Albania. Therefore, Albania suffered the most dramatic consequences of the restructuring of farms, because all collectivized land was distributed to farmers and farm workers. The land privatization created around half a million new private farms, segmented into 1.900.000 parcels, where each farm consisted of between one and ten parcels, i.e. 3.3 parcels on average. During the 1990s, the average farm size in Albania was very small: 1.05 *ha*, and it stretched to 1.29 *ha* in the flat area¹ or shrank to 0.55 *ha* in the mountainous area (*Cunga, A., Swinnen, J. F. M., 1997, 7-8*).

The former Yugoslavia did not have collective farming during the socialist regime. The private sector was dominant in Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro, and at the end of the 1980s it occupied around 82% of the arable soil (*Swinnen, J. F. M., Mathijs, E., 1997, 352*). As a result, the private land ownership has been dominant in all "heir states", i.e. there have been individual farms with a small average size, and with highly fragmented ownership structure, which has been caused by the retention of traditional inheritance laws. The very small average size of farms and high degree of land fragmentation represent a serious problem concerning the improvement of productive efficiency of individual farms. In Bosnia and Herzegovina, approximately 95% of the land, with an average size of 3 *ha* to 5 *ha*, is in private ownership. In Croatia, private ownership takes up 66% of the land, and the average size is 2.9 *ha*. In Macedonia, the private sector takes up between 70% and 85% of arable soil, consisting of farms with a very small average size of 2.5 *ha* to 2.8 *ha*. Serbia and Montenegro, like other countries, is characterized by predominance of private ownership, which occupies over 85% of arable soil. The rest of arable soil is in the hands of the state,

¹ In some flat regions with limited land resources, the average farm size was less than 1 *ha*.

and it is cultivated by huge state farms. These countries are undergoing the process of land privatization, so the share of private ownership is constantly on the rise. The average size of highly fragmented individual farms is very small, and it varies between 3 *ha* and 5 *ha* (Csaki, C., Zuschlang, A., 2004, 68-115). These farms mostly rely on their own workforce, which often consists of households with older members. Out of 800 000 farms, slightly over 100 000 have only one member. There are two members in slightly over 200 000 farms (Bogdanov, N., 2004, 107). Considering only registered farms, the average size of an individual farm is 6.3 *ha*, while the average size of agricultural firms is 431 *ha*.

Figure 1 Rural, agricultural and active agricultural population



Source: Own calculations on the basis of FAOSTAT.

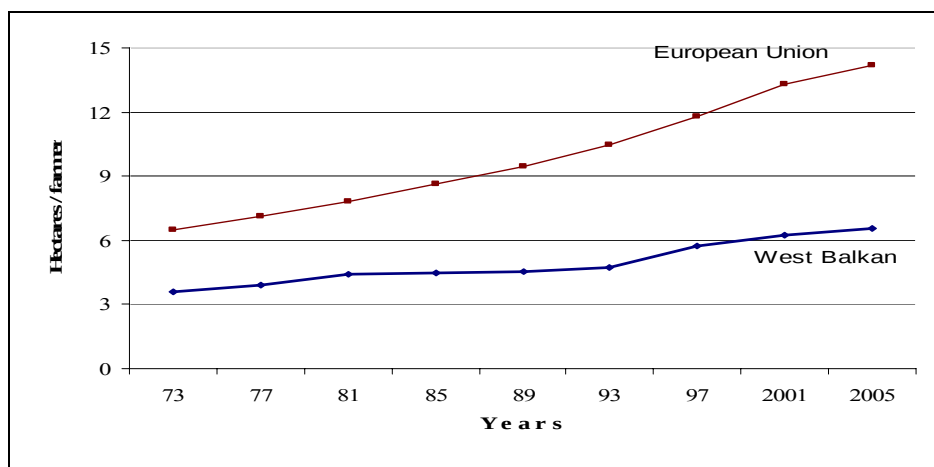
There is a relatively great number of inhabitants in the rural sector in the Western Balkan countries – almost 50%, and they are largely associated with agriculture – farm inhabitants make up around 1/3 of rural population – in Albania even 81% of rural population. In the EU-27, 1/4 of population inhabits the rural area, and every fifth person works in agriculture as a primary activity. In addition, the share of active farmers in total active population is larger in the Western Balkan countries – around 15%, while, it is below 6% in the EU-27, and even less in the EU-15 (Figure 1). The share of agriculture in the total GDP varies from 7% in Croatia to 23% in Albania, while the percentage is one-digit in EU, with the

exception of a few new member states.¹ According to all the criteria mentioned above, Albania represents "the most rural" and "the most agricultural" country in the region, which it largely owes to the farm structure. Agricultural structure highly affects the resource structure in other countries in the Western Balkans as well, which is reflected in the level of agricultural productivity and the competitiveness of the agrarian, and consequently the whole rural sector.

The Resource Structure in Agriculture

The favorable resource structure in agriculture, i.e. the ratio of basic productive factors of land and labor results in the predominance of mechanic or bio-chemical technology, which further influences the differences concerning the level and growth of partial productivity, as well as the differences in determination of labor productivity growth. Partial labor and land productivity are "connected" through the factorial relation between the land and the labor, which can be expressed as $(P/L) = (P/A) * (A/L)$, where P , L and A stand for production, labor and land respectively.²

Figure 2 Structure of agricultural resources



Source: Own calculations on the basis of FAOSTAT.

¹ Source: earthtrends.wri.org.

² The volume of agricultural production is expressed in 1990 international dollars; the labor is represented through the number of active farmers, and the land through the sum of arable land, multi-year crops, meadows and pastures. All categories are defined according to the FAO methodology, since the data is taken from the FAO database FAOSTAT (faostat.fao.org).

Resource structure in the countries of the Western Balkans is far more unfavorable than in the EU-27 (*Figure 2*). Resource favorability varies significantly in the Western Balkan countries. The greatest availability of arable land per labor has Croatia, and the smallest Albania, the only country in the region which has witnessed decrease in the land/labor ratio. Within this context, Serbia could be among the countries with less favorable resource structure, i.e. with a relatively high number workers in agriculture (*Zekić, S., 2008, 67*).

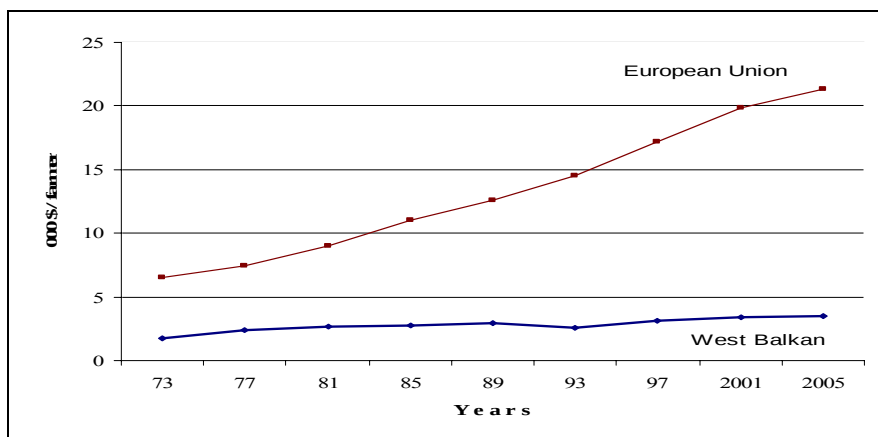
On the plus side, however, the transitional process within all the countries of the Western Balkans, considering all the changes in the agrarian structure, has largely improved the change of more or less extensive ownership structure that is represented here with the rising amount of arable land per farmer. However, this ratio is still lower compared to the EU countries. Although the intensity of changes in the agrarian structure is, on one hand, a function of general economic development, it is necessary to point out that, on the other hand, it is determined by the agrarian policy as well, especially by the policy of structural reconstruction of agriculture in the countries in transition, i.e. their readiness to base their agrarian reforms on the European agrarian model, whose last evolutionary feature is associated with agricultural multifunction within the integrating policy of the agrarian and rural development (*Gajić, M., Lovre, K., Zekić, S., 2007, 592-593*).

Partial Productivity in Agriculture

The analysis of labor productivity in agriculture, measured by the volume of agricultural production per active farmer, shows that it significantly falls behind in the countries of the Western Balkans compared to the EU countries. Although there has been a slight increase in this type of partial productivity over the past fifteen years in the Western Balkan countries, the gap with the EU-27 has additionally widened. In other words, the gap concerning labor productivity between these two groups of countries rose from 1:2.53 between 1973 and 1989 to 1:3.43 in the period between 1990 and 2003. The gap is even wider if the comparison includes the "old" EU member states, i.e. EU-15 and it is 1:3.88 and 1:4.92 in pre-transition and transition periods¹ respectively (*Figure 3*).

¹ As far as labor is concerned, the referential pre-transition period is represented by the last 16 years of the socialist era, i.e. the period between 1973 and 1989, while the transition period starts with 1989. Such division has been based on the FAOSTAT database.

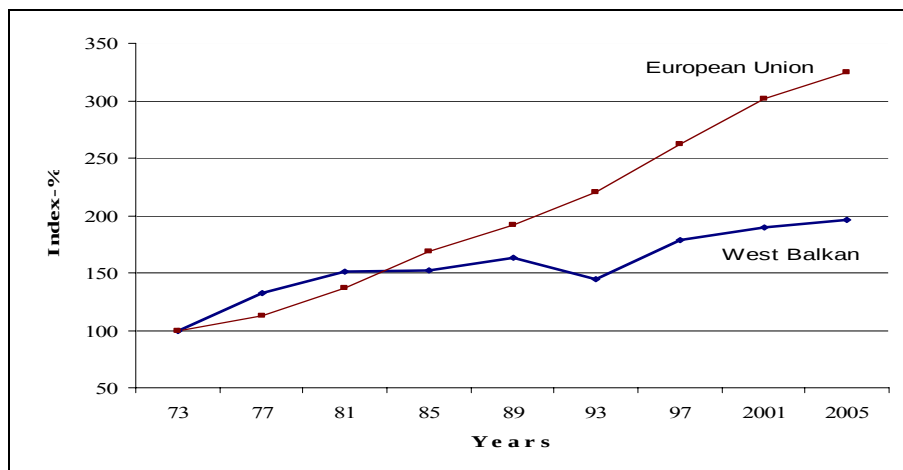
Figure 3 Level of labor productivity



Source: Own calculations on the basis of FAOSTAT.

If we look at the countries individually, labor productivity is highest in Croatia, while Albania holds the lowest level of this type of partial productivity (Zekić, S., 2008, 57). The increase in labor productivity is much more apparent in the EU-27, where the average annual rate of growth of agricultural production per active farmer is 3.43%, for a given period, compared to 1.67% in the countries of the Western Balkans (Figure 4).

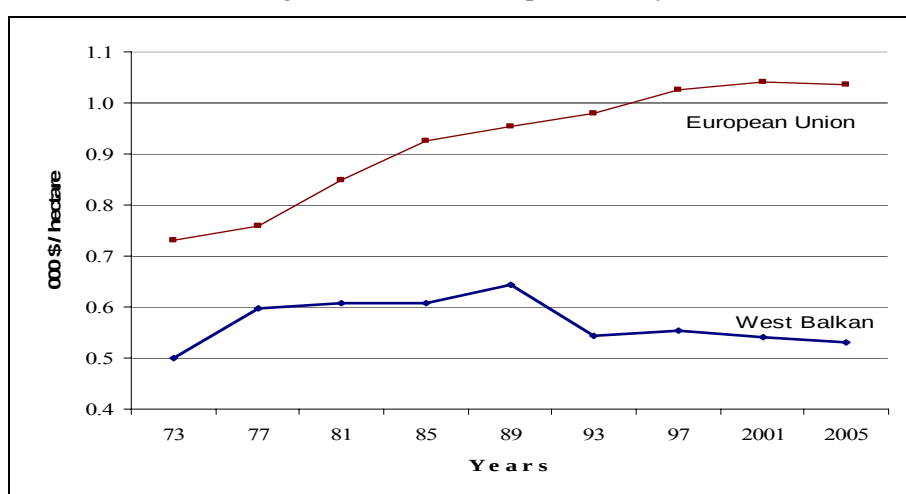
Figure 4 Dynamics of labor productivity



Source: Own calculations on the basis of FAOSTAT.

As far as land productivity is concerned, the situation is somewhat more favorable in the Western Balkan countries, since the gap with the EU-27 is slightly narrower, i.e. 1:1.34 and 1:1.59 in the pre-transition and transition periods respectively. If fifteen old EU member states are included in the comparison, the gap is, naturally, a slightly wider, i.e. 1:1.58 and 1:2.10, for given periods, respectively (*Figure 5*).

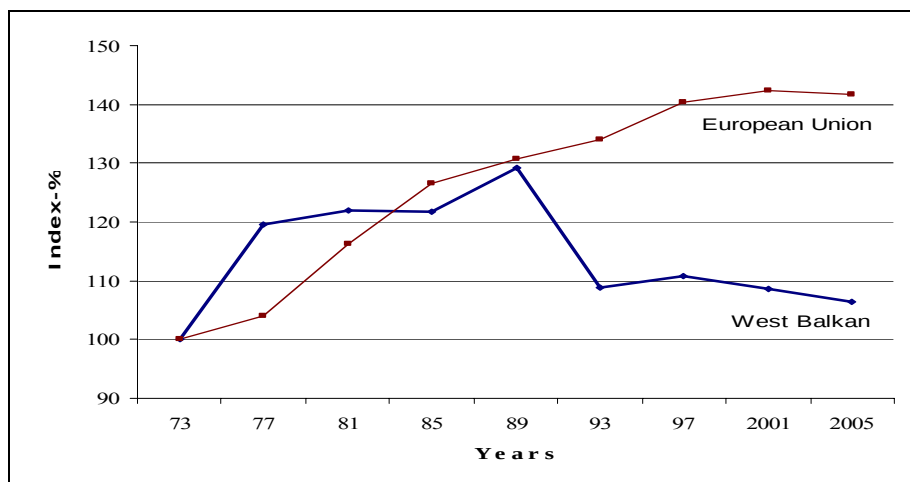
Figure 5 Level of land productivity



Source: Own calculations on the basis of FAOSTAT.

Croatia, Serbia and Macedonia have the greatest volume of production per *ha* of arable soil, while Bosnia and Herzegovina holds the last position (Zekić, S., 2008, 59). However, in contrast to labor productivity, the level of land productivity in the countries of the Western Balkans has decreased during the period of transition, so that, in the given period of analysis, the average annual rate of growth is -0.05% or -0.54%. Although there has been a decrease in land productivity in the new EU member states since 1989, the EU-27 records the increase of 0.82% on average per year, for the given period, in this type of partial productivity (*Figure 6*).

Figure 6 Dynamics of land productivity



Source: Own calculations on the basis of FAOSTAT.

Rural Economy Competitiveness

Farm producers in the Western Balkan countries will, sooner or later, find their place in the common EU market, where they will be exposed to strong pressure of competition from highly efficient producers from, first and foremost, and the highly developed countries of Western Europe. In the process of integration with the common EU market, the non-competitiveness of the agro-food sector in these countries, characterized by a low level of agricultural productivity, especially labor productivity, will induce high costs of production, i.e. price non-competitiveness of food products in the common agricultural market.

The low level of labor productivity is mostly determined by unfavorable resource structure in agriculture, i.e. by a relatively large number of workers in this sector, which is slowly shrinking due to insufficiently rapid development of the non-agricultural sector. The preservation of "over employment" in agriculture "is enabled" by high rural unemployment accompanied by the dual agrarian structure¹, which is predominant in the Western Balkan countries.² Such situation adversely

¹ On one hand, the dual agrarian structure is characterized by large commercial farms, while on the other hand there are small individual semi-natural farms.

² The retention of a large number of workers in agriculture goes hand in hand with the current land policy, which on one hand forbids foreigners, sometimes even national corporations to purchase the land, and on the other hand "promotes" short-term and usually informal lease due to the weak legal protection of land lessees.

affects the profitability of agriculture, diminishes the volume of investments and makes the increase in competitiveness impossible. The effects of high employment in agriculture in the Western Balkan countries depend, among other things, on the political influence of agricultural lobbies and rural population.

In the countries of the Western Balkans agriculture is still undergoing transformations, i.e. there are still traces from the former socialist economy which are to be overcome. The agricultural structure continues to be unfavorable, with a large number of small farms and co-existence of semi-natural and commercial farming sector. Rational application of agro-technical systems to small, semi-natural farms is not possible. This causes low labor productivity, which consequently cannot ensure adequate income.

Another problem in the agro-food sector in the Western Balkan countries is reaching EU standards, i.e. EU requirements concerning product quality. The application of EU standards will have two contradictory effects on the agricultural production and prices. On one hand, cheap, low-quality products will be excluded from the market, and they are still in demand by the poorer population, and partly by the export market in the "poorer" countries. On the other hand, the implementation of the standards mentioned above will have the opposing effects concerning the acceleration of restructuring and creation of more efficient agriculture and channels of food distribution, so that the first middle-term results will be seen in the countries with the low level of restructuring of the agro-industry.

In addition to the comprehensive restructuring process, agriculture in the region should be recapitalized so that production can be modernized and costs reduced. The problem is particularly noticeable in cattle breeding, which will have more difficulties in conforming to EU standards, while the level of competitiveness in plant production will be determined by high transportation costs and a lack of storing capacity. On the other hand, rural regions require faster development of "non-agricultural" activities, which would enable the absorption of the excess of labor force, which is unproductively employed in agriculture.¹ Within this context, the development of this sector for processing farm products, as well as agricultural input industry could play a "significant" role. These processes should be accompanied by the erection of an infrastructural network as well as raising the general level of services.

¹ The development of non-agricultural activities in rural regions will ensure alternative possibilities for the use of labor, capital and land, as well as changes regarding the demand for these factors, which will be reflected in the structure of farm production (Lovre, K., Gajić, M., Trkulja, Đ., 2007, 82).

In order achieve necessary restructuring of agriculture so as to increase agricultural competitiveness, after the accession to the EU, the countries of the Western Balkans will be able to use relatively huge resources from the EU funds, such as direct payments. However, the important question is: what will be the level of such support at the moment of accession of individual countries to the EU and, what will be the outcome of pre-accession talks. Moreover, it is not certain to which extent will this kind of support be adjusted to the economic and social aims of transforming agriculture. In other words, there is a risk that directs payments will be absorbed by increased demand and increased land prices, and that they will result in consolidating the existing structure. This will slow down the process of restructuring towards reducing "over employment" in agriculture and solving the problems of high degree of land fragmentation. In short, direct payments can turn out to be inadequate instrument to obtain investments and social security in agriculture. During the pre-accession period, the countries in the region will be able to use IPA resources (*Instrument for Pre-Accession Assistance*) for their rural development, especially once they become candidates for the EU membership. Then, all five types of support will be available to them, including the support for the development of rural regions.

Conclusion

In the Western Balkan countries, the rural structure is far more unfavorable than in the EU countries, which largely determines the relatively low level of partial productivity in agriculture. This is especially noticeable in labor productivity. As a result, the level of competitiveness of the agricultural sector is fairly lower compared to the EU countries. Since agriculture represents the dominant economic activity in rural regions of the Western Balkan countries, the low level of the competitiveness of the agricultural sector significantly reduces the competitiveness of the rural economy as a whole, as well. Within this context, necessary reconstruction of agriculture is still far from completion. The problem of competitiveness is particularly noticeable in the sector of cattle breeding as well as in small semi-natural farms, which will have the greatest difficulties in the future common EU market. However, such farms are still of key importance for social security in rural regions, where semi-subsistent production represents the main factor of economic sustainability. In addition, rural regions require faster development of non-agricultural development, which would enable absorption of the excess labor force unproductively employed in agriculture. Within this context, the development of the sector for processing farm products as well as the agricultural input industry could "play" a significant role.

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“SOCIAL AGRICULTURE”: A PATTERN BETWEEN FARM INNOVATION, SOCIAL RESPONSIBILITY AND MULTIFUNCTIONALITY

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Abstract

Rural context and agricultural process are assuming growing credibility as a mean to promote well being and social inclusion in the population as a whole.

Fattoria solidale del Circeo” constitutes one of the many examples of social agriculture that have risen in the recent years in Italy. Differently from the general case, it is a large farm which is moving from a conventional an intensive farming system to another model, without abandoning its entrepreneurial nature.

Even if it is not easy to assign a theoretic paradigm, it could be useful both in order to understand it and to give correct instruments to policy makers. So we can try to put the Fattoria Solidale del Circeo’s experience in a theoretic context.

It seems to us that at least three different models can be applied: the well-established Schumpeterian model of innovation; the Corporate Social Responsibility, the Multifunctionality of agriculture.

Key words: Social agriculture, Innovation, Corporate Social Responsibility, Multifunctionality of Agriculture

Introduction

Rural context and agricultural process are assuming growing credibility as a mean to promote well being and social inclusion in the population as a whole. We do not refer only to the countryside capacity to improve individual welfare because of the slower and relaxing lifestyle, we refers to specific experiences developed by

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some farms in supplying social and health services. In Italy, role of agriculture in social and sanitary processes is not news: agriculture has been used for at least 30 years in social inclusion trail in the case of drug dependency and more recently it has been used in psychiatric department as a support in therapy. However, now the range of social services supplied by farms is widening and, at the same time, agricultural policy has started to support farms which supply social and health services, namely project of labour training for disabled people (especially mentally deficiency); didactics visit for school children; “green cares” such as horticultural therapies. Even if “social agriculture” has not yet a juridical framework in Italy, at least two important planning documents mentioned it: the rural national strategy plan, produced in the context of rural development policy and the programme “Guadagnare Salute” approved by ministry of Health in 2007. In the latter it is hoped that rural development policy takes in account the aim to develop healthy activities for population also trough social agriculture.

On the other side, Italian National Strategy Plan considers “social agriculture” as a possible mean of farm diversification beyond to be an opportunity to improve quality of life in rural areas. More specifically, strategic plane considers interesting to promote and support the increasing trend of farm to implement private enterprises which develop practices addressed disables, weak and socially excluded people.

Different practices and different juridical frameworks

Many activities can be considered under the category of “Social agriculture”. These practices may be very different each others, except for the fact that every of them is based on natural resources and rural context. It does not refer to a passive experience of the beauties of the countryside as it happens in the agro-tourism. It deals with the use of the vegetable and animals as a tool in different kind of social services (therapeutic, rehabilitative and social integration activities) because of the persuasion that natural cycles and rural rhythm have a thaumaturgical attitude.

A part of the possibility of overlapping, we can group the Italian experiences under a few different categories according to their prevalent ambit of action (Di Iacovo, edited by, 2008). The grouping on one side implies a simplification which reduces the complexity of the real situation, on the other side is useful to supply a briefly presentation of this world¹.

The groups are:

¹ A wide description of Social Agriculture is available on the “Social Services in Multifunctional Farms” (So Far) project’s website: <http://sofar.unipi.it>.

Professional training and labour inclusion, directed to low bargaining people (disabled individuals, ex drug-addict, detainees, etc) where agricultural creates the opportunity of employment and income for disadvantaged people;

Recreation and quality of life, which are mainly “not for profit” activities, often managed by municipality which give little allotments to elderly people with the aim to create opportunity both to enjoy oneself and socialize with the neighboured;

Education, that is actions to improve knowledge of agricultural practices and rural culture and to develop the environmental sensitivity in the new generation (garden in the school managed by the schoolchildren, educational farms, etc.);

Services to population in rural areas, such as kindergarten, summer reception for children, elderly home. Since lack of services, together with the low job opportunities, is one of the most important reasons of depopulation in rural areas, this opportunity seems particularly interesting on the point of view of the local development dimension;

Rehabilitation and therapy, where socio-sanitary professionalism prevails. Agriculture is a tool to improve the welfare of individual with some kind of problems (generally psychiatric). Agricultural activities could be carried out in sanitary structure or in farms which supply their resources and expertises.

From the normative point of view, social agriculture often finds a settlement in the field of social cooperation¹. More specifically, agriculture could have a passive role being part of a wider therapeutic project because of the “thaumaturgical” power of the rural context. This is the case of the Animal Assisted Therapy with or horticultural therapy (Sempik, 2007).

Another is the case in which agriculture constitutes the business of social cooperative and it grants the opportunity of employment and income for disadvantaged people².

In Italy, cooperative is a consolidated normative framework for the social agriculture, as well as for the “social oriented” activities in general. Further this typology social agricultural could be implemented both by public bodies and by

¹ According to law 381/1991, the social nature of the cooperatives in Italy – which implies some fiscal facilities– could be linked to the object of the services supplied or to the characteristics of their members. So they could be: “A kind”, which supply educational, social and sanitary services; “B kind”, which have the aim to improve the opportunity to work of disadvantaged people. In addition the cooperatives could be a mix of the two typologies.

² About 30% of the “B Kind” or mix cooperative is active in the agricultural sector.

“for profit” enterprises, but often it implies some kind of agreement between public and private sector (table 1).

Table 1 Main kind of social farming experiences in Italy

Kind of organisation farm	Kind of activities	Position of organisation/farm	Position of disadvantaged persons
“A” social cooperatives (non for profit enterprises)	care farming, education	providing care services’ or education; care is paid by social/health public bodies (daily fees); education can be paid by diverse institutes; obligation: no profit	public services’ users; can be also members of the cooperatives
“B” social cooperatives (non for profit enterprises)	labour integration; socio-therapeutic integration; training; socio-recreation	doing business in agriculture (and other sectors) as a means of social inclusion; opportunities: subsidized contracts, tax relief, systems of agreements for adjudication of jobs; obligations: no profit, minimum 30% of employed disadvantaged persons	can be regularly employed, trainees or volunteers; can be also members of the cooperatives. In case of socio-recreation can be paying users/participants
Private farms (for profit enterprises)	training; socio-therapeutic integration; labour integration; socio-recreation	doing business in agriculture for profit; opportunities: human resource for labour, subsidized contracts, (other indirect advantages).	can be trainees, volunteers or regularly employed. In case of socio-recreation can be paying participants/users
Public Institutes	care farming; socio-therapeutic integration; training	providing care, education, rehabilitation; being involved in research or other activities in the fields of agriculture and/or social/care	can be users, be engaged in rehabilitative, research or educational programmes, volunteers, trainees or else.

Source: Di Iacovo, Pieroni, 2006

Recently, new opportunities could rise from the decree n. 155/2006 which acknowledges the social enterprise as the firm which does not pursue the aim of profit but social welfare improvement. This new rule could produce an improvement in the social activity in agriculture as well as in other sectors.

A case study

“Fattoria solidale del Circeo” constitutes one of the many examples of social agriculture that have risen in the recent years in Italy. At the same time this experience is particularly interesting because, differently from the general case, it is a large farm which is moving from a conventional an intensive farming system to other model, without abandoning its entrepreneurial nature.

The farm was established in the Pontina Plane to the South of Rome in the XIX century and it witnessed to great natural and social changes. In fact the area was a marsh which has been reclaimed during the Fascism regime. After reclamation productive organization of the area changed from a marginal model linked to the traditional *transhumance* to a very intensive and modern exploiting of land. The farm has been managed by the same household for four generation and the family was always able to readapt its business to the new environment over the time.

Nowadays, social demand towards agriculture is being enriched by new expectations from agriculture activities and rural context. This fact gives to actual young holder – Marco – the opportunity to combine his entrepreneurial attitude with the attention towards the disables. For a long time he has given voluntary services within an organization for disables. There he could notice that disables’ capabilities were probably unevaluated. In fact they were engaged into a lot of activities but to work. On the contrary he was sure that they could be able to do some kind of jobs. After he became the holder of the farm, in 2004 he invited some disabled persons to work in his farm during summer period. In this first experimentation 40 persons were involved in different productive phases according to their abilities.

During this experience, both disables and their voluntary assistants were accommodated in one of the building within the farm. In fact, together with the 150 ha of land the farm includes some buildings and even a little chapel. Since the farm is specialised in dairy, that is a low labour intensity activity, some vegetables were planted to give the guests the opportunity to do a simple, not dangerous cultivation with a short productive cycle. So they could have the possibility to see the concrete results of their work. In addition to farming simple conservation process had been done in order to give the opportunity to participate to people unable to walk.

On the very beginning, Marco had an entrepreneurial approach that is he was immediately oriented to economic self-sufficiency. In fact he registered a brand “Splende il Sole!” (Sun is shining!) which made it clear that the products involved disabled people’s work.

After the products were carried on the market, it seemed clear people prefer “social products” among others but they are not willing to pay a higher price. As a consequence Marco decided to concentrate on high added value and labour intensive production such as ready-prepared fresh salads. On the same time he turned to direct selling and created an organised purchasing group, which is a group of people looking for ethical consumption.

Together the feasibility of the project, the test demonstrated the existence of some needs. First of all the necessity of training on the agricultural practices. Assistants have to do training as well as disabled people. Otherwise sanitary operator was not able to valuate neither the dangerousness neither the potentiality of the agricultural practices for disabled people.

Training has become an important part of the Fattoria Solidale’s activity, further the necessity of its own projects. Many experiences were born which gave also the opportunity of collaboration with local professional schools. After this positive experience he decided to set up a professional training activity for disabled. The two years course is now going to finish and some people will be employed in the farm. The farmer, together with a specialised pedagogue team, is now planning other activities in the field of social services. One of the most interesting features of this experience is the owner’s strong will that social services achieve an economic self sufficiency so that they could have continuity without weighing on other farm’s activities or depending on public support.

Some possible theoretic frameworks

Social agriculture is a spontaneous phenomenon which is not easy to put into a theoretic paradigm. Agricultural economists are trying to understand in which of their categories they have to allocate these experiences with the purpose to suggest instruments to policy makers.

So we try now to put the Fattoria Solidale del Circeo’s experience in a theoretic context.

Generally speaking social agriculture can be trace back to, at least, three different models. They are the well-established Schumpeterian model of innovation; the Corporate Social Responsibility and the Multifunctionality of agriculture.

Social practices in agriculture need of a double kind of professionalism: agricultural and social expertises must interact to conceive actions and adapt them to specific context and requirements. At the same time, this is a very new field and protocols do not already exist. As a consequence these practices are always very specific and farmer's ability to innovate is a key element for their successful implementation. As usual, attitude to innovate is the main incentive for survival and expansion of business and – in a wider perspective – for the general development of society. Entrepreneurs introduce innovation to look forward to improve their earning and, doing that, they also improve collective welfare. On the other hand, since we are talking about private enterprise, it is important to consider that each experience must be remunerative, and so self-sufficient. In a capitalist system profit-seeking is the drive behind the economy. Social agriculture could be interpreted as a product innovation to meet the new demand rising from the post-modern society.

On another point of view, in the Corporate Social Responsibility (CSR) approach, profit is conceived in a new way. It is not still strictly related to firm perspective but it must involve other expectations. In fact, in the CSR profit maximisation is still considered the main motor of the economy but entrepreneurs must limit themselves in order to consider also other stakeholders' needs. Widening the meaning of profit is considered necessary to prevent social conflict and, definitively, to let capitalism survive. In fact, conflicts are perceived as intrinsic to capitalism and without a new ideology able “to widen the definition of capitalism from being economic-specific, to include the social and environmental” issues, capitalism will fatalistically destroy itself (David Birch, 2003). Social agriculture could be interpreted as a tool to involve social concerns in the purposes of economic activities.

Finally, since we are in the context of primary sector, Multifunctionality of agriculture can constitute a specific theoretical framework. Multifunctionality refers to the specific capacity of agriculture to supply benefits beyond its ability to be remunerated for them. This happens because of the presence of jointed products. More specifically, according to the “working definition” of OECD (2000), two key elements concur to the definition of Multifunctionality: “the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture; and the fact that some of the non-commodity outputs exhibit the characteristics of externalities or public goods”.

Social agriculture supplies externalities because it contributes to quality of life in rural areas and in this way it could play a part in prevents their depopulation. In fact scarcity of services in rural areas could be one of the factors which reduce their viability. At the same time, development of social agriculture, because of its multidisciplinary nature also feeds local social capital, which is a public good.

The definition of the theoretical framework is not a pure academic exercise, but it is necessary to individuate which role must be attributed to policy maker. In the case of innovation, public intervention must support the general contest in order to create a good environment for the development of the farm.

In the CSR context, the main problem is the “information asymmetry”. It deals with the situation in transactions where one party has more or better information than the other. This creates an imbalance of power which can sometimes produce a “market failure”, that is the transactions does not occur as in the case of adverse selection (Akerlof, 1970) or it results unfair. In this case the role of State is to grant the transparency on the market, so that the farm does not boast a virtuous behaviour without reason.

Finally, if we are considering the case of the Multifunctionality of agriculture, it will be necessary to support the producing of good externalities or public goods (such as social well being and cohesion).

Conclusion

After the brief review of the possible theoretical approach, we can compare our case study to it.

Fattoria Solidale del Circeo was born as a consequence of the holder's sensitivity about social inclusion of disables. Even if, as we said, he adopts an entrepreneurial approach, his main concern is to supply an opportunity to improve quality of life of a specific category of people and not to improve his earning.

This attitude is consistent with other actions he puts into practice on the territory. For instance, independently of this specific experience, he has often employed disadvantaged people when he was asked by local association to help someone.

Since the main drive behind Fattoria Solidale is a social concern, we conclude that in this case the CSR model seems to prevail, but together with CSR feature we can underline that it is also a case of innovation as well as an example of Multifunctionality of agriculture.

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HUMAN CAPITAL AND FARM HOUSEHOLDS: A MAP OF MANAGEMENT MODELS IN ITALY

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Abstract

This paper is designed to verify empirically the choices that Italian farm households make when investing in human capital. Census data from the National Institute of Statistics (Istat) were used to describe the main structural and organisational characteristics of the farms. Multivariate statistical tools were used to process the information in the database, so that the different types of Italian farm households could be defined and geographically located. The results allowed us to analyse the competence endowment inside the family farm by determining the existence, the types and the strength of the relationships between the characteristics of family farms and certain variables which described the specific local environment and the human capital available to the family. At the end of the paper we make some suggestions for norms which may be of value to policy makers.

Keywords: human capital, household farms, agricultural labour, spatial analysis.

Introduction

More than 90% of the 2.5 million Italian farm workers are exclusively or mainly family members (Istat, 2003). In such farm households the management models are conditioned by economic and extra-economic objectives and are influenced by various factors. Among these the most important are: i) the existence of employment opportunities other than labour on the farm (Mortensen, 1986); ii) subsidising underemployed labour resources (Barkley, 1990); iii) legislation on social security and welfare for agricultural workers and the rural population as well as access to effective incentives for early retirement (Sundstrom and David, 1988; Gale, 1993); iv) the structure and size of the family holding and, to be more precise,

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the predominant property owning system in the area (Gasson and Errington, 1993); v) the availability of resources for investment in general and the specific knowledge of the availability of such resources in the family (Bernheim et al., 1985; Huffman, 2001). These environmental factors influence the farmers' organisational and strategic choices in different ways.

The adoption of organisational and management solutions by household farms has several implications for human capital investment and endowment. This argument is of great importance today, because the new European Agricultural Model (sustainable, multifunctional, competitive in the global arena) introduced by the recent CAP Reforms requires new skills and knowledge and the family farm has to immediately adapt to it (European Commission, 2003).

This paper is designed to verify empirically the choices that Italian farm households make when investing in human capital. A spatial analysis of the different types of farms was carried out, by drawing up a map of farm households in Italy. Census data from the National Institute of Statistics (Istat) were used to describe the main structural and organisational characteristics of the farms. Multivariate statistical tools were used to process the information in the database, so that the different types of Italian farm households could be defined and geographically located.

The diversity among farm types is related to the quality of the human resources available on the farms. There are some diagnostic parameters which can be used to describe this (educational levels, female involvement, young entrepreneurship etc.). The results allowed us to analyse the competence endowment inside the family farm by determining the existence, the types and the strength of the relationships between the characteristics of family farms and certain variables which described the specific local environment and the human capital available to the family.

Background

The human capital endowment of farms is an important factor which must be borne in mind when evaluating the relative competitiveness of local agricultural production systems. Among its components, the investments made in education and training over a period of time are frequently considered to be among the most significant factors when analysing farm efficiency as well as total factor productivity and real wages and income. There is a great quantity of economic theory literature and applied research essays and articles on the returns produced by such investments (see for example Schultz, 1964; Becker, 1993; Johnson, 2000). At the moment it is widely accepted that education and training investment is optimal when marginal returns are equal to marginal costs (Huffman, 2001). In other

words, such investments encourage qualified workers to take up off-farm employment, where the acquired knowledge and competence are rewarded by higher wages. This is true for farms where new technology is only adopted slowly. However when extra-farm wages are insensitive to qualifications and competence and agriculture can count on a constant stream of innovations which require new skills, then investment in education and training can ensure good returns inside the farms themselves. Empirical research has found that in developed countries additional schooling increases the likelihood that farmers will be employed in off-farm waged work. This is not necessarily the case for farmers working in the Green Revolution areas of developing countries¹ (Huffman, 2001). Investment in education and training is very sensitive to the time horizon of the choice. Thus, human capital investments made during the later stages of an individual's life are obviously of less value. By contrast, the steeper slope of the graph of the marginal costs of the investment suggests that human capital accumulation should be spread over more than one period (Huffman, 2001).

Census data shed some light on the conditions of Italian agriculture (Istat, 2003). Only about 64,000 people out of more than 2.4 million employed in agriculture have an agricultural science (or engineering) degree or diploma. This number rises to about 470,000 when all types of degrees and scholastic titles are included. A recent analysis found that farms managed by farmers with degrees in Agricultural Science had an average turnover of € 66,876, while the national average was only about € 15,000 (CNEL, 2004). The former work on farms with an average size of 19.9 hectares of farmland, corresponding to € 3,363 turnover per hectare, which is lower than the national level of € 3,409 per hectare. The specific characteristics of skilled farmers can be identified when one considers the turnover/days of labour ratio. In their farms this figure is estimated to be € 239 per day, far higher than the national average of € 124 (CNEL, 2004). These data are evidence of the technological gap between the different types of farms, where those managed by skilled farmers evidently adopt labour saving (such as mechanization) rather than land saving (such as fertilization) innovations. On the other hand, it is well known that capital investments substitute unskilled labour but increases the demand for skilled workers (Griliches, 1969).

1 The Green Revolution started in Mexico during the 1940s when the introduction of new disease resistance high-yield varieties of wheat, combined with modern mechanization technologies, made this country a net exporter of wheat in the 1960s. Except for Africa, countries all over the world benefited from the Green Revolution: USA, for example, became self-sufficient for wheat in the 1950s and a net exporter in the 1960s; thanks to a new variety of rice, IR8, India is today one of the world's leading rice producers (Briney, 2008)

A logistic regression model for high quality agricultural workers

Census data from the National Institute of Statistics (Istat) were used to describe the main structural and organisational characteristics of Italian farms in 2000. The data referred to NUTS3 territorial detail, i.e. to provincial administrations. A more detailed database, referring for example to local authorities (communes), was not available for all the variables which were considered relevant for this analysis. Table 1 shows the variables used in the analysis.

Among other things, Table 1 highlights the high degree of variability of the low weight of qualified workers compared to total agricultural labour. A logistic regression was carried out to identify and evaluate the main factors explaining such variability. The logistic regression was estimated by the OLS method using the logistic transformation of the dependent variable y (GRA in Table 1),

Table 1 List of variables introduced in the logistic regression

Variables	Description	Mean	Standard dev.
GRA	Labour days of workers holding an agricultural sciences degree or diploma/Total labour days	0.046	0.031
PRO	Hectares of property/Total farm area	0.779	0.128
BIG	Total area of farms > 50 hectares/Total farm area	0.451	0.179
FAM	Total area of farms using family labour exclusively or predominantly/Total farm area	0.656	0.146
ARA	Hectares of arable crops/ agricultural area used	0.519	0.258
LIV	n. of livestock farms/n. farms	0.347	0.191
TRA	No. of farms owning tractors/No. of farms	0.441	0.225
YOU	Agricultural workers younger than 29/Total agricultural workers	0.137	0.030
MAL	Male agricultural workers/Total agricultural workers	0.649	0.102
AGR	Agricultural workers/Total workers	0.070	0.043

Source: data processed from Istat (2003)

$$\log\left(\frac{y}{1-y}\right) \quad (1)$$

and the fitted values from the regression were transformed as follows

$$y = \frac{1}{1 + e^{-\beta x}} \quad (2)$$

where x was the fitted value from the OLS regression and β was the estimated coefficient. Data was processed using the GretlTM v.1.8.1 econometric package.

Table 2 Logistic regression (dependent variable: GRA)

Variables	Coefficient	St. Error	T ratio	P-value
Constant	-3.420	0.834	-4.103	0.000***
PRO	-0.459	0.500	-0.918	0.361
BIG	-0.576	0.344	-1.671	0.098*
FAM	-0.932	0.471	-1.981	0.051*
ARA	0.401	0.186	2.156	0.034**
LIV	-1.004	0.278	-3.615	0.001***
TRA	2.108	0.266	7.912	0.000***
YOU	3.384	1.511	2.239	0.028**
MAL	0.422	0.429	0.986	0.327
AGR	-0.912	1.048	-0.870	0.387
RSS	11.164		St. err. regr.	0.346
R ²	0.675		R ² corr.	0.643
F (9,63)	21.455		P-value (F)	0.000
Log-likelihood	-31.714			

Table 2 synthesizes the main results of the logistic regression¹. The logistic regression brings up some interesting points. Looking at the structural characteristics, high quality human resources appear preferable in local agricultural systems where farms owning tractors are common, despite the low concentration of agricultural land in the hands of bigger farmers. A worker holding an agricultural sciences degree or diploma is more often found on arable rather than livestock farms. An important result is that qualified workers are more often employed on farms where the family are not the exclusive or predominant source of labour. This result does not necessarily imply that family farms do not invest in agricultural education, but simply indicates that skilled workers, whether they come from agricultural households or not, need to work in conjunction with external labour, giving birth - in

1 Here the full model is presented because the Maximum Likelihood Ratio test (producing a chi-squared value equal to 3.411 with 3 degrees of freedom corresponding to BIG, MAL and AGR variables excluded because of their low significant coefficients) showed the limited gain of significance coming from the reduced model. Akaike, Schwarz and Hannan-Quinn criteria support this choice.

both cases - to “capitalist” farms, as they were labelled in the past. With reference to the social factors, the relationship between high quality human capital and the large number of young workers in the total number of local agricultural workers is noteworthy. This result highlights the importance of inter-generational transfer in rural households in improving the qualifications of the human resources in agriculture.

Synthesizing the logistic regression results, today agricultural education investment in Italy is best exploited in regions where farmers preferably employ external labour, use their own tractors and produce arable crops rather than dairy goods or meat. The high percentage of young workers in agricultural employment indicates that agriculture offers concrete prospects of income and employment in these areas. In such areas the low concentration of landholding is principally an indicator of the difficulties faced by young qualified farmers when trying to set up farms on their own land. These elements seem to be the most important ones which policy makers should concentrate on when drawing up labour qualification policies for agriculture.

A Discriminant Analysis of farm households

Deeper analysis of the characteristics of farm households in Italy shows that there are links between the geographical location of the agricultural activities and the role of qualified workers in the farm management. A Linear Discriminant Analysis was made in order to define the different types of farm households and their location in Italy.

The 103 provinces were classified with reference to two parameters. First, the FAM variable described in Table 1: the provinces where the FAM was larger than the national mean were separated from those where the FAM was smaller. In this way an objective, although relative, classification of local agricultural activities was made which took into consideration the importance and the spatial diffusion of household farms. Second, the provinces located in the Northern and Central Regions of Italy were separated from the “Mezzogiorno” (Southern Italy and the islands of Sicily and Sardinia) provinces. This double classification gave us 4 different groups of provincial farms.

Table 3 Classification groups for Linear Discriminant Analysis

		Type of farm	
		FAM>national mean	FAM<national mean
Area	North-Centre	1	2
	South-Islands	3	4

Table 4 List of variables for Linear Discriminant Analysis

Variables	Description	Mean	Standard dev.
PLO	No. of plots/No. of farms	5.053	4.558
REN	Hectares rented/Total farm area	0.176	0.125
PRO	Hectares of property/Total farm area	0.779	0.128
SIZ	Total farm area/No. of farms	11.123	9.070
UAA	Agricultural Area used/Total farm area	0.682	0.167
ARA	Hectares of arable crops/Agricultural Area used	0.519	0.258
PER	Hectares of permanent crops/Agricultural Area used	0.200	0.167
LIV	No. of livestock farms/No. of farms	0.347	0.191
MAC	No. of farms using machines/No of farms	0.871	0.072
TRA	No. of farms owning tractors/No. of farms	0.441	0.225
YOU	Agricultural workers younger than 29 years of age/Total agricultural workers	0.137	0.030
OLD	Agricultural workers older than 55 years of age/Total agricultural workers	0.226	0.050
MAL	Male agricultural workers/Total agricultural workers	0.649	0.102
AGR	Agricultural workers/Total workers	0.070	0.043
DIP	Days of labour days of workers holding a degree or diploma/Total days of labour	0.192	0.065

Source: data processed from Istat (2003)

The classification was created using some quality parameters for human resources on farms as well as some variables which described the main structural conditions of local agriculture. For the educational training indicators the focus was on total number of workers holding some kind of Bachelor's or university degree or diploma rather than on individuals who had completed special agricultural sciences courses, because this latter parameter did not have significant discriminatory power. Data was processed using the SPSSTM v. 12.0 statistical packages.

The basic assumptions made on multivariate normal distribution, homogeneity of variances/covariance across groups and correlations between means and variances were successfully tested¹. Three canonical discriminant functions were used for the classification.

1 With specific reference to the homogeneity of variances/covariance, Box's M test was 892.858, corresponding to a F (240, 14171.189) approximately equal to 2.720.

Table 5 Canonical Discriminant Functions

Function	Eigenvalue	Eigenvalues		Canonical Correlation
		% variance	% accumulated	
1	3.607	74.6	74.6	0.885
2	0.963	19.9	94.6	0.700
3	0.262	5.4	100.0	0.455
	Wilks' Lambda			
Test of Functions	Wilks' Lambda	Chi-squared	df	Sig.
1 to 3	0.088	225.192	45	0.000
2 to 3	0.404	83.897	28	0.000
3	0.793	21.494	13	0.064

The following tables allow us to synthesize the main results of the Discriminant Analysis. The Structural Matrix shows the correlations within the groups between discriminant variables and standardized canonical discriminant functions. The significance of the coefficients is made clear, on one hand, by the group means for each function, and on the other, by the territorial map.

The classification of Italian farms based on their geographical location was found to be a good choice. Discriminant function 1 separated Northern and Central Italy from the Mezzogiorno. Local agricultural systems with predominantly family labour forces were clearly identified along the vertical dimension of discriminant function 2. Structural parameters rather than human quality resource variables characterised such types of farms. To be more precise, the high incidence of UAA as a proportion of total farm area, of arable crops as a proportion of UAA, the mechanization of agricultural operations and the widespread use of farmland were the most powerful discriminant variables for characterising family farms in Italy. Human quality resources were mainly discriminant factors between the North and the South. Thus, older workers were more common in North and Central Italy, where diploma or degree holders find better conditions for employment in agriculture. This result has to be compared with the large number of workers employed in agriculture in the Southern provinces.

The canonical discriminant functions were used to predict the groups for each provincial agricultural system. The prediction was based on the Mahalanobis distance from group centroid and took into account the a priori probabilities of the farms belonging to one of the 4 groups.

Table 6 Structural Matrix

	Function		
	1	2	3
TRA	0.522*	-0.469	0.064
AGR	-0.444*	-0.106	0.189
LIV	0.371*	-0.029	0.086
OLD	0.343*	-0.326	-0.028
PER	-0.297*	0.148	0.252
SIZ	0.205*	0.131	-0.066
DIP	0.194*	0.007	0.176
PLO	0.134*	0.092	0.056
UAA	-0.177	-0.725*	0.133
ARA	0.099	-0.518*	-0.121
MAC	0.006	-0.464*	0.120
REN	0.306	-0.448*	0.308
PRO	-0.271	0.397*	-0.231
MAL	0.069	-0.253	-0.552*
YOU	0.031	0.189	-0.202*

Table 7 Group means for the discriminant functions

Group	Function		
	1	2	3
1	1.485	-0.935	0.266
2	1.219	1.183	-0.310
3	-2.464	-0.682	-0.599
4	-2.646	0.856	0.944

Discriminant analysis confirmed the first impressions suggested by the logistic regression: human capital investments in education need the support of positive present conditions and future prospects for agricultural activity. While logistic regression highlighted the importance of the good structural state of the farms, discriminant analysis showed that such conditions are more often found in North and Central Italy.

Figure 1 Territorial Map

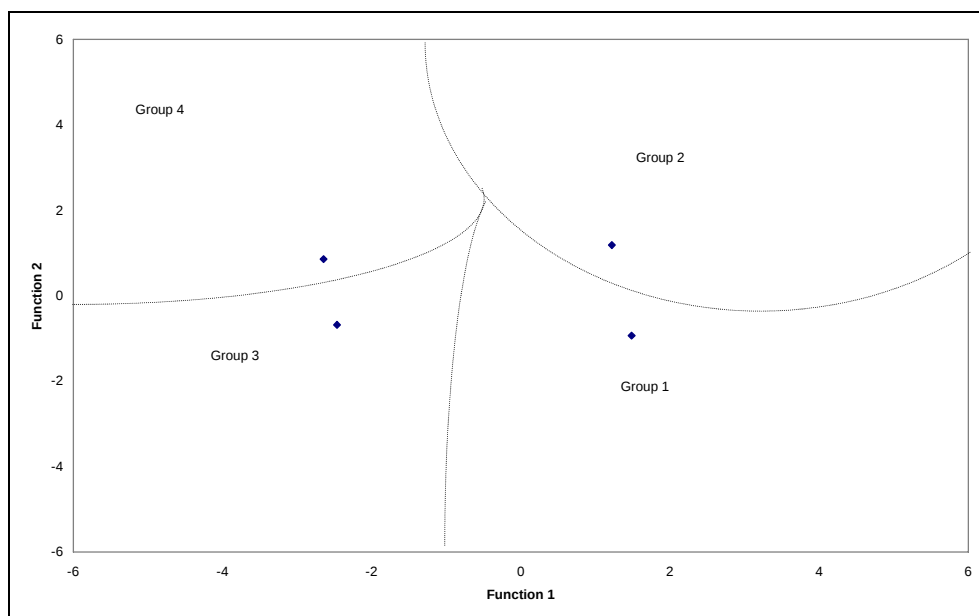


Table 8 – Classification results

Original	Predicted				Total
	1	2	3	4	
1	32	3	1	0	36
2	4	26	0	1	31
3	1	0	19	2	22
4	0	1	3	10	14
Total	37	30	23	13	103

84.5% cases correctly classified

Some concluding remarks

A map of human resource endowment in Italian farm households was created. Among other things, the most important results confirmed the arguments of the literature on economic theory and also the results of past empirical studies. The results confirmed that there are “two Italy's”, mainly differentiated by factor endowments and socio-economic environmental conditions. In North and Central Italy agriculture sometimes offers better economic conditions and prospects for a new generation of skilled farmers. Agricultural science diploma or degree holders

have more possibility of finding work in areas where there is significant investment in mechanisation, where arable crops are cultivated and where there are a significant number of extra-family workers in the agricultural work force. This suggests that policy makers have to bear in mind that training and qualifying the human resources employed in agriculture is not a problem of institutional education or training. What is needed is a holistic development plan with structural as well as social and institutional objectives. The specific local economic, social and institutional conditions should be given greater weight in such plans.

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CONSUMER PERCEPTION TOWARDS TRADITIONAL SERBIAN AGRICULTURAL AND FOOD PRODUCTS¹

Vlade Zarić, Danijela Petković, Milorad Radošević²

Abstract

Market success depends in large part on how well consumer behaviour and perception supplies understand. They need to understand how consumers evaluate products characteristics, gather information regarding various alternatives and use this information to select specific product.

The object of this research was to determine consumer perception of Serbian agricultural and food products and especially perception of home made products. In October 2008, a research was conducted in the Belgrade market on a sample of 338 persons. The results were analyzed using univariant statistical analyses.

The results of this research can be used by producers for defining marketing activities and by researchers to conduct further research in this field.

Key words: traditional agricultural and food products, territorial competitiveness, consumers, the Republic of Serbia.

Introduction

Production of agricultural-food products in Serbia is constantly increasing in the last few years, and there is a surplus in the foreign trade of these products (Zarić, 2008). However, most of these products are exported as "non-name" (Zarić, Vasiljević, 2007). At the same time in the domestic market there is significant

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number of products of foreign origin. Producers of agricultural-food products in Serbia will have a greater attention given to the requirements of customers if they want to stay competitive (Kotler, 2008).

Perception and requests of the consumers is possible to estimate by observing purchase and consumption or by research of consumer behaviour. Proper knowledge of the perception of consumers is one of the prerequisites for successful marketing agricultural-food products. Analysis of consumer perception is an important part of the research on the basis of which the formulation of commercial policy is made. Perception research combines the elements of psychology, sociology, anthropology and economics (Albaum, Smith, 2005).

Methodology

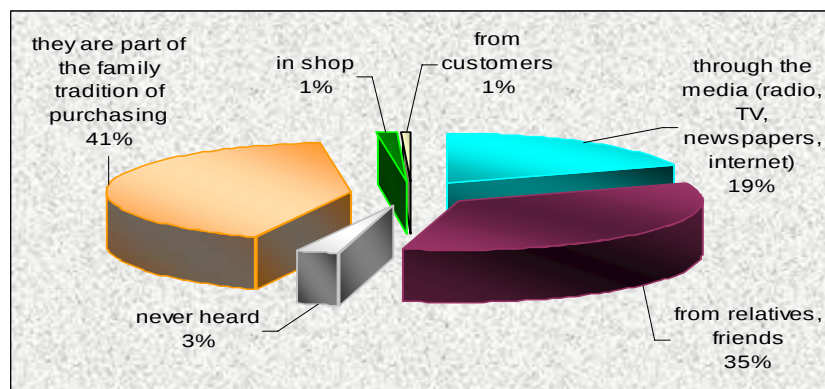
The aim of this paper is to determine the relationship of consumers to the traditional Serbian agricultural-food products. Data were obtained on the basis of the field research organized in two steps of which one was in the form of a closed type of survey, for consumers, and others, open type, intended for experts in the field of agricultural economics. The information obtained by survey were analysed using SPSS. Based on consumer perception the marketing strategy could be defined. Moreover expert opinion on trade marks and brands could help in product positioning (Zarić, et al 2008).

Results and discussion

Survey was conducted for customers in the territory of the city of Belgrade, on a random sample of 338 persons, among which there was more women, 64% and 36% man. Age structure was determined by category, below 17 years about 1%, the three groups of 18-30 years, 31-50 years, 51-65 years, were equally by 32% each and the group over 65 years some 4%. Most respondents had a higher and a high degree 57%, secondary education 37% and the remaining part the elementary education.

In most cases, purchase of domestic products is a part of tradition in households (Graph 1). The most common form of obtaining information about these products is from the mouth to mouth. These two ways of gathering information on the domestic products are dominant in the opinion of 76% of respondents. Advertising through different types of media is an important source of information for one fifth of respondents. Almost all respondents have awareness of local products that are listed in the survey.

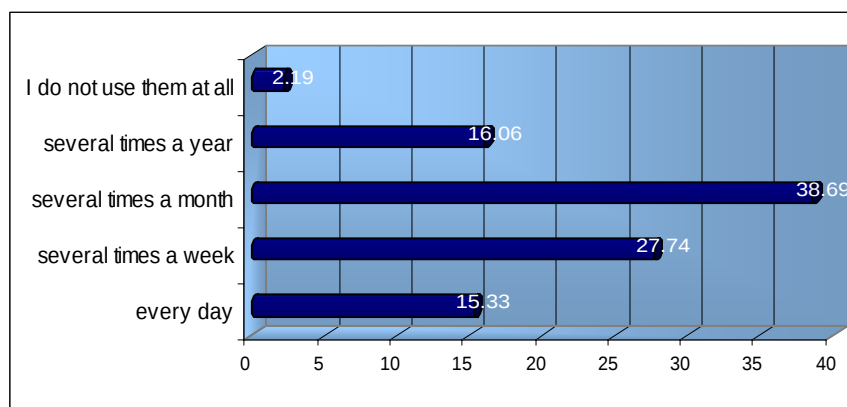
Graph 1 Sources of information on traditional products



Source: Survey

Domestic agricultural-food products, as shown in the graph 2 are relatively often consumed in households, because 43% of respondents said that they used at least several times a week, while 15% use them daily. There are negligible numbers of respondents who do not use these products.

Graph 2 Frequency of tradition product consumption/purchasing

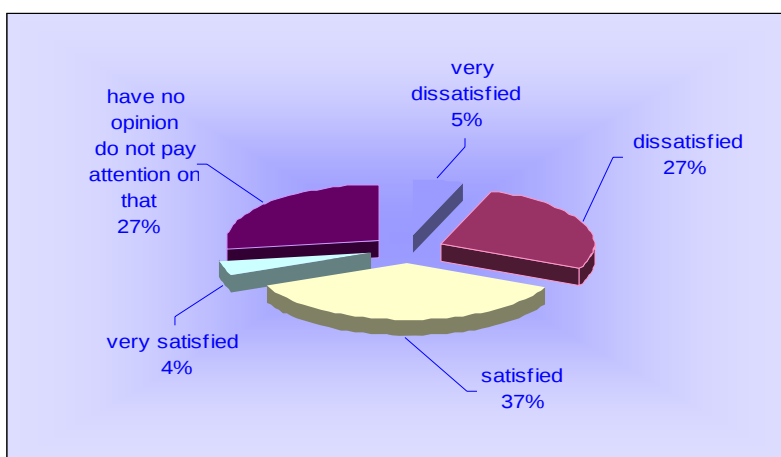


Source: Survey

In terms of promotion of these products (Graph 3) it is interesting to point out that the small number of respondents (4%) are very satisfied, or dissatisfied

(5%). Satisfied with promotion are some 37%. However most of the respondents were either dissatisfied or did not have any opinion on promotion. These research results point to the conclusion that marketing activities aimed at providing appropriate information on domestic products to consumer are one of the key factors for successful selling. Because the fact that almost one third of the respondents has no opinion about the promotion we could conclude that past activities in this field had not given satisfactory results.

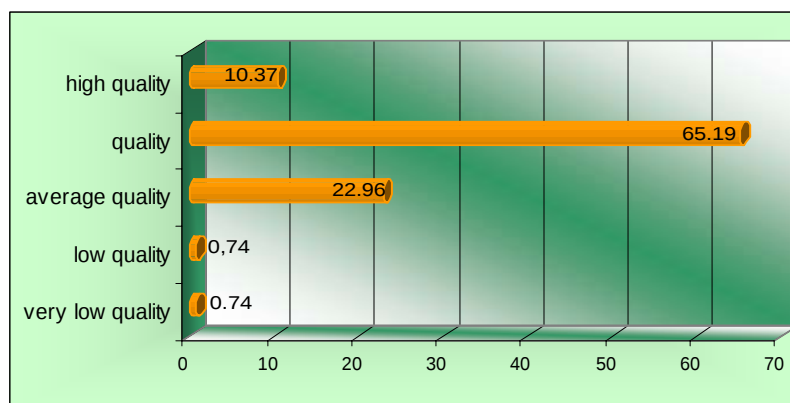
Graph 3 Consumer opinion about promotion of traditional products



Source: Survey

In terms of quality (Graph 4) almost all respondents believe that local products are of good quality and some 10% of respondents believe that those products are extremely qualitative. However, almost half gave the assessment that the prices of domestic products are more than expected, while some 38% believe that the price is fair. In favour of this is the answer to the question "What would you change at the first place by the mentioned agricultural-food products?". The largest number of interviewed persons stated out that the price changes (42%) and packaging (22%) are most important. On the basis of this we can conclude that the domestic producers have to be very careful in the implementation of price strategy because it may lead to significant decrease of products consumption due to high prices. It can also be recommended to adjust commercial packaging to the buyer requirements.

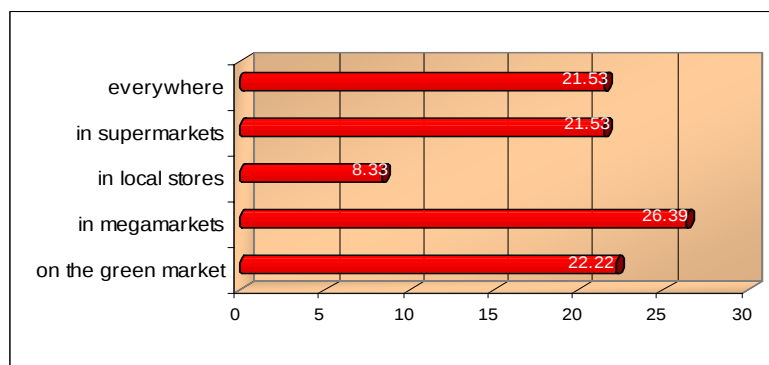
Graph 4 Quality of traditional products



Source: Survey

Purchasing decision is based on quality (average score 4.67) and then on price (3.97). Packaging size and location of sales have a moderate impact on the decision to purchase, while consumer awareness of products has a small role. Evaluation of the above mentioned characteristics was carried out on a scale of 1-5, where 1 indicated the lowest importance and 5 the highest.

Graph 5 Purchasing places of traditional products



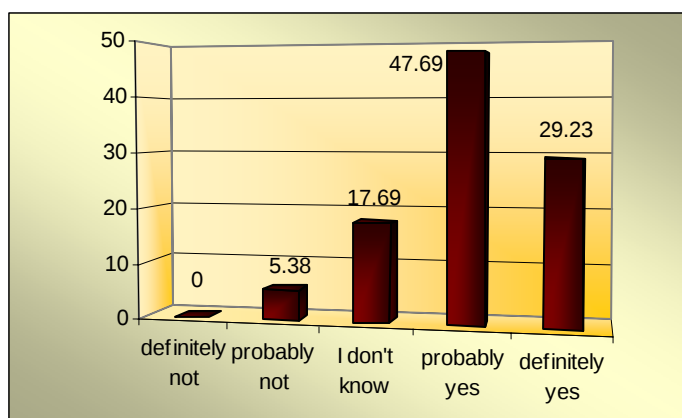
Source: Survey

Products of domestic origin are usually purchased in mega markets (26%) and almost equally in super markets (22%) and green markets (21%) or on any

other place (22%). On the basis of this (Graph 5) can be concluded that domestic producers must dispose of the product with sufficient amount of standard quality during the entire year so that their product could be offered in the larger commercial chains. Given the small importance of small corner shops in selling traditional products (8%), manufacturers can not count on this channel of distribution.

Almost 80% of respondents believe they would buy the same traditional domestic products in the future, which shows that products enjoy confidence. Perhaps the results depend partly on marketing activity of the Serbian government over the Ministry of Trade "Buy domestic products" which was carried out. At the same time, there is a higher confidence in product than in trader, because some 64% of respondents answered that they change place purchasing, but could not provide answer how often.

Graph 6 Willingness to buy traditional products in future



Source: Survey

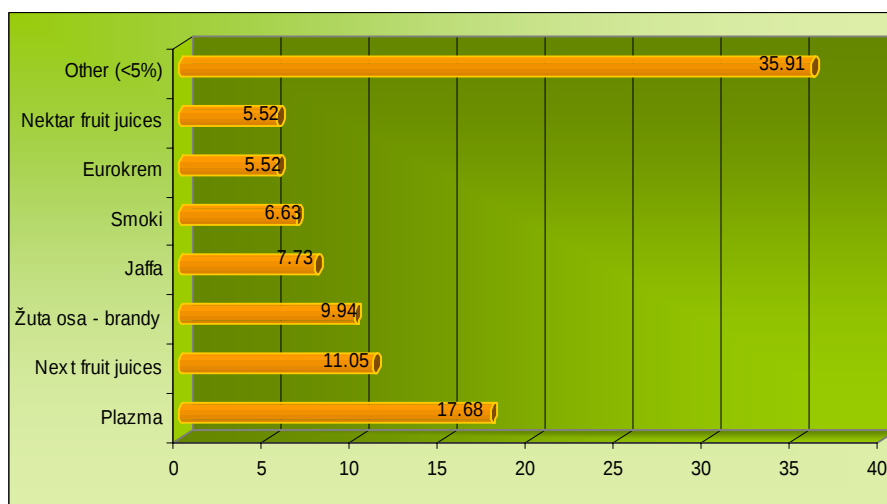
All respondents would recommend some of the domestic products, and there are also a large number of products that are known only at the local level. It is interesting to point out that there are groups of consumers, some 20%, which only buy imported products, which is an additional challenge for domestic producers and traders. However, this group stated out that reason to buy foreign products is the absence of domestic in supply, such as olive oil.

At the same time, the open-type survey was carried out whose aim was to obtain expert opinions on agricultural-food products no matter how they are

produced industrially or in households. This poll was conducted on symposium of agrarian economists with international participation on the occasion of 45 years of the Department for Agricultural Economics, University of Belgrade in October 2008.

On the basis of this survey the following results were obtained. The most popular brand-food agricultural products are: "Plazma", "Next", "Žuta osa", "Jaffa", "Smoki", "Eurokrem", "Nektar" (Graph 7). It is interesting to note that the Jaffa and Smoki are most popular in the older population, while the Next juice is known in the younger generation. All other stated products are popular independent of age of pulled person. All other agricultural-food products that are mentioned in the survey have less than 5% of the votes of respondents.

Graph 7 The most popular domestic agricultural and food products recognized as trade marks and brands in Serbia



Source: Survey

The most successful domestic manufacturers of agricultural-food products are Imlek, Stark, Bambi, Carnex, Swisslion Takovo, PKB, Rubin Krusevac and Vital. All the manufacturers have better position among the older population, while Stark by younger population. The biggest difference is by PKB (awareness by older 20% and 3% by young responders).

In the survey it was a question regarding main characteristics of domestic agricultural products (Table 1). The answers indicate that the quality of the product is in the first place, following by package design and in third place is a good advertisement. Price is important for some 6% of respondents. All other characteristics are of minor importance having less than 5% answers.

Table 1 Main characteristic of trade marks and brands

Characteristics	%
High quality	35,66
Packaging, design	13,95
Advertising	12,79
Product price	5,81

Source: Survey

The most important advantages of domestic brands agricultural-food products (Table 2) are quality, tradition in the production, domestic origin of products, favourable price and safety. Consumer confidence, regional specifics and environmentally friendly production do also play an important role.

Table 2 The most important advantages of domestic brands

Advantages	%
Quality	34,53
Tradition in production and domestic origin	12,23
Favourable price	10,79
Safety	10,07
Consumer confidence	7,91
Regional specifics	7,91
Environmentally friendly	6,47

Source: Survey

The greatest disadvantages of domestic brands of agricultural products (Table 3) are poor marketing, changeable and not the highest quality, as well as, inadequate packaging. In terms of opportunities for the creation of brands, attention should be primarily taken for the development of marketing and production of invariable quality and finally the existence of an appropriate business environment.

Table 3 The most important disadvantages of domestic brands

Disadvantages	%
Poor marketing	35,38
Changeable and not high quality	17,69
Inadequate packaging	16,92
Inappropriate state policy	9,23
Narrow assortments and low demand	8,46
Lack of human resources	6,92
High prices	5,38

Source: Survey

The greatest potential (Table 4) to become brands in the opinion of the respondents have Serbian brandy, cheese and traditional delicatessen. It is interesting to point out that in terms of potential there is a lot of uniform distribution of answers by groups of products.

Table 4 Possible brands of agricultural and food products

Products groups	%
Brandy	13,61
Cheese	10,06
Traditional delicatessen	10,06
Milk Cream - kajmak	9,47
Ajvar	7,10
Wine	5,92
Raspberry	5,92
Products of fruit and vegetables	5,92
Fresh and dried fruit	5,33
Frozen finished products	4,14

Source: Survey

Conclusions

On the basis of this research the perception of consumers towards the Serbian agricultural and food products are determined and for those manufactured in households or produced in the industry.

Most consumers have positive attitudes towards products manufactured in the households. Consumers believe that these products have a high quality, are

produced in the environmental friendly way and would gladly recommend them to others.

As the possibility of improving characteristics the most important are unchangeable qualities, more marketing activities and improved packaging design. As with traditional product made in households, industrial products enjoy consumer confidence and there are brands that are widely known.

On the basis of research results it could be concluded that the price is less important parameter than product quality. However, it must be taken into account that the answers in terms of price are adjusted to society opinion that product quality is crucial by decision making. However, purchasing decisions could be quite different to these findings.

Respondents believe that there is a large number of products that could become a brand but having in mind the structure of answers one could conclude that neither one of them have enough potential for success.

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CHALLENGES FOR THE FLEMISH AGRICULTURAL RESEARCH INSTITUTES TO SUPPORT AN INNOVATIVE AND COMPETITIVE AGRICULTURAL SECTOR

Anne Vuylsteke, Dirk Van Gijseghe¹

Abstract

Agriculture is faced by permanent evolution and it is expected that this trend will continue in the next decennium. The question is what challenges lie ahead and which types of agricultural research can support the sector in order to retain its competitive power by the year 2020. To address this issue, a multi-stakeholder and multi-disciplinary process was initiated in Flanders. The process outcomes learn that two types of action are needed. Firstly, there is need for a focused knowledge production in 5 thematic fields. Central issues hereby are an efficient agriculture, the broadening of the value creation model of agriculture and the increasing sustainability of production. Secondly, efforts should be made to improve the organisation of research with emphasis on participation, anticipation, meta-coordination and validation of research outcomes.

Key words: Research organisation, knowledge networks, innovation

Introduction

Agriculture nowadays faces a rapidly growing demand for biomass in many different forms. This not only concerns food and feed, but the demand for bio-fuels, diverse materials, health-promoting substances and recreations is also increasing. At the same time, the sector is confronted with a shrinking natural resource base and the existence of numerous interactions between human and

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natural processes into account (EFFP, 2005; OECD-FAO, 2008; SCAR, 2007; UK Government Cabinet Office, 2008; Van Braun, 2007).

Although this context is extremely challenging for farmers, both in Flanders and abroad, it also provides immense opportunities. The agricultural sector must guarantee and increase both the natural and the social capital which are entrusted to her and search for synergies with e.g. the chemical and pharmaceutical industries, the retail sector and environmental actors. It should not only focus on Flanders, but strive for embeddedness within an international framework.

Agricultural research can support the sector in meeting these objectives through the optimization of the existing production processes and by supporting the search for new and innovative applications for agricultural products and processes. A vigorous and focused knowledge production will thereby have to anticipate to the future demand for new technologies, policy instruments, and forms of cooperation. The Platform for Agriculture Research acknowledged these challenges and started in 2007 a process to identify the long-term priorities for Flemish agricultural research.

This paper focuses on the outcomes of this process and describes the challenges for research institutes to develop knowledge and techniques that support the agricultural sector to maintain its competitive position in the next decade. The second section starts with a short discussion of the process of priority-setting. Section 3 gives an overview of the main fields in which additional knowledge is necessary. But only putting forward priorities will not create dynamics, efforts should also be made to guarantee that the required knowledge is produced and that the research is efficiently organised. Starting from the present situation, section 4 explores which actions can or should be taken in order to come to a solid research organisation that is capable of supporting a competitive and innovative agricultural sector. The concluding remarks of the paper are formulated in the fifth and final section.

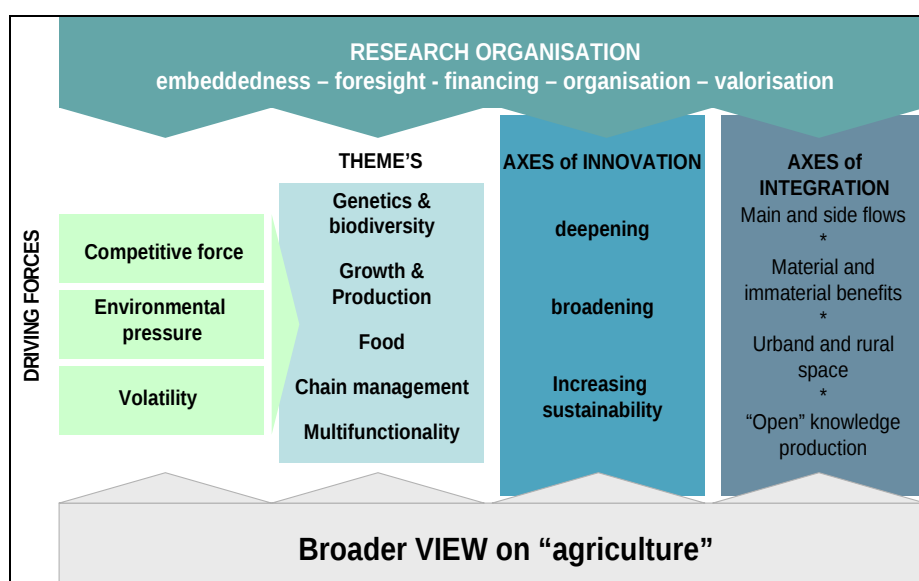
Setting long-term priorities to support an innovative and competitive agricultural sector

Foresight and priority setting are hot topics and several dedicated processes have been initiated. The German FUTUR project (Cuhls & Georghiou, 2004; Smits & Kuhlmann, 2004), the SCAR exercises (SCAR, 2007; 2009), the Rural Futures Project of DEFRA (Future Foundation, 2005) and the efforts by IAASTD (2008) are only a few examples. In Flanders, a consultative approach was adopted to set the priorities for agricultural research.

The process (see

Figure 1) consisted of five consecutive phases and started with the consultation of ca. 40 national and foreign experts on their long term expectations for the global agricultural sector. Central element in the outcomes is that agriculture is an activity at a crossroad of natural processes and human systems, and the sector is, as a consequence, liable to a very broad and complex network of influencing factors. Firstly, there is a rising demand for food products, which is (for several reasons) not followed by the supply of agricultural products. A second element is the depletion of fossil fuels, which leads to the need to rethink the energy infrastructure and to reflect on the possibilities and restrictions of agriculture as a supplier of bio-energy crops. The need to improve the balance between human activities and the ecological needs, the climate and the restricted natural resources is a third factor that will influence the future developments of agriculture. Next, there is the restricted availability of arable land and the rising pressure from other functions in the countryside. Fifth factor is the globalisation of commercial flows, which connects prices with the world market, but also leads to higher price volatility and finally, there are the possibilities of new technologies (provided that a social consensus can be found).

Figure 1 Overview of the process outcomes



Based on these priorities, three future needs, from which society expects that they are addressed by agriculture, could be identified: (i) the need for a knowledge

production which enables the raise of productivity and cost-effectiveness of agricultural production, (ii) the need for a knowledge production which helps agriculture to raise the social appreciation and to reduce the impact of negative externalities which are linked to its activities, and (iii) the need for an anticipative (foresight) capacity that allows to align research activities with unexpected developments in the matrix of external factors.

In the next phase, a group discussion with the members of the Platform of Agricultural Research learned that advancements are needed in five research fields to address these societal needs: (i) genetics and biodiversity, (ii) optimization of growth and production factors, (iii) enforcing supply chains, (iv) improving quality and the societal role of agricultural food products and finally, (v) multifunctional agriculture. The discussion furthermore revealed that it is also necessary to question the research organisation. Each of these topics was further developed by a working group consisting of wide array of scientists and other stakeholders. Based upon the researchers' expertise and taking into account the information gathered during the first phase of the process, these working groups identified research questions that need to be addressed in the future. These research questions were then prioritized according to their sense of urgency, the relevance for the Flemish situation, the existence of a sufficient knowledge base and the possibilities for validation. Only those questions that received sufficiently high scores were sustained and these were consequently grouped into a "White Paper on Agricultural Research".

Focused knowledge production

As was mentioned in the previous section, the process learned that there is a need to focus the Flemish knowledge production in five fields and around selected research questions. Each of these fields is shortly addressed in the next paragraphs.

Genetics and biodiversity. Research that aims to increase the sustainability of production and products not only requires an improved understanding of the development of plants and animals, but also from the role of genetic factors and environmental conditions. Research should therefore develop the correct techniques, methods and strategies. Given the importance of genetic heritage, it will also be crucial to maintain and use the existing biodiversity.

Additionally, new techniques are necessary to cope, in a sustainable way, with threats that may influence the quality and the quantity of the production. This concerns not only new substances to protect the plant and animal production, but scientist should simultaneously develop new strategies.

It is furthermore necessary to continuously strive for added value and broadening of the market. This can for example be realised through the improvement of local niche species or races and the development of new crops.

Optimisation of growth and production factors. Research should help to improve the productivity and output of the plant and animal production. Knowledge of the intrinsic potential of the different processes is of vital importance and can contribute to the development of new technologies that optimally exploit the potential.

Given the evolving consumer demand, there are also possibilities for new products, diversified production and the processing of primary raw materials into energy. Sustainability of new and existing production processes, described by clear criteria, must be the guiding principle. Important issues in this field are more eco-efficient production processes and waste reduction in supply chains.

Finally, the efficiency of individual farms must be raised through the optimal use of production factors and support for company-specific management decisions.

Chain management. To valorise products maximally, demand-driven supply chains, which innovate in response to social, technological and environmental developments, must be developed. Research must also contribute to the (safe) valorisation of secondary and waste streams and support farmers' value creation efforts through a performing chain organisation.

To reinforce the chain position of the primary producers, new mechanisms should be developed to distribute value and risk over all chain actors and to improve both horizontal and vertical cooperation. To support Flemish farmers that opt for an export strategy, it is important to have a good knowledge on their relative strengths and weaknesses and on the impact on the entire chain to do so successfully.

Quality of agricultural products and the societal role of food. Product quality, food safety and consumer perception are central issues in the optimisation of food production. The development of quality standards, performing quality and control systems, criteria to monitor the sustainability of production and consumer research are essential.

There are also possibilities to extend the market through the exploitation of the intrinsic heterogeneity of agricultural products and the creation of added value for region-own products. Agriculture can furthermore provide raw materials for the agro-food industry and other sectors.

Sustainability criteria must be used to communicate with consumers and other stakeholders on food, diet, sustainable food production and the social

importance of the agro-food production chain. By doing so, consumers receive arguments for a more justified food choice and a safer use of food.

Multifunctional agriculture. Next to the traditional products, multifunctional farmers also produce outputs which are requested but often not remunerated by society. At present, the farmer's efforts are almost exclusively valorised by the government. New instruments must be developed that help to recognize the non-commodity outputs of agriculture and to measure their value.

It is however not enough to validate these non-commodity outputs, but efforts must also be made to increase this output through the convergence of functions. This not only concerns the optimization of existing function combinations, but new combinations should also be established. Other important topics are the enhancement of the synergy between urban and rural areas and the optimal use of the available area by means of integrated production models.

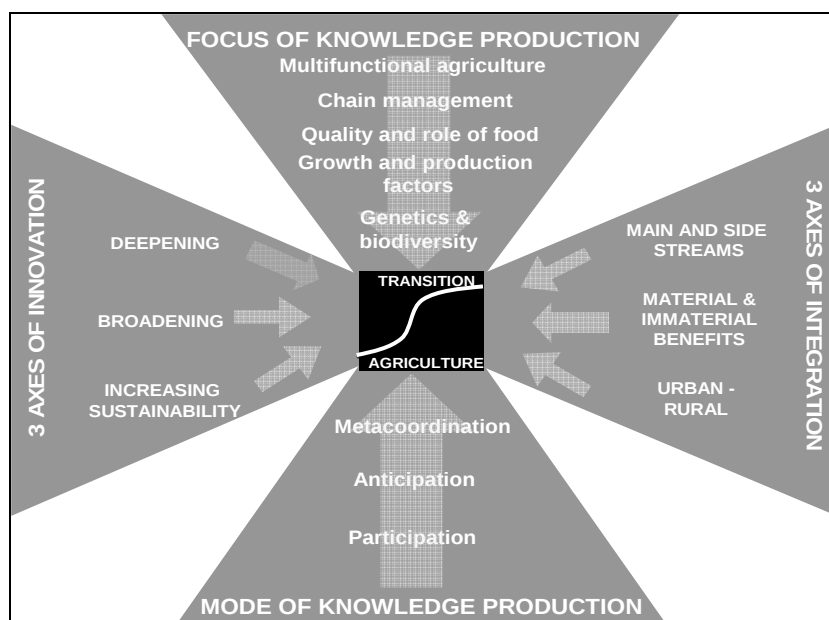
Although these five research fields differ largely, there are also important similarities. Agricultural research should namely realize developments in three main innovation areas: (i) the deepening of the existing processes and competences in order to realize an efficient production system, (ii) the broadening of the value creation model of agriculture and (iii) an amelioration of the sustainability of production.

Implications for the organisation of the research activities

Throughout the discussions, it became clear that the outlines of a new, integrative agriculture paradigm are emerging (Figure 2). Traditional contrasts – like the opposition between main and secondary flows, urban and rural space and commodity and non-commodity goods – will be transcended into a new holistic concept that considers agriculture as the integral value creation on the basis of natural resources. The rise of concepts such as bio-based economy, multifunctional agriculture and metropolitan agriculture already announce this transformation.

The transformation can however not be realised through substantive work only, but should also be impregnated in the organisation of research and knowledge production. Four challenges should thereby be addressed: (i) to realize a higher degree of participation through cooperation with institutions, companies and related fields, (ii) to make research more anticipative so that it proactively searches for new opportunities or the prevention of possible risks, (iii) the creation of a body that provides meta-coordination on financing, cooperation and competences and (iv) the development of new strategies to valorise research results. Each of these challenges is now shortly discussed in the next paragraphs.

Figure 2 Elements influencing the transition towards a new agricultural paradigm



Participative research as a starting point for innovation. A first challenge for research is to embed itself in the user community by establishing cooperation with other institutions, fields and businesses. Research can in this way evolve towards a more open process of knowledge production, including a demand-driven component and active involvement of beneficiaries.

The new paradigm will moreover lead to unprecedented, fundamental questions concerning the use of technologies (such as genetic modification or nanotechnology), the role of agriculture in climate change and adaptation and the ways in which commodity and non-commodity outputs can be validated. Interaction between researchers, sector and society in general will be essential to address these issues.

Finally, research must also anticipate to the emergence of opportunities or threats and start a proactive process of knowledge production. The evolution towards knowledge networks, with special attention for agricultural and food companies will be a basic condition. The dividend that results from an improved embeddedness is plural: gains in efficiency and effectiveness of the research, better validation of the results and creation of a basis for co-financing by the sector. Permanent efforts should thus be made to support the positive return in research dynamics.

Putting forward priorities and development of a foresight capacity. Flemish research traditionally had a bottom-up approach: individual scientists set the topic, the objectives and the methods of their research. Although this approach has led to an excellent knowledge basis, it is commonly adopted that evolution towards a knowledge economy requires focus so that the involved researchers can distinguish themselves and become (or remain) world players (Debackere, 2008; Goorden, 2005). Specific for agricultural research, the fields discussed earlier can serve as a starting point. Within each of these topics, research must aim to deepen the existing competencies in intensive and efficient agriculture, to broaden the value creation model and to make production more sustainable.

At the same time, a foresight body should be started to proactively coordinate research in function of emerging opportunisms and threats. Not only researchers should be involved in this foresight process, but all relevant actors and organisations and in extension the entire society.

Towards a meta-coordination of financing, competences and organisation. A third challenge to realize the transformation of the agricultural sector concerns the organization of research. There is need to improve the collaboration between researchers and the sector, to maintain competences and to improve funding. Each of these issues is addressed in the next paragraphs.

Financing. Although Flanders scores relatively well on the Lisbon targets for the funding of agricultural research, there is still room for improvement. A large part of the funding is namely provided by the government, there is a fragmentation of research resources and it is hard to find funding for new approaches.

The fragmentation of research resources leads to important efficiency losses and a defective valorisation of the results. The development of an overarching research strategy that includes all financing canals and the entire research chain could be a valuable strategy. This strategy should simultaneously aim for a better harmonisation with the European and international research frameworks.

Another issue is the fact that it is nowadays very difficult to find funding for innovative research trajectories. This is in contrast with the need for new research strategies (such as long term, trans- and multidisciplinary, explorative, risky and conceptual research) required in a context of evolving paradigms and high demand for creative solutions.

Competences. A dynamic agricultural research sector largely relies on the competences and skills of the involved researchers. Most of the research institutions however work with a small permanent staff because of the restricted basic financing. This lack of critical mass makes it difficult to preserve and deepen the competences that have been built. The creation of competence pools that offer

the necessary flexibility for experts to commute between research institutes can provide new opportunities to build a strong network of experts.

Organisation of research. In the past, there were already some actions to promote cooperation between research institutions, but additional efforts are needed. Collaboration should be encouraged through the creation of the correct conditions and by means of policy and financing. Research groups that go beyond the competitive, thematic logic of research can then for example be rewarded. This could also open possibilities to pool costly infrastructure and to stimulate multidisciplinary cooperation between Flemish complementary research teams and for the creation of consortia with Walloon and foreign research teams. The interaction and knowledge exchange between different research types (fundamental, applied, etc.) and application at practice level can moreover be promoted by the research in research chains and networks.

To realise these challenges and provide meta-coordination for the entire agricultural research sector, a new body should be created. It should search for synergies over the financing canals and research topics in order to achieve a maximum effectiveness of the deployed resources and expertise. This should preferably be realised through the installation of a forum in which both research institutions and financing institutions are represented.

Valorisation of research results. In recent years, a dichotomy has grown between knowledge production in open and closed knowledge bases. An increasing amount of private funding is often accompanied by a rising pressure to establish closed knowledge bases. This evolution however hampers the broader distribution of the obtained knowledge. As a consequence, the question arises to keep - especially - basic research as much as possible in open, rather accessible knowledge bases. Research characterized by an open knowledge base is on the other hand vulnerable to the leaking of intellectual capital. As a consequence, the researchers are often not appreciated for their work.

Efforts should thus be made to design of a fair regime of intellectual property rights, with attention for both the interests of the knowledge users and producers.

Conclusions

Agriculture is faced by continuous evolution, leading to an increasing competitive pressure, an increasing pressure to take the environment and climate into account and an increasing volatility of the market environment (which causes higher uncertainty for the farmers). Within this framework, this paper discussed the outcomes of a consultative process and investigated how agricultural research can

contribute to the enforcement of the competitive power of the Flemish agricultural sector in 2020. The outcomes learn that action is needed on two fronts: the focus of knowledge production and the organisation of research.

There is a need for a focused knowledge production and five priority fields were identified for Flemish agricultural research: (i) genetics and biodiversity, aimed at an optimal exploitation of the genetic potential of plants, animals and micro-organisms and of biodiversity, (ii) optimisation of growth factors (plant, animals and soil processes) and production factors (such as capital, labour, knowledge and land), (iii) increasing performance and robustness of agro-food chains, (iv) raising the quality of agricultural products and valuation of the social role of food, and (v) broadening the value creation model of agriculture by developing a multifunctional agriculture. Within each of these fields, research should aim (i) to deepen the existing processes and competences in order realize an efficient production system, (ii) to broaden the model of value creation of agriculture and (iii) to contribute towards a more sustainable production.

As a second element, the organisation of research should be reconsidered so that four challenges can be addressed. A first element is an increased participation of relevant actors and organisations so that research networks can be established. Secondly, the research must be able to anticipate and to proactively address the occurring challenges and opportunities. A third element is the creation of a new body that provides meta-coordination on issues like financing, cooperation and competences and finally, new strategies should be developed to valorise research results and to transcend the duality between open and closed knowledge bases.

These findings were summarized in a White Paper on Agricultural Research, but this doesn't guarantee that the (theoretical) findings are implemented in the field. Continuous efforts should be made, by the researchers, the government and the agricultural sector, to tackle the issues. The first efforts have now been made. The Platform for Agricultural Research has agreed to take the White Paper as a lead in the design of its future activities and the largest Flemish farmers' organisation agreed to invest an additional 3 million Euro in applied research activities (VILT, 2009).

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CROSS-BORDER COOPERATION, PROTECTED GEOGRAPHIC AREAS AND EXTENSIVE AGRICULTURAL PRODUCTION IN SERBIA

Zaklina Stojanovic¹, Emilija Manic¹

Abstract

The concept of Sustainable Agricultural and Rural Development (SARD) is based on resources effective usage that brings strengthen social cohesion of rural regions. Sustainable agro systems take care of natural resources conservation, as well as of economic and social aspects of rural economy. In order to advance complementary activities, agricultural sector has been often seen as the base for local economical diversification of capacities. The connections between agriculture, nature and tourism are especially important. The EU countries insist on this kind of connections which is the integral part of financial support of common funds, while the candidate countries are using the IPA assistance for rural development programs. Program of cross - border cooperation has been placed within this context, too.

The article, also, gives several examples of cross-border cooperation project that might include Serbia with some of the neighboring countries in the area of tourism and rural development. The most important elements of cooperation with comments and issues from the author's perspective of view are given in this paper.

Key words: multifunctional, extensive agriculture, SARD, cross-border cooperation, rural tourism, ecotourism, Serbia.

Introduction

The concept of Sustainable Rural Development means three aspects – social, economical and ecological. They suppose to act in synergy, but, at the same time, these aspects suppose to be in the concurrent opposition. Agriculture, as a

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traditional activity of rural economy, contributes to the sustainable development of rural areas only if there is adequate resources management. If not, there will be significant degradation of rural environment. These are the reasons why sustainable agriculture development is being emphasize, through which the productivity is maximize, and the negative effects on nature and human resources are minimize. In this context, the connection between agriculture and tourism exists, where this application of sustainable agricultural development concept produces extern effects connected to biodiversity protection and environment in rural areas.

On agreed and mutually accepted principles is based EU cooperation. The new member countries and candidates for membership are though the process of association and stabilization accepting and incorporating those principles. Through numerous programs of cross-border cooperation European Union supports them. In the area of tourism development in bordering protected areas, which includes both development of tourism promotion and development of complementary activities, special interest have been shown. In the areas of protected natural environment, cultural and historical heritage, especially interesting aspect is fitting rural development with creation of integral tourist offer. Republic of Serbia has numerous protected natural and cultural areas. Some of them are in border areas to neighboring countries. Taking into account options that EU IPA funds offer for joined projects of cross-border cooperation, tourism and rural development of those areas becomes very important factor of their overall economic growth.

1. Rural and eco-development

Sustainable development is development that satisfies the needs of present generations without jeopardizing the ability of future generations to meet their own needs is interpreted. As such, it comprises different aspects of sustainability – social, economic and ecological, which can, to a certain extent, develop synergy, but also be mutually unsupportive, that is, competitive in their accomplishment. The social dimension implies creating a satisfactory level of rural employment and enabling the quality of life in rural areas. The economic dimension of sustainability refers to diversification of rural economy leading towards efficient resource exploitation, competitiveness of rural areas and vitality of integral rural economy. The ecological dimension of sustainability refers to preservation of resources (natural, human and manufactured) in order to satisfy the needs of present and future generations in an adequate way. This aspect of sustainability was first discussed in the sense of rational usage of limited resources, but today, within the dimension of sustainability, there is more and more talk about external effects of different activities in rural areas connected to protection of countryside, habitats, biodiversity, as well as quality of water and air (*Tietenberg T., 2006*).

Agriculture plays a special role in the development of the SARD concept as the traditionally present activity of rural economy. Natural, human, manufactured, financial and local resources are all engaged in agricultural production. By means of politics, procedures and institutions, these resources are transformed not only into food as a visible product, but also into employment, welfare of local community, clean air, healthy environment, reduced crime rate in rural areas, strengthening of social cohesion et al. If resources are not managed adequately, it is possible that there occurs a degradation of the basis for rural economy development, which is most often seen in the form of depopulation of rural areas, uncontrolled forest cutting, soil and water pollution. Sustainable agro systems contribute to strengthening of positive effects on resources, thus contributing to the increased possibility to serve by their own activities to the accomplishment of needs of future generations (*James R. Kahn, 1998*). In the context of the connection between agriculture and the concept of sustainable rural development it is often emphasized that farmers exert significant influence on local, national and international economics and ecosystems – a positive or negative one. In the era of modernization of agriculture, special emphasis is on growing danger of losing biodiversity, and that is the reason why traditional farmers (the so-called rural world) are marked as guardians of natural environment. Experts of different profiles, dealing with analyses of agricultural production, all agree nowadays in saying that agro-sector provides a unique public service which no other economic sector can provide.

Sustainable agriculture is based on using technologies that maximize productivity and at the same time minimize the negative effects on natural (soil, water, air and biodiversity) and human resources (rural population and consumers). By finding the way to use resources most efficiently, sustainable agriculture leads towards strengthening of social cohesion – trust in partnership between the institutions on the local level. Not without reason, it is considered today that only agro systems of this kind (based on highly valued human and social resources) are also sustainable in the long run. The concept of sustainable agriculture was extended in 1989, and today it comprises sustainable agricultural and rural development (SARD). In that sense, SARD is defined as a concept of “management and preservation of natural resources and directing of technological and institutional changes in such a way as to enable achievement and continuous satisfaction of the needs of present and future generations. Such a development preserves soil, water, plant and animal resources, does not degrade the environment, it is technically convenient, economically proper and socially acceptable.” (*Jovanović Gavrilović B., 2004*). It should be mentioned that the concept of multi-functioning and sustainability of agriculture and rural development have a common basis. Both concepts rely on multidimensional conceptualization of the role of agriculture which yields market and non-market

results. Still, there is also an important difference between the afore-mentioned concepts. While sustainability insists on the efficient way of resource usage, multi-functioning is oriented towards analyzing the multiple product of agricultural activity (food, external effects and public goods) which deserves a more significant support of the so-called green box measures of agricultural budget. Agriculture is nowadays viewed as a basis for diversification of local economic capacities, in the sense of promotion of complementary activities. It is especially talked about the connection between agriculture, protection of plant and animal resources, intact nature and ecotourism.

2. Specific areas in Serbia applicable for the eco-rural-tourism cross-border programs

Through cross – border cooperation projects many aims could be reached, among which one of the leading places takes the aspiration for promotion of sustainable economical and social development in border regions. Knowing that these regions are usual passive and undeveloped, the projects of cross – border cooperation could induce development of those activities in local economy which could bring better living condition and economical prosperity on one hand and protection of environment, on the other. Examples of this kind of projects in Serbia are usually in rural and ecotourism development in specific areas with geographic protection.

Analysis is addressed to a Program perspective application in agriculture and tourism development (rural and eco tourism) based on different examples of cross – border cooperation between Serbia and EU or EU candidate countries. This kind of cross - border cooperation would mean common investments in infrastructure, space organization, protection of environment and joint presentation of tourist products and tourist offer on third markets.

Differences in natural resources and cultural heritage in border region in Serbia could be used in the development programs of these parts of the country: (1) Spatial nature reservation of «Upper Danube» region between Serbia, Croatia and Hungary; (2) Old Mountain between Serbia and Bulgaria; (3) «Djerdap» between Serbia and Romania. These projects would suppose development of ecotourism and rural tourism with joint action between economy and ecology, and through which the standard of local communities would be upraised and border region would be in position to develop faster.

Map 1 Protected areas in Serbia, neighboring countries
and cross-border cooperation projects



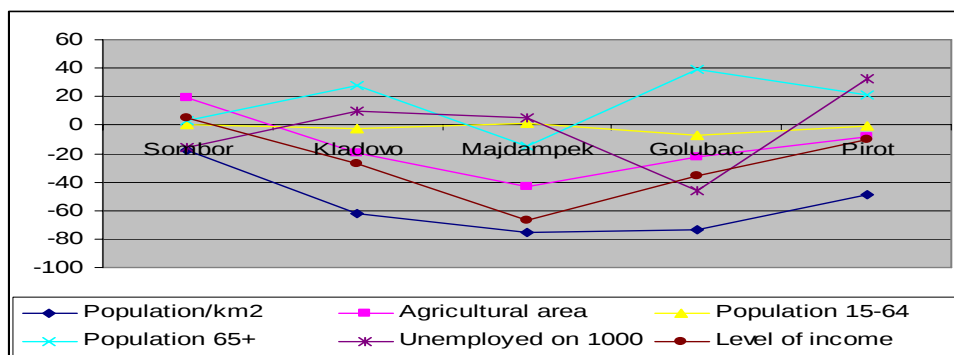
Table 1 Observed municipalities - general data

Municipality	Area	Population (2002)	Population change (2002-1991)
Sombor	1.33	1.32	3.00
Kladovo	0.71	0.3	-11.20
Majdanpek	1.06	0.29	-11.60
Golubac	0.42	0.13	-8.50
Pirot	1.39	0.83	-4.60
Total	4.91	2.87	-1.00

Source: Municipalities in numbers, Statistical Office of Serbia 2008.

The analysis is based on the different indicators of agricultural and rural economy development in specific areas chosen for the research. General data, vital statistics and both eco and economic indicators shows that chosen border municipalities are mostly overwhelmed with different kind of developmental problems – underdeveloped economy, unemployment, dominantly share of the primary sectors activities in GDP, significant share of elderly in total population ect. (Table 1, Graph 1). In others regions in Serbia, especially in region of Vojvodina under intensified agricultural production, there is degradation of soil or reduced biodiversity. According to Health Statistical Yearbook 2007, Zapadnobacki district (Sombor) had 2 times higher percentage of water samples noncompliant with Rulebook (physical-chemical safety), while Borski district (Majdampek and Kladovo) was on average for Serbia (19,87%), Branicevski district (Golubac) was two times lower and Pirotski district (Pirot) counted almost non significant water pollution at level 0,63%. Underdeveloped economy brought an important advantage – non polluted environment and perspective for rural sector development throughout ecotourism and extensive agricultural production especially to South region. Further analysis is addressed on specific regions of Serbia applicable for cross-border eco/rural tourism programs.

Graph 1 Observed municipalities selected data (Average for Serbia = 0)



Source: Municipalities in Serbia, Statistical Office of Serbia 2008

a) Case study I - Cross border cooperation in the area of Special nature reservation „Gornje Podunavlje”

Special nature reservation “Gornje Podunavlje” is very interesting for creating cross border cooperation in area of tourism development, especially rural and ecotourism between three countries, Serbia, Croatia and Hungary. It is located in western part of Bačka and is a part of the largest swamp area in Europe. Pan

European transport corridor 7 intersects with this area, which creates favorable conditions for cooperation and affirmation. All three countries introduced protection of this area, in Serbia it's Special nature reservation (SNR) „Gornje Podunavlje“, in Croatia it's Nature park „Kopački rit“ and in Hungary it's National park „Danube – Drava“. Diversity of nature, specific folklore elements, local architecture and location on the junction of border regions, are strong stimulus for establishment of cross border cooperation, especially through the tourism development programs and joined entry on other markets. The fact that given area is rural, tourism can be very important pull factor for development of other complementary activities, like agriculture and organic food growth. All three countries have recognized this potential and incorporated these ideas in some of their development documents (*NICEF, 2007*).

So far each country have been individually working on tourism development in these areas, with modest attempts to achieve cross border cooperation with one of neighboring countries their; none document identified any attempt of three parties cooperation of Serbia, Croatia and Hungary. Considering Serbia, tourism development in area of SNP „Gornje Podunavlje“ is described in Master plan of „Tourist area Gornje Podunavlje“ with focus on utilization of biodiversity, nautical potentials on Danube, swamps, channels, pastoral nature and surrounding rural areas (*Stojanović Ž., Manić E., 2009*). This document clearly identifies elements that will be the foundation for building tourism offer of this area: preserved nature, magical rivers, plain landscape and rural settlements – salaši. Good accessibility, dispersed attractions and infrastructure modeled those elements in two basic tourist products - recreational and rural tourism, but still without differentiated ecotourism products.

In the Nature park „Koparački rit“, Croatia has developed ecotourism products, such as residing at biological station, seminars organization, birds watching, photo-safari, as well as standard tourism products, such as recreational fishing, excursions to typical local farms, visits to Zoo or to Tikveš castle. Additionally, Croatia has already been involved in cross border cooperation with Hungary trough project of Euroregional cooperation „Dunav – Drava – Sava“, together with Bosnia and Herzegovina, while Serbia has observer status (www.crp.org.ba). During the period 2000-2002, municipallities from this area had joined presentations on tourist fair events. But, this cooperation didn't lead to creation of joined integral tourist product, which would unite all thee protected areas.

Still, there are some aspects of the cross- border cooperation in the area. Serbia and Hungary have over 40 years history of cross-border cooperation between brotherly cities of Sombor (Serbia) and Baja (Hungary) in various areas. Unfortunately this cooperation still doesn't include tourism development. Only

attempt in this direction is joined city guide of those cities, published in 2007. (*RASMSE, 2007*).

Cooperation of Serbia and Croatia in area of joined tourism product development and joined presentation on other markets is still very modest. Only one joined project has been realized so far: Bicycle tour “Panonian peace route” between cities of Sombor and Osijek. This project has been supported by non governmental organizations CRS and USAID, as well as cities of Sombor and Osijek. Bicycle tour that connects two cities is 80 km long and goes through protected areas SNP „Gornje Podunavlje“ and Nature park „Koparački rit”. Project has been realized as part of much bigger project “Development of cross border tourism on the Middle Danube”, financed by EU through “CARDS 2004” program. The goal of the project was Middle Danube region sustainable economical, social and tourist development. In that context we can monitor development of agriculture and countryside life, as an important part of the integrated tourist product.

b) Case Study II - Cross border cooperation opportunities between Serbia and Bulgaria in the area of Old Mountain

An interesting area for development of rural and ecotourism though cross-border cooperation is Southeastern Serbia, Pirot and Dimitrovgrad municipalities, which partly reside on Old Mountain area. Along the crest of Old Mountain is the border between Serbia and Bulgaria, which is seen in the future as a factor that connects tourism development of two countries in this area. Additional integration factor is the fact that these municipalities populate significant number of Bulgarian national minority members. Pirot and Dimitrovgrad are only around 60 km away from Bulgarian capital city Sofia, which is also very important factor for planning tourist offer and directing marketing activities.

Both municipalities have exceptional preconditions for ecotourism development. On Serbian side of Old Mountain, Strict Nature Reservation is established with a goal to protect numerous autochthon plant species, endemism, rare birds and venison. Additionally, Jerma canyon and valley of the river Temštica are protected as nature areas. This opens opportunity for organization of ecological schools, as well as performs classic eco tours. Numerous villages, such as Dojkinci, Brlog, Rsovac and Topli Do, with specific architecture, folklore and traditional handicrafts, give great opportunity for rural tourism development. Village households, local colors, dialect and authentic landscape are giving special flavor to the tourist offer of this area (*Glorigjević M., Devedžić M., 2006*). On the other side, Bulgaria has been doing much more in the area of rural tourism development. This fact can be significant booster for cross border cooperation (*Radovanović M., Bjeljic Ž., 2004*).

So far there have been some contacts between municipality of Pirot with neighbouring Bulgarian municipalities, having similar folklore elements and handicrafts, but no specific project have been started in the area of tourism. Some joined projects supported by EU exist, but their focus is on local government improvement and economic development as a whole. During a few last years, Serbia has started project of forming Ski center „Old Mountain“, that can positively impact development of tourism, including ecotourism and rural tourism, as well. One of the project tasks is creation of cross border cooperation with Bulgaria.

c) Case Study III - National Park “Djerdap” and neighboring countries cross border cooperation

National Park “Djerdap” is the biggest national park in Serbia and one of the richest with natural and anthropogenic tourist resources. National park area is located over significant part of three municipalities’ territory: Golubac, Majdanpek and Kladovo. Additionally area protected by law includes big parts of few more neighboring municipalities. National park has vast of floral and animal diversity and its territory is significantly preserved from human influence. There are intensive ongoing activities in forming ranger service with aim to contribute to the National park preservation. Numerous monuments demonstrate rich cultural and historical heritage, which give additional value to the area. Finally, Danube as important European transport route, gives a special connection of this area to the rest of Europe.

Danube is also a country border with neighboring Romania and as such is seen as an important integration factor for cross-border tourism development. On the other side of National Park “Djerdap” and country border, we have National park “Iron gate” in Romania, also rich with various natural resources. This fact opens opportunity to unite protected areas which are combined with its location on major transport route and all that give an excellent predisposition for creation of joined integral tourist product that can be offered on other markets.

At the moment there are two regional cooperation projects ongoing with participation of Majdanpek municipality from Serbia and city Turn-Severin from Romania. First project “Danube without borders” is led by Tourist organization of Majdanpek and Pro Mehedinci from Turn-Severin and has budget of 70.800 EUR. Project goals are joined promotion of tourist offer from both sides of border, mapping tourist resources, making joined publications, participation on tourist fairs and providing equipment for tourist offices in Donji Milanovac and Turn-Severin (Severineanu R.S., Mirela M., 2007).

Second project “United tourist destination Djerdap” is led by Tourist organization of Majdanpek and Turn-Severin municipality. Project goals are

creation of joined promo material (film, catalog and map) and equipping both municipalities' info centers (the budget for this project is 165.000 EUR). Both projects are seen as basis for future applications to EU IPA funds.

One more cross border project is ongoing that has focus on tourism development in the area, with participation of Serbia, Bulgaria and Romania. Active participants in this project are municipalities of Majdanpek, Kladovo and Bor from Serbia, Vidin municipality from Bulgaria and Mehedinti district from Romania. Project goals are tourism development, creation of united integral tourist offer and uniting this area in one Euro region. They have an intention to produce several tourist products established on numerous tourist resources in those countries: speleological tourism, cultural tourism and sport events (including events on Danube). Tourism development requires significant investments in local infrastructure, agriculture, handcraft and ecology. Promotion and protection of natural and anthropogenic values in this area will contribute to tourism development, overall economic growth and improved cross border cooperation, resulting with sustainable development of whole area. Considering that in those municipalities and district dominate rural population with one urban center, this kind of cross-border cooperation would contribute to the rural development and its better overall integration in the whole Euro region.

3. Conclusion

Sustainable development considers three equally important components – economic, social and ecological. When we speak about sustainable development in the rural economy and tourism, we refer to all these elements. This research pointed out that underdeveloped economy brought an important advantage – non polluted environment and perspective for rural sector development throughout ecotourism and extensive agricultural production, especially to South region of Serbia.

The examples that are presented in the text confirmed common interests between sustainable, eco-rural development and cross-border cooperation programs. The projects that are being developed in Serbia in this area represent good foundation for future, much more fruitful cross-border cooperation in the area of tourism development, especially in protected areas, as well as in the agriculture and rural areas. Such projects would lead to investments in infrastructure, coastal areas regulation of the rivers, as well as presenting the integral tourist product on the third markets. Diversity of ethnical and national characteristics, as well as nature beauties is elements that should be utilized and offered on international market. Additional stimulus in this direction could be Cooperation Memorandum that signed Institute for Nature Protection of Serbia and International Union for

Conservation of Nature (IUCN), which includes opening an IUCN office for Southeastern Europe in Belgrade. This cooperation will open new opportunities for cross border cooperation in area of nature protection, establishment nature parks in border areas we mentioned, but also in other, such as Mountain Prokletije (Serbia and Albania) and Šar Mountain (Serbia and FYR Macedonia).

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PROBLEMS IN THE EXTENSION WORK AND FARMERS' NEEDS IN SERBIA¹

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Abstract

In the paper, the authors analyse problems in the extension work and farmers' needs on the basis of the empirical sociological survey that comprised attitudes of all the agricultural extension workers in Serbia. The survey has been conducted by the authors during 2008 in all of the extension offices in Serbia using the semi-structured questionnaire. The analysis reveals the regional specifics of the farmers' needs and the problems that the advisors face in daily work, as well. According to the survey results there are three types of problems that are mutually connected: 1. general crisis of the agricultural sector, 2. problems regarding characteristics of farm holdings and farmers population in Serbia and 3. problems that are related to extension organization. Farmers' needs analysis points to four dominant needs of farmers in Serbia: 1. farm management, 2. help in establishment of farmers' cooperatives, 3. plant protection and 4. information and advice regarding the agricultural policy.

Key words: agricultural extension, problems in extension work, farmers' needs

Introduction

Agricultural extension in Serbia is facing the essential reforms that have to be made. At the moment, Serbian Ministry of Agriculture, Forestry and Water Management is working on the Law on Agricultural Services and the Strategy of Development of Agricultural Extension. During the last several years reforms of

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extension service have had very slow pace and this may be the consequence of the inertness of the government to start dealing with the crucial reforms in the extension sector, but also the consequence of the extension services themselves to introduce reforms in their own work (see Janković and Čikić 2008). Having in mind the importance of participation of extension staff in the future reforms, the authors of this paper have conducted an empirical survey (by using semi-structured questionnaires) on the role of agricultural stations in agricultural extension in Serbia (Province of Vojvodina and Central Serbia), comprising the attitudes of all of the extension staff in all agricultural extension offices (agricultural stations) in Serbia (Vojvodina: 13 agricultural stations with 72 advisors; Central Serbia 21 agricultural stations with 134 advisors). In the absence of such and similar research in Serbia, these results could be one of the elements for the creation of adequate policy in the agricultural extension, if, of course, the government is able to appreciate such analysis. In that sense, we believe that considering the extension staff's opinion on many issues regarding the reforms of "their" extension organization would be very motivating for them and might be the one of several conditions for success of the future reforms of Serbian extension. Regardless to all of the shortcomings in organization, extension programs, human resources and technical aspects of Serbian extension, the authors of this paper consider the human resources in Serbian extension as very important in agricultural development and development of family farms in Serbia. Due to low level of farmers' education, lack of information and knowledge regarding new technologies and market situation, agricultural extension is very important factor for future farm modernization in Serbia.

Extension service in Serbia is addressed to family farms and these services are free of charge for them. Other extension suppliers (private extension companies, NGO, etc) are almost non-existent. Within this broad target group the government aims most of extension activities to more commercial family farms (so-called "selected farms" – within the program period of three years) whose number in Vojvodina is approximately 3500 and in Central Serbia approximately 5000 farms (see Janković and Čikić 2008). Extension work includes mostly individual visits to these farms, but other types of communication and extension methods to these, but also to other (non selected) farms¹. The authors' research of

¹ Some data from the System of information in agricultural extension service of Vojvodina, that was created by the authors for the purpose of monitoring of extension activities for the Province Secretary of Agriculture, Water Management and Forestry, reveal that advisors in Vojvodina spend around 30% of their working hours engaging themselves with "non-selected" farms, as well. Besides farm visits that are mostly reserved for the selected farms, other farmers enjoy extension support through mass media, lectures, field days, phone, fax, mail and other types of extension communication (see Petrović 2007).

extension in Vojvodina shows that advisors have selected farmers with whom they have already had better communication and cooperation in the previous period (we assume that the same conclusion can be made for the advisors in Central Serbia). This points to certain homogeneity of the selected farms with respect to their interest for extension support. This actually confirms the well-known bias of advisors who prefer to work with farmers with whom the cooperation is easier, mostly better-off farmers, who initiate cooperation by themselves, who are more interested in extension support and who have more financial means to apply the advised technology or organization of farm production¹. In Serbian context it is understandable that this target group is pretty small. But, in the concepts of state organized and financed extension, potential help to as many farmers as possible is important because the extension is the obligation of the state. It is “first because of its duty to create social justice and social equality and secondly, because an adequate supply of food and further development aims cannot be attained unless the mass of agricultural producers can be activated” (Albrecht et al. 1989: 37). According to this fact, one can expect neglecting of other farmer groups (usually small, less commercial and less interested in extension support), especially in Vojvodina where – compared to Central Serbia – the land and other resources are more in favour of intensive model of agricultural production².

Problems in extension work with farmers in Serbia

Based on a qualitative analysis of the advisors’ opinion about the most important problems they face in everyday extension work with farmers, we may conclude that – according to the survey results – some regional differences in the context of problems in extension work do exist and that there are three types of problems that are mutually connected: 1. general crisis of the agricultural sector, 2. problems regarding characteristics of farm holdings and farmers population in Serbia and 3. problems that are related to extension organization.

According to the qualitative analysis, extension workers in Central Serbia more often emphasise problems that are mostly related to age structure of the

¹ “In laymen’s terms we could say that change agents, like most human beings, associated themselves most with those who were on the same wavelength, and with whom they got along best. In doing so, they also tended to become more familiar with the problems and issues faced by such farmers, leading to further efforts to cater for their needs, rather than for the needs of others” (Leeuwis and van den Ban 2004: 137)

² Target group strategies are some of important issues in extension (see, van den Ban and Hawkins 1996; Albrecht et al. 1989; Leeuwis and van den Ban 2004; Rölling 1988) that are linked to the aims that government wants to achieve with a certain extension policy (see more, Brent and Adams 1999; Adams 2001).

farmers, traditional farming and small scale agriculture. This can be understood if we have in mind the average size and number of plots in Central Serbia¹ (5 plots, the average size of a plot 0.74 ha) compared to Vojvodina (3 plots, the average size of a plot 1.25 ha) (Bogdanov and Božić 2005: 96). Compared to Vojvodina, ageing process is more intensive in Central Serbia with significant share of the oldest members on the farms (over 65 years=24.3%), higher share of mixed farms and lower share of non-agricultural farms (Božović and Bogdanov 2005: 83). Also, in Central Serbia share of population on farm holdings with the lowest education is higher than in Vojvodina (Ibid. p. 85).

When asking advisors about the most important problems they face in everyday extension work with farmers, advisors in Vojvodina seem to be more critical to the organization problems in extension, which is very interesting since the extension service in Vojvodina is decentralised and under authority of Province Secretary of Agriculture and it is undoubtedly considered as more organized, modernized and financially stronger in comparison to extension organization in Central Serbia². Rural areas in Vojvodina are also in infrastructural sense, land policy and modernization more developed due to historical background and economical conditions of Vojvodina as the most developed region in Serbia.

Table 1 Advisors' opinion regarding the most important problems they face in everyday extension activities.

	Problems related to the farms / farmers' characteristics	Problems related to the extension organization
Extension staff in Central Serbia	Farmers' characteristics - old farmers population - traditional habits in agriculture; seeking advice after the harm has already been done - low educational level and lack of knowledge in modern technologies - low application of science and expert advice;	Extension organization - small number of advisors; lack of equipment and laboratories; lack of cars - lack of permanent education of advisors; - due to bad and unstable finance, lack of motivation of advisors - lack of adequate management

¹ According to Census 2002.

² If we compare the satisfaction of the way in which the extension work is organized in the agricultural stations, the opinion of advisors from Vojvodina and Central Serbia is pretty similar: in Vojvodina – 34% totally satisfied, 54.3% partially satisfied, 5.7% not satisfied at all, 5.7% do not know; in Central Serbia -36.6% totally satisfied, 58.8% partially satisfied, 3.1% not satisfied at all, 1.5% do not know. If we take into account all of the extension workers in Serbia, majority seems to be just partly satisfied (57.2%) with the organization of extension work in their agricultural stations. That fact tells us a lot about the necessity for reforms, especially in the management of the whole extension service.

		of the extension service; advisors are in charge for many other duties, including administrative tasks; no strict division between extension and other work/tasks
	Financial situation on farms - inability to apply the advice due to lack of money; low effects of the extension help due to low prices of products and high input prices; unstable agricultural policy; problems with selling the products; low motivation to apply the advice - lack of money for farming; lack of subsidies, credits for inputs and investments	
	Farm characteristics - small scale agriculture, old mechanization and buildings; bad infrastructure in rural areas	
	Huge lack of trust of farmers in the government, its institutions and policy; reflection of this fact on extension service (perceiving them as represents of the government's interest; blaming advisors for bad policy, unstable market; bad parities and high input costs); hard work on creation of trust between farmers and extension service	
Extension staff in Vojvodina	Problems related to the farms / farmers' characteristics	Problems related to the extension organization
	Financial situation on farms - lack of finance for inputs in agricultural production and investments; bad and unstable agricultural policy - lack of finance to apply what has been advised by the extension service	Extension organization - organization and management problems - lack of finance for extension activities - overload with non-extension tasks
	Farmers' characteristics - traditional farming - lack of the basic record on farm (economic and other indicators)	
	Lack of farmers' trust in extension due to its link with agricultural policy and government interests	

Source: Petrović, Ž, Janković, D. and Jovana, Čikić (2008). Empirical survey "The role of agricultural stations in agricultural extension in Serbia"

Farmers' needs in extension in Serbia

In the survey we assumed that it may be very important to analyse the estimation of Serbian agricultural advisors regarding the needs that farmers would have during the next five years in the area of their extension activity.

Farmers' needs should be the basis for establishment of adequate extension service, regardless if the service is state-organised or has other type of organization (finance and delivery). It should also be noted that extension services in developed countries have passed through the process of evolution from the transfer of technology model, to the service based dominantly of farmers' needs¹.

Estimations of all advisors point to four dominant needs of farmers in Serbia: 1. farm management, 2. help in establishment of farmers' cooperatives, 3. plant protection and 4. information and advice regarding the agricultural policy (see Janković and Čikić 2008).

The results reveal regional specifics of advisory needs – in Central Serbia these are mostly in fruit growing and plant protection, whereas in Vojvodina besides farm management and plant protection, farmers' need for information regarding the agricultural policy measures is significant². The regional differences exist due to the already mentioned higher level of modernization of farms in Vojvodina, with more intensive (mostly) crop production, better mechanization and overall orientation of Vojvodina region to more intensive agricultural production (even in fruit growing which is more the attribute of Central Serbia). The significance of farmers' cooperation is higher in Central Serbia due to different type of production (fruit, vine, berries) compared to dominant crop production of individual farmers in Vojvodina who are, obviously, more interested in agricultural policy, government subsidies and help with investments (buildings, high value mechanization etc.) partially because of two sources of finance (Provincial Secretary and Ministry of Agriculture)³.

¹ It would be naïve to believe that all extension services in developed countries serve only the farmers' needs, but their long tradition, development and pluralism in extension have averted them from serving the government interests and oriented them more to what farmers need from such service. This is mostly true in extension services where farmers play a key role in determination of goals and extension programs.

² These results are partly comparable with similar survey of the same issue (see Meier 2000; Boland 1996). Even more valuable information would be to analyze the farmers' needs in extension with farmers themselves, but in absence of such in Serbia it is possible only to suppose that advisors (as experts with much experience) are capable to estimate well what might be the basis for the future extension programs.

³ Data from the analysis of selected approximately 3500 farms in Vojvodinian extension reveal that average farm size is around 16 ha of land in property, with 19 ha of the leased (tenured) land

Table 2 Farmers' needs in extension in Serbia in the next five years
(estimation from the side of agricultural advisors).

Farmers' needs in extension	Central Serbia %	Vojvodina %	Republic of Serbia %	Ranking R. of Serbia
Farm management	16.33	24.17	18.87	1
Farmers' cooperation	12.35	5.83	10.24	3
Fruit growing	10.36	3.33	8.09	6
Plant protection	9.56	17.50	12.13	2
Crop farming	8.76	7.50	8.36	5
Animal husbandry	8.37	4.17	7.01	8
Organic production	8.37	4.17	7.01	9
Vegetable production	6.37	3.33	5.39	11
Agricultural policy	5.98	17.50	9.70	4
Soil analysis, plant nutrition	5.18	7.50	5.93	7
Irrigation	3.98	0.83	2.96	12
other	4.38	4.17	4.31	10
TOTAL	100.00	100.00	100.00	--

Source: Petrović, Ž, Janković, D. and Jovana, Čikić (2008). Empirical survey "The role of agricultural stations in agricultural extension in Serbia"

Conclusions

From the analysis it is evident that there are certain regional differences in extension problems and that certain differences in farmers' needs in Serbia do exist, as well. Farmers' needs differ due to different modernization level, structure of agricultural population and production, characteristics of farms and historical background and development levels of the two regions that have been surveyed. Similar problems in extension service are present and they are mostly related to the general lack of trust in the government that reflects itself on the extension service and their work. Extension services in both of the surveyed regions have similar problems regarding finance, management, technical support and overload with non-extension activities of the advisors (but advisors in Vojvodina emphasize those problems more than advisors in Central Serbia). Without essential reforms of the extension service one can expect that farmers won't be optimally supported and also that extension staff (due to low motivation and working conditions) could even leave the service what will be the huge loss for the government and for farmers in Serbia.

that is far higher than official statistics (around average 3.5 ha of property land). This also shows that selected farms are mostly better-off farmers with more commercial production.

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HUMAN CAPITAL AND SUSTAINABILITY OF RURAL DEVELOPMENT

Milan Milanović¹, Milutin Đorović², Simo Stevanović²

Abstract

The strategies and policies of agricultural and rural development, within the overall long-term area development, traditionally lean on natural-resource capital and certain differential-rent advantages. New dimensions of the agricultural and rural multi-functionality of areas in the zones of large industrial and urban agglomerations and the inevitable processes of degradation of natural capital, stress the role of science in the process of sustaining the level of overall production potential. This presumes a certain degree of substitution of natural capital with human, primarily intellectual capital. This is the basis for considering the creating possibilities and transfer methods for new scientific knowledge, in the function of reaching a strategic developmental goal – long-term sustainability of the agricultural and rural development of a certain agro-ecological or economic-geographical region.

Key words: resources, capital substitution, role of science, sustainability of development

1. Introduction

The valuation of natural and manmade values and conditions in rural areas, in the production and market context, should be based on the significant agricultural and rural potentials and **developmental advantages** of certain areas. These advantages can be identified in three forms: (1) **natural capital advantages** – diversity and abundance of agro-ecological, ecosystem and rural production

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potentials and overall natural heritage as an economic resource; (2) **market differential-rent advantages** – proximity of large sales centers, or availability of physical and financing capital (growing purchasing power, developed and growing market infrastructure, retailers, wholesalers, public warehouses, banks etc.); and (3) **human capital advantages** – favorable conditions for creating and reproducing human capital in agriculture (human and intellectual), or acquired knowledge and production experience, as well as the scientific, technical and overall cultural potential that a certain area has at its disposal. In this the network of institutions in the field of agro-economical and biotechnological sciences (secondary school, college and university levels of education, research and scientific implementation) is of determining importance.

The identified developmental advantages of rural areas indicate the necessity of defining the determination to, primarily with (a) long-term sustainability of agricultural and rural development, and (b) production and structural, as well as socio-demographic revitalization of rural zones, (v) secure a better balanced agricultural and rural, and especially demographic development, i.e. (g) a more even / balanced and demetropolized development of urban, suburban and rural areas, as a **strategic developmental goal**.

Apart from the customary structure of the market demand for agricultural produce-foodstuffs, the increase of a specific form of business-tourism demand can be expected, continuously throughout the year, and particularly during large international business, political, sports and cultural conventions. Such demand must have its appropriate match in agritourism supply. A specific component of (e) development of the agritourism supply would be not just the diverse, high-quality and secure offer of authentic agricultural produce, but also creating the opportunity for the promotion of traditional values, cultural and historical content and events in authentic rural areas, ecological zones and protected natural values.

2. Science and Profession as the Basis of Human Capital

In the context of the goal of long-term sustainability of agricultural and rural development, and the inevitable degradation processes of natural capital, particularly agricultural land, science, profession and education, as the basis of creating and reproducing human capital, will both absolutely and relatively increase in significance. Agricultural land is rapidly decreasing in favor of the swift regulated or unregulated spreading of urban development land, construction of settlements, for the requirements of industry, utilities, road and other infrastructures.

As is known both in economic theory and in contemporary practice, if the total capital, as production potential, is provisionally divided into:

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- *Natural capital* (C_n) and
 - *manmade (human)*– physical and intellectual capital (C_h), then one of the criteria of **sustainability of the production potential** of agricultural and rural development would be fulfilled only if it were ensured that
 - *the total available capital* (C_n+C_h), did not drop during a foreseeable period of time.

An obvious requirement for the above is to ensure a certain degree of substitution between the various forms of capital, i.e. to compensate the inevitable decrease in natural capital with increase in the available human, primarily intellectual capital. This can, then, be achieved only by increased implementation of already acquired and new knowledge and the best contemporary production practice, i.e. by using the resources of the overall scientific and technical as well as the cultural potential.

The core contribution and main role in the fulfillment of this important requirement is bestowed upon science, profession and education, i.e. the appropriate network of institutions, particularly in the field of agro-economic and biotechnological sciences (secondary school, college and university levels of education, research and scientific implementation). Their programs must be modernized and adaptable to the long-term developmental goal, creating new knowledge, new agricultural technologies and new products, especially new sorts and species adapted to the more efficient use of (probably) altered agro-ecological conditions and resource potentials of a specific economic-geographical area.

If we take a closer look at the network of institutions in the field of agro-economic and biotechnological sciences in Serbia, we will see that the area of Belgrade, as metropolis and capital city, has the highest concentration of higher school and scientific-research institutions³, the programs and activities of which are of double significance for the fulfillment of strategic goals: (1) as teachers educating new professionals, and (2) as researchers occupied with science and research.

³ The most significant institutions are as follows: **faculties of the University**, in the field of biotechnological sciences – Agriculture, Veterinary Science, Biology, Forestry and Technical-Metallurgical Sciences; in the field of economy and management – Faculties of Economics, Business Studies, several faculties and colleges in the field of management, etc.; **institutes** – Institute for Agricultural Economics, Corn Institute, Livestock-Breeding Institute, Institute for Medicinal Herbs, Institute for Implementation of Science in Agriculture, Veterinary Institute, Institute for Protection of Plants and the Environment, Meat Technology Institute, the “Agroekonomik” Institute and others.

The most prominent position in the creating of human capital in agriculture is certainly held by the Faculty of Agriculture of the Belgrade University and the Faculty of Agriculture of the Novi Sad University. Studies at the faculty in Belgrade at all levels are organized in 22 (twenty two) programs-educational profiles⁴, and at the faculty in Novi Sad in as many as 32 (thirty two) programs⁵. Both faculties have an impressive number of teachers and teaching associates, as

⁴ **The Belgrade Faculty of Agriculture** has academic studies organized in four levels (according to the 4+1+(2)+3 system): **Undergraduate academic studies**-bachelor (4 years), 6 programs (Plant Production, Zoo-technical Sciences, Soil Management, Agricultural Technology, Agricultural Economics, Food Sciences and Technologies,); **Graduate academic studies**-master (4+1 year), 9 programs (Crop Sciences and Vegetable Farming, Fruit Growing and Viticulture, Horticulture, Phytomedicine, Zoo-technical Sciences, Soil Management, Agricultural Technology, Agricultural Economics, Food Sciences and Technologies); **Specialist studies**-specialist (4+2), 4 programs (Zoo-technical Sciences, Phytomedicine, Food Sciences and Technologies, Agricultural Economics,); **Doctoral studies**-PhD (4+1+3), 3 programs (Agricultural Sciences, Food Sciences and Technologies, Agricultural Economics,).

⁵ **The Novi Sad Faculty of Agriculture** organizes academic and professional studies. Academic studies are organized in three levels (according to the 4+1+(2)+3 system): **Undergraduate academic studies**-bachelor (4 years), in 13 (thirteen) programs: Crop Sciences and Vegetable Farming, Livestock Breeding, Fruit Growing and Viticulture, Phytomedicine, Agricultural Technology, Water Management, Usage and Preservation, *Agricultural Economics*, *Horticulture*, General, Landscape Architecture, Biotechnical Sciences and Management, Agro-ecology and Environmental Protection, Agritourism and Rural Development; **Graduate academic studies**-master (4+1 year), in 14 programs: Cultivation of Field Plants (5 modules: crop cultivation; vegetable cultivation; cultivation of fodder crops; crop irrigation; agro-meteorology); Land and Plant Nourishment; Genetics, crop improvement and cultivars; Organic Agriculture; Livestock Breeding;. Fruit Growing and Viticulture (2 modules: fruit growing; viticulture); Phytomedicine (5 modules: phytopharmacology; entomology; phytopathology; herbology; agricultural, veterinarian and medical zoology); Water Management, Usage and Preservation, Agricultural Technology, Agricultural Economics, Horticulture, Biotechnical Sciences and Management; Rural Development Management, Water Management in Agriculture; Integrated academic studies of the 1st and 2nd level: Veterinary Medicine (10 semesters - 5 years); **Doctoral academic studies** (6 semesters - 3 years) in three programs: Agronomy, Animal Production, Agricultural Economics, Veterinary Medicine. **Professional studies**-bachelor appl., organized only on the first study level (undergraduate professional studies, 3 years) in three study programs: Agronomy (5 modules: livestock breeding; phytomedicine; crop sciences and vegetable cultivation; fruit growing and viticulture; horticulture); Agricultural Technology and Water Management (two modules: agricultural technology; water management) and Agricultural Economics (two modules: agricultural economics; agritourism and rural development).

well as other professional and technical associates in laboratories and experimental farms.⁶

It has been estimated that the acquiring of biotechnological skills and skills in the field of agricultural economics according to new study programs, primarily at agricultural and other faculties and institutes, would enable students at undergraduate and graduate levels to work independently in institutions in the field of agriculture, but not entirely in professional advisory bodies and their role in contemporary conditions without additional specific education. This particularly refers to the content of programs in secondary vocational (and even elementary) schools, particularly in the field of agriculture and food sciences and technologies, the graduated students of which would find their place in these departments as well.

In developed societies with developed agriculture and agricultural industry, during the past several decades advisory practice has shaped into both a teaching and a research discipline under the heading of *Advisory Sciences*. This is actually a very complex discipline, based on learning in the field of Rural Sociology, Communicology, Social Psychology, Adult Education, Management, Systems Theory, Social Anthropology and other social sciences. Advisory science is an integral and very important part of the education of agricultural professionals in all developed societies, as well as in some societies in transition which, through reforms of education in the field of agriculture, strive to stimulate the developmental processes in agriculture and ensure sustainable rural development. As a teaching subject *agricultural advisory science* is still not profiled as such in Serbian faculties of agriculture⁷, although such a specific discipline could be formed from the plethora of study programs, educational profiles and so-called modules.

3. How to Achieve the Strategic Role of Science in Development Sustainability

Reaching the given strategic goals, which are basically oriented towards **socio-demographically, economically and ecologically sustainable development**, generally presumes three strategic activity levels: (1) functional

⁶ The teaching and scientific staff of the Faculty of Agriculture of the Belgrade University includes: 71 full professors, 52 associate professors, 36 assistant professors, 1 senior lecturer, 1 foreign language teacher, 66 teaching assistants, 32 teaching fellows, 17 teaching associates and 140 professional and technical associates.

⁷ As of recently the Faculty of Economics in Subotica added Agricultural Management to the education of students in the Department of Agricultural Economics.

organization, (2) applicative education; and (3) effective motivation of direct stakeholders.

3.1. Functionally Connecting Science and Profession. The anticipated structural changes on a resource-developmental basis (less natural and of necessity more intellectual capital) demand that the focus of activities must indubitably be, first and foremost (or almost entirely) on stimulating the development and implementation of new applicative agricultural technologies and applied organizational and managerial methods and skills in direct practice. Essentially, without the active role of the state (at all levels), agriculture cannot be successfully organized and advanced. Fundamental scientific research and higher education, as well as the basic instruments and institutions that ensure macroeconomic stability and basic market guarantees to producers (including import protection and stimulation of agricultural exports) should be within the competence of central governmental authorities.

Therefore, the regional, town and municipal authorities and budgetary institutions of the local self-governance should direct the focus of their activities primarily towards practical advisory services, develop mechanisms for stimulation of the practical implementation of contemporary results of biotechnological and agro-economical sciences, throughout the reproduction chain, from inspection of the quality and cultivation of the land, protection and nourishment of the crops, to the final sale and consumption. The thus stimulated direct implementation of new agricultural technologies and introduction of contemporary production methods will, with the anticipated further reduction not only of the basic natural capital (agricultural land) but of the live labor of the primary producers as well, enable a significant increase in the unit resource productivity and further growth of the volume and quality of the overall agricultural output, in keeping with the growth and structural change of the demand for agricultural foodstuffs.

The most important task of the governmental authorities in charge of agriculture, science and education, both the central authorities of the Republic and the town and local self-governances, is to establish a firm functional relationship between the indubitably respectable scientific potential of faculties and institutes (not just in the capital city, of course) as providers of specific knowledge services, on one hand, and the also respectable production and overall agro-ecological conditions and potential of a certain regional economic-geographical area, i.e. the individual farmers, farms and entrepreneurs of various profiles, as the beneficiaries of such services, on the other. The key then lies in transforming advisory science into advisory practice.

3.2. Applicative Education, Advisory Services and Transfer of Knowledge. The development of primary agriculture, but of processing as well, should lean on the results of scientific research and their implementation in practice. The

fundamental implementers of new agricultural technologies in the function of agricultural and rural development should be scientific research institutions and an authoritative professional advisory department. Agricultural advisory services as a practice have a long-standing tradition, particularly in developed countries with developed agriculture. At the same time, the governments of all societies strive to develop and reform agricultural advisory services and agricultural research, considering the well-known and confirmed fact that investing into this sector pays off many times over, through various direct and indirect effects.

Advisory services in agriculture evolved over time, in keeping with the development of advisory practice and the emerging of problems that needed to be defined and theoretically and practically thought out. The evolution of advisory services actually portrays the development of advisory practice of each country. The “advisory services” of less developed countries have not even reached the **early stage**, in which the main task of the advisers is to successfully transfer production and technical knowledge to farmers; the advisory services of other, developed countries are in the early stage or the stage of providing support to farmers to help them reach good decisions, develop an awareness of their problems and the knowledge and skills to overcome them; the most developed countries (such as the Netherlands) have an established practice of advisory services in the form of a network of relationships between social teachings and negotiations of all participants in the change of farming practice, further development of agriculture and the village as a social community, i.e. multi-functional rural development.

In the given context, agricultural advisory services in Serbia are still in the early developmental stage and with merely certain indications of providing support for farmers to reach good decisions. In fact, as in many other sectors in the transition process, this field has also witnessed retrograde processes. Since the early sixties when professional departments were founded, agricultural stations (agricultural offices, agricultural institutes) primarily acted towards the advancement of the socially- and governmentally-owned and cooperative agricultural sector. The transfer and diffuse dissemination of science and profession in practice was achieved through this sector, through the developed forms of production cooperation and association. The fact that the socially-owned sector is systematically disappearing, that many coops, business associations and other entities in the agricultural infrastructure have been discontinued, necessitates a shift in the focus of advisory services towards individual-farming agriculture.

It is very important for the agricultural advisory services of any society to, among other things, establish the optimum balance between the number of experts and the agricultural-resource community in which they operate. Global experiences differ greatly, but unfavorable relations throughout Serbia can easily be recognized.

Agricultural advisory services in Serbia are for the most part provided through the Institute for Implementation of Science in Agriculture, Belgrade, which serves as the Agricultural department for the Republic (with 33 regional departments)⁸. The Institute now comprises a unified agricultural department with 730 employees, 349 of which are with university degrees (40 PhD's, 33 masters, 13 specialists, 263 graduate engineers) and 381 other employees. This department is expected to provide the appropriate services for around 779,000 farms, which cultivate around 1,920,000 ha of arable land. This means that one adviser with a university degree should service as many as 2,225 farms, or production on the area of 5,500 ha⁹.

For example, in Slovenia, which even in SFRY had the most advanced advisory services of all the Republics (while the role of agriculture in its industrial structure is not nearly as significant as in Serbia), in 2000 the agricultural advisory department employed 308 agricultural experts, in the following agricultural context: 86,467 farms and 485.879 ha of agricultural area. In the Netherlands during the 1990s the governmental advisory sector employed 600 on-site advisers, 200 advisers for socio-economical issues and problems and 2,500 consultants and technical advisers.

The intensive process of further fragmenting of agriculture (largely as a consequence of the mechanical inflow of population – internal migrations) points towards the necessity of a stronger presence of the profession and advisory services in all regions, even in the area of Belgrade. From the viewpoint of advancement of production and rural development, such a situation is unsustainable in the long run, a huge number of farms will still not be included in advisory services, particularly “medium” and “small” family farms (which are the most numerous), the commercial and social importance of which will still be great.

⁸ This Institute evolved from the Cattle Selection and Accounting Office, Belgrade (founded by Decree of the government of NR Serbia, 1952) and the Agricultural Production Advancement Center of NR Serbia, Belgrade (founded in 1958) and their merger in 1974.

⁹ Even in the Belgrade area there is an evident disproportion between the agricultural community and the number of experts in advisory departments, particularly the number of direct advisers, and the total number of farms and arable areas. In the territory of Belgrade there are 60,370 farms (7.75 % of the overall number in Serbia), which cultivate around 104,000 ha of arable land (5.4 % of this resource in Serbia), i.e. 1.72 ha per farm. The average size of farms in the territory of Belgrade is significantly smaller than in Serbia overall (2.46 ha), even in the predominantly rural municipalities (Sopot 2.34 ha, Mladenovac 2.22 ha, Obrenovac 2.15 ha).

3.3. Necessity of Reform of Advisory Services. The system of advisory services in Serbia needs to be fundamentally reformed. This will partly depend on the (re)organization of the existing advisory network (the Institute for Implementation of Science in Agriculture and regional agricultural stations) and the willingness of the elements thereof to swiftly approach internal changes. In the other, naturally more significant, part, the reforms will depend on the government and its institutionalizing of advisory policies. Such reforms, through the enactment of new regulations (law, by-laws, rules), should cover several different aspects, especially:

(1) resolving the concept and ownership status of agricultural advisory services – which, in our opinion, should be mostly public (governmental), i.e. what and under which conditions would make up private advisory services;

(2) forming the appropriate territorial organization which would enable the advisory department to cover as great a number of producers-farmers as possible (the most important goal of the advisory service), which presumes the development of local advisory services within the overall advisory system;

(3) stable sources and significantly greater funds for advisory services¹⁰ (secure financing, mostly from the budget, and in a lesser part from the commercialization of certain services);

(4) improvement of human resources and establishing the necessary structure of various profiles (agronomists, veterinarians, agricultural economists, etc.);

(5) a program for the planned and systematic education of advisers;

(6) development of advisory programs and the directing thereof towards the needs of the farmers;

(7) separation of advisory work from activities with a monitoring function;

(8) strengthening management and planning of advisory work;

(9) establishing a unified information system (with typology of advise and services, charts of farms with all relevant information and farm characteristics, linking of all information and the statistical processing thereof) as a necessary analytical evaluation and monitoring tool, the further development of advisory services and establishing rational and optimal advisory policies, in the service of public (national) interests and the interests of farming agriculture in Serbia.

The authority of the advisory department should lean on two firm foundations: (1) a well-organized network for transferring professional and expert

knowledge; and (2) secured financing for the department (mostly from the budget, and in a lesser part from the commercialization of certain services). In accordance with the above, the professional advisory department should:

(a) lean on science – faculties and institutes, in such a manner that each teacher/researcher manages, in the capacity of mentor, a more specific branch, directly contacts the local advisors and a certain number of producers/farms;

(b) apart from the necessary advice relating to the implementation of agro-bio-eco-technological knowledge in production, offer other content as well, and specific agricultural-economical advice, relating to business management, commercial activities; securing information pertaining to the market; the possibility of obtaining funding through mortgage-secured, Lombard and other loans, receipts-warrants from public warehouses etc.; manners, forms and advantages of interest-based association into coops, mechanization rings, clusters etc;

(v) provide services not only to agricultural producers but also to processors and merchants as well, i.e. to all participants in the chain of production, on the following: production, market fluctuations, business economics, ecological and other requirements for environmental protection, production practice conditions, standards and protocols, business plans etc.;

(g) provide evaluation and monitoring of the program for the development and work of the local advisory services, including the licensing of mentors and advisers; the monitoring should cover not only the advisors and their mentors but their clients as well – farmers, producers and other beneficiaries of the advisory services.

Conclusion

New knowledge, methods and technologies in primary agriculture, apart from theoretical education and raising the general education level, make up the form of intellectual capital the relatively swift growth of which enables the fulfilling of one of the criteria of sustainability of the production potential of agricultural and rural development, that the *overall stock of capital* (natural and human) not drop during a foreseeable period of time. This satisfies the prerequisite of ensuring a certain level of substitution between the various forms of capital, i.e. that the inevitable decrease of natural capital in agriculture (soil degradation, global warming, spreading of arid areas, change of purpose) be compensated by an increase in the available human, primarily intellectual capital, through the implementation of new agro-bio-eco-technological knowledge in production.

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RURAL DEVELOPMENT NETWORK AND TERRITORIAL COMPETITIVENESS¹

Vesna Popović, Branko Katić, Jelena Živanović-Miljković²

Abstract

In this paper, as a case-study, the authors examine development potentials and capacity building of local actors in one of the future NUTS III regions of Serbia, functional region Kolubara–Mačva-Podrinje, that encompass 14 municipalities of Kolubara and Mačva districts. The results of the situation analysis, including SWOT matrix, indicate local actors' animation and its regional networking as one of the basic factors of territorial development.

Key words: territorial competitiveness, rural networking, capacity of local actors, rural development support, Kolubara–Mačva-Podrinje region.

1. Introduction

Regional differences, regarding the capacity of local actors (knowledge, skills, common values, attitudes, culture, tradition in civil engagement, pronounced local identity and quality of life) and quality of theirs, formal and informal, internal and external networks, can contribute considerably to the territorial competitiveness and to the explanation of differing development results under similar development conditions. The synthesis of ex-ante evaluations of EU RD programmes also exhibits that, in the countries undergoing a process of regionalization and decentralization, many local action groups have evolved into partnership-based local agencies and delivery mechanisms for a wide array of support systems (Lukesch, 2008).

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Rural networking in the EU is defined in Article 67 (*European Network for Rural Development*) and Article 68 (*National rural network*) of the Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and it was launched during the European Commission Conference on rural development in Cyprus, at October 2008. According to the responses provided by the *Survey of National Rural Networks*, carried out by the EN RD Contact Point during February and March 2009, networks are composed mainly of regional network and agencies. United Kingdom has 4 regional networks, Belgium 2 regional networks and 1 national Contact Point, Germany one national and 5 regional agencies, Latvia one central unit and 9 regional expert, regional LAG network is being established in Denmark, all regional levels are active in France and Czech Republic... Main network actors/stakeholders are: 1. Universities and research institutes; public administrations (national and regional authorities); LAG associations; agricultural associations; 2. Association of rural communities; professional and commercial chambers (agricultural chambers); 3. Environmental organizations, local authorities, individuals, education, advisory and rural development institutes; 4. SMEs, social and youth associations. Main tasks of NRNs are: inclusion/integration of all rural stakeholders in the aims of: reinforcing the territorial approach, maintaining enthusiasm and ensuring the vertical dialogue (top-down versus bottom-up approach) (Law, 2009).

Following these EU experiences, Serbian Ministry of Agriculture, Forestry and Water Management (MAFWM), within the scope of project *Rural development support capacity building*, established Rural Development Support Network. In this moment, network is containing of eleven regional centers.

The main aims of RDSN establishing are: rural development fostering and balancing, vertical - top-down versus bottom-up dialogue ensuring, and local capacity building for application of Leader approach in RD policy and LAGs establishing, that is expected after 2011¹. Since 2007, Government has financially supported regional and municipalities' centers as well as potential new rural centers - civil organizations and legal non-profit entities (OG RS, 104/07, 35/08, 18/09, 43/09²). Regional and municipality's rural centers, in cooperation with Ministry project team and external consultants have been performed training and information actions, including diffusion of scientific knowledge and innovative practices, using PLA/PRA methodologies.

¹ During II phase of RD National Programme (2011-2013) (MAFWM, 2009).

² In line with Amending budget for 2009, the related budget appropriation was cancelled and the financial support was assured by donations.

The Poverty Reduction Strategy Implementation Team has recognized the significance of rural development for poverty reduction and financially supported this MAFWM project of PLA training and RDSN human capacity enhancing¹.

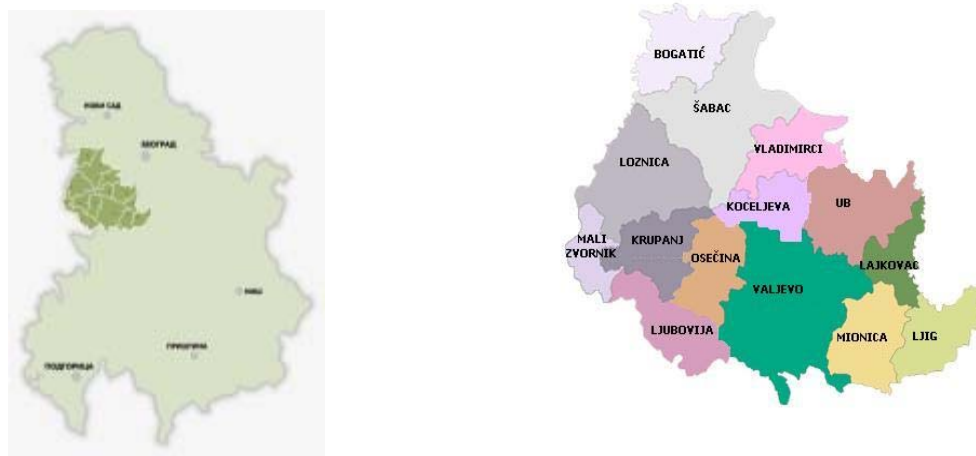
As a case-study, in this paper we examine 1) *development potentials* and 2) *capacity building of local actors* in one of future NUTS III regions² - functional region Kolubara–Mačva-Podrinje, using situation analysis and SWOT matrix. This region includes 14 municipalities of Kolubara and Mačva districts, the major ones being cities of Valjevo, Šabac and Loznica. Functional region, as integral entity of small and medium-sized towns and their rural peripheries, is the most appropriate level for rural development action and implementation, capable to offer infrastructural services and form labor, information and communication markets.

2. Kolubara-Mačva-Podrinje region case study

2.1. Situation analysis - Regional Development Potentials. The Kolubara-Mačva-Podrinje region is positioned in Western Serbia, covering an area of 5,737 km², or 7, 4% of the total area of the Republic of Serbia, with a population of 521,829 living in 446 settlements. The region has a good road (M21, M24 and

Figure 1 Kolubara-Mačva-Podrinje region – geographic position

Figure 1a. Region's municipalities Figure 1b. Region's position in Serbia



¹ <http://www.ruralinfosrbia.rs>.

² According to Draft Survey of Republic Statistical Office, 2009.

M19) and railway connections (Belgrade – Bar railway). The planned route of the Belgrade-South Adriatic highway goes through three municipalities which will incorporate the region into the international transport corridors 10 and 7. The Sava River connects the region to Danube European water corridor (Figure 1b).

Table 1 Kolubara-Macva-Podrinje Region - *main development indicators*

		Republic of Serbia	11 Region's small municipal ities	Republic of Serbia = 100%	14 Region's municipal ities	Republic of Serbia = 100%
1	Area (km ²)	77474	3429	4,43	5737	7,41
2	Utilized agricultural area (000 ha)	5105	236,5	4,65	391,2	7,66
3	Arable land and permanent pastures (000 ha)	4765,9	217,3	2,56	357,8	7,51
	- Share in utilized agricultural area (%)	93,4	91,9		91,5	
4	Settlements	4720	262	5,60	446	9,45
5	Population per 1 km ²	97	63		88	
6	Population – by Census 2002	7498001	215062	2,86	521829	6,95
7	Economically active population – by Census 2002	3398227	109931	3,23	259677	7,64
	- Share in total population (%)	45,3	51,1		49,8	
8	Agricultural population – by Census 2002	817052	79611	9,74	128708	15,75
	- Share in total population (%)	11,00	37,00		24,70	
9	Agricultural economically active population – by Census 2002	529236	54489		86961	
	- Share in total economically active population (%)	15,57	49,57		33,49	
	- Share in total agricultural population (%)	64,80	68,40		67,56	
10	Agricultural holdings	778891	44549	5,70	76651	9,84
11	Agricultural holdings – income sources structure (%)					
	- Agricultural	17,80	34,72		32,50	
	- Non-agricultural	62,30	38,35		41,96	
	- Mixed	16,40	23,75		21,76	
12	Population aged 15 and over, by education (%)					
	- Without education and unfinished primary ed.	21,9	39,0		30,4	
	- Primary education	23,9	26,2		24,2	
	- Secondary education	41,0	28,9		36,5	
	- High and higher education	11,0	4,2		6,8	
13	National income per inhabitant (dinars), 2005.	123473	71915	58,2	97320	78,8
	Share of main 4 sectors (%), national income = 100	76,1	87,4		84,8	
	A Agriculture, hunting, forestry and water works sup.	17,0	58,9		31,5	
	D - Manufacturing	27,1	13,8		33,3	
	F Construction	7,3	4,3		4,0	
	G Wholesale and retail trade; repairs	24,7	10,4		16,0	
14	Investment in new fixed assets (mill. dinars), 2007.	482341	1951,4	0,40	13351,2	2,77

* *National income* (net product) is a newly value added (GDP subtracting depreciation).

Sources: Republic Statistical Office. Municipalities in Serbia, 2006, 2007 and 2008; Census 2002.

Although having in its disposal all of these location and significant resources possibilities, this predominantly agricultural region is lagging behind national

average according to almost every socio-economic indicator. It is particularly conspicuous for eleven small municipalities of the Region. The increased intra-regional differences in development results, which appear in spite of similar resources abundance conditions, give the arguments that ***regional and local actors' capacity and network play a great role in regional economy development and need to be strengthened.***

2.2. Situation analysis - Capacity building and networking of local actors.

All the municipalities of the Kolubara-Mačva-Podrinje region, except Očečina, are comprised within 2 regional RDS centers:

1. *Regional center for rural development for West Serbia – Loznica*, that, also encompasses 11 municipality's centers (Šabac, Loznica, Valjevo, Lajkovac, Bogatić, Vladimirci, Koceljeva, Ljubovija, Krupanj, Mali Zvornik and Bajina Bašta); and

2. *Regional center for village development Moba – Ljig*, that coordinates 11 municipality's centers (Čačak, Gornji Milanovac, Ljig, Kosjerić, Mionica, Knić, Topola, Rača, Lazarevac, Ub and Smederevska Palanka).

As a results of it's activity, *Regional center for rural development for West Serbia – Loznica*, in its Survey¹ stands out: reached partnership with municipalities; organization and equipment of 12 local centers in 11 municipalities and employment of 12 persons - members of local development partners; promoting of Ministry's measures of support; offering of information and advices to 2480 registered agricultural holdings and 226 legal entities and entrepreneurs; offering of 666 consulting services for farmers and 216 for potential farmers; implemented education of potential fruit producers, education of persons for public adverts and performed lectures for 119 persons; constantly briefing of stakeholders and wider publics about network activities, accomplished PLA analysis for village after organizing of instructive seminar (the village identification maps), organized requests preparing for farms registration, established services for livestock registration in two municipalities; and accomplished cooperation with Republic of Srpska and Slovenia.

The *Agricultural producers association Moba* achieved good results in developing of local partnership since its establishment in 2002 until obtaining the status of regional center for rural development. The Association gathers agricultural producers from the area of Ljig municipality and other parts of Serbia, agricultural experts, scientific workers and entrepreneurs in the joint work regarding revival and development of Serbian villages and agriculture through: organization and association of farmers; promotion of agriculture; protection,

¹ <http://www.ruralinfosrbia.rs/index.php?l=1>.

restoration and development of the Serbian village and its natural, cultural and spiritual values; production of high quality and safety food with environment protection; support and development of organic agriculture; internet application services in agriculture; advisory services and knowledge diffusion to farmers; organization of scientific and professional meetings, seminars, workshops, exhibitions; representation of institutions and companies; joint appearance on the market; marketing and promotion of brands and protection of the rights and interests of farmers.

In its Survey¹, *Regional center for village development Moba – Ljig* summarizes results: cooperation and partnership with municipalities and organizations from Central Serbia (by visiting of 190 settlements in Central Serbia); employment and coordinators' training for giving information about general strategies, agricultural and rural support program and activities of MAFWM by: organizing of tribunes, direct contact (4507 of beneficiaries), telephone (2542 of beneficiaries), green market attendance (823 of beneficiaries), creating and distribution of 5 000 promo flyers, by questionnaire and by local printed and electronic media; database setting up, by collecting data related to rural development from the field; international cooperation straighten and organization of RDSN Meetings.

The municipalities also have continued separated efforts on local development capacity building. In May 2007, the municipalities of Šabac, Valjevo, Koceljeva, Krupanj, Vladimirci, Bogatić, Osečina and Lajkovac founded the Regional centre for SMEs development. In August 2007, the national Municipality and City Managers Network were founded in Koceljeva.

All of these associations should contribute to fostering capacity building of local actors and its network with all relevant development agents in the country and abroad. But, the increased intra-regional differences in development results give the arguments for *regional and local actor networks strengthening in the territory of Mačva and Kolubara district (14 municipalities) as a whole*. Network of regional rural support centers at present do not coincide to expected NUTS regionalization.

2.3. SWOT Matrix of regional competitiveness factors. As mentioned above, the internal and external situation analysis produces a large amount of information, much of which may not be highly relevant. The SWOT matrix as an interpretative filter reduces the information to a manageable quantity of key issues. Generated SWOT profile is the basis of goals setting and strategy formulation and

¹ <http://www.ruralinfosrbia.rs/index.php?l=1>.

implementation¹. In this case, it will be used as the basis of recommendations and conclusions defining.

Table 2 Kolubara-Mačva-Podrinje Region - *SWOT Profile*

Strengths	Weaknesses
▪ favorable geographical position; ▪ mild and moderate climate and a balanced distribution of rainfall; ▪ available natural resources (arable land, waters, mineral resources, nonmetals and thermal springs, woody mountains rich in various game, rivers rich in fish); ▪ accessibility and tourism potentials; ▪ production of high quality and safety food with environment protection; support and development of organic agriculture; ▪ tradition and quality in productions of maize, fruits and livestock as input base for food industry development; ▪ foreign investment success stories in the Region's economy, specially in the food industry (Rauch, Grünewald International - Podgorina Frucht d.o.o, Rostfenix, Vindija); ▪ agricultural producers associations, like Moba and partnership-based regional agencies like Regional Chamber of Economy - Valjevo and Regional centre for SMEs development - Šabac achieved good results in developing of local partnership;	▪ poor local infrastructure; ▪ education structure of region's population bellow the national average; ▪ share of agricultural population in total population higher than the national average; ▪ higher share of agriculture and lower share of trade and other services in GDP sector structure than the national average; ▪ higher percentage of agricultural holdings with agricultural and mixed income sources relative to national average; ▪ land fragmentation, outdated mechanization ▪ very low region's share in national GDP, investments, average salaries, employment; ▪ non-developed regional administrative structures and LAGs; ▪ network of regional rural support centers at present do not coincide to functional region's frontiers, i.e. to expected NUTS regionalization; ▪ in the RDS network is still present

¹ <http://www.netmba.com/strategy/swot/>.

▪ regional and local centers for rural development in the joint work regarding development of agriculture and rural areas.	few partners – mainly agricultural producers; there is no cooperation with enterprises, cooperatives or with chamber of commerce; support for local authority is organize-verbal nature and in some municipalities is generally missing.
Opportunities	Threats
▪ new investment opportunity and facilities in industrial free zones in Šabac, Koceljeva, Lajkovac, Loznica, M. Zvornik, Krupanj, Bogatić and Vladimirci (concessions for projects in infrastructure, energy and ecology; lease from 10 to 99 years; employment incentives...); ▪ utilization of EU IPA (RD) funds; ▪ border region eligible for EU CBC programmes; ▪ establishment of Local action groups (LAG's) that will contribute to programming and coordination of local areas development, and to better utilization of EU IPA funds.	▪ political uncertainties and delays in EU accession process and pre-accession fund utilization; ▪ world economic crises, macroeconomic uncertainties, budget and credits shortages; ▪ delays in transition process (lack of some basic legal acts, slow and unsuccessful privatization process, high level of corruption, non-briefing and delayed information, mistrust to public institutions); ▪ migration of young people to urban centers; ▪ land competition between agriculture and industry/mining/construction sector.

The generated SWOT Profile gives the basis for followed *recommendations for future activities in regional actors' capacity building* that should be concentrated to:

- accomplishing of the training for current and new-opened rural centers-offices; activating and strengthening cooperation with enterprises, cooperatives and chamber of commerce, agricultural experts, scientific workers, universities and research institutes; public administrations (national and regional authorities); association of cities and municipalities; environmental organizations, social and youth associations;

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- reorganizing present regional and local RDS network according to NUTS III expected subdivision. It would be better that one regional RD center encompass the territory of Mačva and Kolubara district as a whole;
 - volunteer-associates should be found in every village, which will contribute more successful work of network on the field;
 - organizing and accomplishing of training related to start business with agriculture and rural entrepreneurship; organizing of farmer management training by study tours and visiting successful farms in the country and in abroad, so they could be enabled for independent acting and to achieve necessary self-confidence for innovation and diversification of activities;
 - establishing Local action groups (LAG's) which would contribute adequate programming and coordination of local areas development, and to better utilization of EU IPA (RD) funds.

Conclusions

More creative local development strategies designed through highly open and participatory approaches and new ways of supporting partnership creation and development between public, private and non-governmental actors are essentials. Leader-like local action groups and rural networking are instruments for realization of these aims.

Network should be straightened, at the first place through training and constantly education of coordinators and through encouraging of cooperation and connection inside of network; thence through connecting with the rural development networks in the EU and WBC countries.

National network should be reorganized regionally, according to NUTS III expected subdivision, in order to coordinate with development initiatives easier. NUTS III regions are the levels on which support to the regional development and IPA cross-border cooperation support will be concentrated.

Only communities and regions with well developed local actors capacity and their dynamic internal and external, i.e. horizontal and vertical networks can support learning and innovation processes as a key source of competitive advantages and a key multiplier of economic activity, employment and development.

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MULTIFUNCTIONAL AGRICULTURE AS AN INNOVATION PATH FOR RURAL AREAS

Lívia Madureira¹, Susete Costa²

Abstract

The main purpose of this paper is to discuss the potential of MFA model to enhance innovation in rural areas build on the analysis of information from a database of best practices on innovation in EU rural areas collected by the RAPIDO project³. The analysis shows innovation to be strongly related to multiple-activity. This suggests the synergies between functions and land-uses to overlap the competition for resources between activities and that MFA shows a promising approach to enhance innovation in rural areas.

Key words: Innovation, Multifunctionality, Rural areas, Sustainability.

1. Introduction

Multifunctionality of agriculture (MFA) has been acknowledged in the last years, both by scientists and politicians, as a promising approach to address sustainable development within rural areas. The synergies between productive activities and environmental functions and services have been encouraged since 1992 by the EU agro-environmental policy. In addition, rural development programmes and policies have promoted the MFA model build on its social dimension and its potential to enhance on-farm diversification strategies. This

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³ RAPIDO – Rural Areas, People & Innovative Development. SSPE-CT-2006-44264. Detailed information available on www.rapido-fp6.eu.

public support to the MFA was accordingly to the consumers and societal demands for food quality and safety, recreation and environmental quality.

As a result of market and societal demand drivers and the stimulus of EU domestic policies there has been, within the last decade, a reinforcement of the on-farm diversification strategies build on the advantages of specific-location features to the development of new products and services. An interesting outcome of these strategies is the emergence of a multiple output land-based supply, evidencing the multifunctionality as a promising innovation path for rural areas.

The role of innovation and knowledge to promote sustainable development in the EU rural areas is acknowledged, at some extent, by the rural development strategy for 2007-2013 (EC, 2005). However, this latter strategy is built on a sectoral vision, focusing its attention into the promotion of innovation and knowledge within the “conventional” rural sectors, agriculture, forestry and food industry. It assigns a secondary position to the multifunctional and multi-sectoral activities, whereas acknowledging its importance.

The dominance of a technological and sector-oriented paradigm for innovation, following the OECD definitions and methodologies to measure innovations (OECD, 1997 and 2005), explains why the rural areas are widely excluded, both from the study and the implementation of targeted innovation plans or programmes, which address basically the sectors with global competitiveness potential. Therefore, though EC (CEC, 2003) defines innovation as “the successful production, assimilation and exploitation of novelty in the economic and social spheres” and recognises, in a subsequent communication (CEC, 2006), that all forms of innovation need to be promoted, for innovation comes in many forms others than technological innovation, including organisational innovation and innovation in services”, this broad definition still has not turned operational for other scales than the firm/sectoral ones.

Innovation taking place in the EU rural areas is characterised by a diversity of innovation types and actors and by minimal innovation often build on tacit know-how and supported on informal networks (RAPIDO, 2009). Another important feature of innovation in EU rural areas is that is frequently undertaken by rural enterprises with multiple activities and involved all along the value chain. The plasticity shown by the “rural innovators”, while convergent with the diversification strategies promoted by rural development policy, is not captured by the conventional support schemes to agriculture and rural development. The gap between “rural innovators” dynamics and the public policies supporting competitiveness and rural development evidences the importance of a better understanding of the motivations and strategies of rural enterprises and other organisations in order to build the knowledge needed to adjust the public support and to turn it successful in promoting innovation in rural areas.

This paper provides a contribution to fill the knowledge gap on the innovation taking place within EU rural areas and on how it could be enhanced. The paper builds on data and findings of the RAPIDO project, and its objectives are two-folded. First to characterise innovation in rural areas build on the analysis of a number of case-studies of innovative initiatives located across different regions of UE. This characterisation includes variables such as the type of promoter, sector(s) where it operates and type of innovation undertaken. Emergent activities related to innovation, such as environment-related activities, are examined as well its interactions with more conventional activities of rural organisations. Secondly, the multiple-activity dimension of innovative organisations is analysed within the framework of MFA to support a discussion on the potential of the multifunctionality model to enhance innovation in EU rural areas.

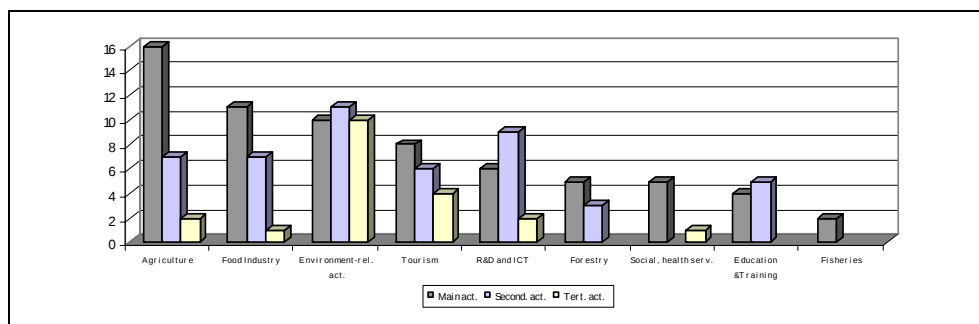
The paper is organised as follows. The next section provides empirical evidence on some features of the innovation taking place in the EU rural areas. Section 3 analyses the multiple-activity strategies of innovative organisations within the framework of MFA and discusses the potential of MFA model as an innovation path for EU rural areas. Finally, section 4 provides some concluding remarks.

2. Evidence on innovation in EU rural areas

The empirical evidence presented and discussed within this section is based on the responses to a survey conducted at case study level. Data were collected by the RAPIDO project (2007-2008) and consists on a database of best practices on innovation in EU rural areas, with 67 case studies spread all over 17 EU countries. This database includes a diversified set of information, such as the sectors of activity, type of innovations, the promoters of the initiatives and socio-economic impacts of the innovation (RAPIDO, 2007). The information presented in this section addresses three main questions: Which are the innovative sectors? Who are the innovators? And, what types of innovation have been undertaken?

2.1. Which are the most innovative sectors? The RAPIDO database shows innovative organisations to be concentrated within the conventional rural sector's, agriculture, food industry and tourism, reflecting the relative weight of these sectors in the EU rural economies (see Figure 1).

Figure 1 Innovative initiatives by activity sector, including secondary and tertiary activities



Source: RAPIDO, 2008

Figure 1 shows that the conventional rural sectors, agriculture, food industry, tourism and forestry, appear mainly as the main activity of the organisation. However, all of these activities show to be also relevant as secondary activities and even as tertiary for others organisations.

The environment-related activities, which include activities such as bio energy, landscape management, nature and biodiversity conservation and environmental education, presents a similar importance as main or complementary activity for the organisation. It is the more expressive sector appearing as second and third activity. Renewable energy production, meaning bio energy with one exception (photovoltaic), represents 70% (7 of 10 case studies) of the case studies where these activities are the main activity. Renewable energy production shows to be less important as secondary or tertiary activity (4 of 21 case studies) (RAPIDO, 2008). The high proportion of activities related to the environment appears as a surprising finding, in particularly its importance as secondary and tertiary non productive activities.

Research and development (R&D) and information and communication technologies (ICT) reveal to be significant activities for the surveyed organisations. They are reported as the primary activity for a number of case studies, but mostly projects with supra-regional scope. Even so, while less important as the main activity compared to the conventional rural sectors and environment-related activities, they represent a relevant sector as a secondary activity.

Yet, probably the most surprising finding is the weight of multiple-sectoral organisations: 70% of the innovative initiatives have a secondary activity and 30% have a third one. Further, there are a significant number of organisations that

integrate within its values chain activities of the three major economic sectors (agriculture, industry and services).

To sum up, and answering the question “which are the sectors showing to be more innovative” there is four aspects to underline. The first is that both “traditional” and “emergent” rural sectors show to be innovative. Secondly more than sectoral innovation we see multi-sectoral innovative organisations. A third remark is the growing importance of the environment-related activities in particular associated with the conventional rural activities, agriculture, forestry and tourism. Environment-related activities emerge as new sector calling for a space of its own within the economic activities nomenclature. Finally, it is important to report the weight of R&D and ICT activities, in particular as complementary activities of both conventional and emergent sectors.

2.2. Who are the innovators? The innovators include mostly private organisations, such as service providers, producers, private investors and tourism operators. Table 1 shows the nature of innovators, highlighting the importance of private organisations: two in each three case studies. Public agents account for less than 20% of total innovators, yet their importance increases when considered they subsume into the “association of categories”.

Table 1 Actors implementing the innovation

Type of actors	No	%
Service providers	15	22.7
Producers	13	19.7
Private investors	10	15.2
Tourism operators	5	7.6
Residents	4	6.1
Governmental bodies	8	12.1
Local authorities	4	6.1
Association of categories	7	10.6
Total	66	100.0

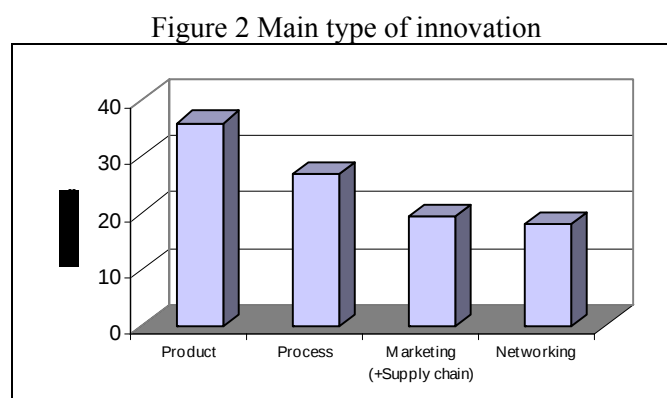
Source: RAPIDO, 2008

Another related question is “where innovation is taking place? The database provides information for 53.7% of the case studies. Yet, the majority of them (83.3%) locate its activities within lagging/peripheral rural areas (RAPIDO, 2008). These figures seem to confirm the findings presented in the literature, that a peripheral location might encourages innovation (e.g. Patterson et al. 2003, North and Smallbone 2000). Further, the importance of lagged/peripheral areas within the

sample explains, probably, the relevance observed for the environment-related activities.

These results highlight the importance of the location-specific factors (SERA, 2006) to the development of innovative products and to the diversity of activities undertaken by the majority of the innovative rural organisations. They suggest also that these locations favour innovation through multifunctionality to respond consumers and social demands for environmental quality, food safety and leisure.

2.3. What types of innovation are being undertaken? The principal type of innovation implemented according to the organisations surveyed is displayed in the Figure 2. It shows product innovation as the most important for around 35% of the case studies. Process innovation comes in second place, reported as the main innovation type implemented by more than 25% of the organisations surveyed. Marketing (chain supply) and networking have globally a relevant weight (37.3% of the total case studies) (RAPIDO, 2007).



Source: RAPIDO, 2008

These figures show, that in spite of reporting only the main type of innovation undertaken, the importance of organisational innovation is quite relevant, certainly needing to be object of an especial focus within the innovation analysis in the rural areas.

3. Multiple-activity strategies and the MFA model

This section analyses the multiple-activity strategies observed for the innovative rural organisations within the framework of concepts and models of

MFA, in order to discuss the potential of a multifunctionality model as an innovation path for EU rural areas. It starts with a brief review of the MFA framework, which is used next to analyse the empirical evidence on the multiple-activity strategies of innovative rural organisations. The third part of this section is dedicated to discuss the potential of multifunctionality model to enhance innovation in EU rural areas.

3.1. Concepts and approaches to MFA. There are different conceptual approaches to MFA, namely the conventional distinction between demand and supply sides (Van Huylenbroeck et al. 2007). Supply approach envisages MFA as a technical issue related to the ability of agriculture to provide multiple joint outputs; whereas, demand approach sees MFA as a societal demand, therefore as a “duty” of agriculture to supply a diversified bundle of outputs to society, including public goods and positive externalities. These alternative approaches are somewhat linked by a third view which sees multifunctionality in a broader sense and as framework for a new agro-food and rural development model (Van der Ploeg and Roep 2003, Van Huylenbroeck et al. 2007, Renting et al. 2009).

While supply and demand approaches to MFA appear as dichotomous views of the same phenomena, this situation only holds when non-commodity outputs are jointly produced without representing an additional cost to the producers. The current situation in most of EU rural areas is that, on one hand, negative externalities and public bads of agriculture became “joint products” unaccepted by the society and, on the other hand, the positive externalities and public goods jointly produced with food/fibre production became scarce to respond to an increasingly demand for environmental quality, food safety and leisure. Therefore, priceless joint products of agriculture, such as waste or landscape become priced outputs. This pricing has been done through the environmental and agro-environmental policies of EU. The agro-environmental grants are the most well known measures of the latter policy, and are basically payments to avoid/encourage negative/positive externalities of farm activities. These green payments, launched by the EC in 1992, were in a certain way the first acknowledgement of the MFA of European farmers, built on the demand/normative side concept of MFA.

The synergies between productive activities and environmental functions have been encouraged in EU since then. Therefore, it was not surprising the importance given to the MFA under the Agenda 2000, linking it with the sustainability concept on the rural development policy ground. In addition, within the later years, rural development programmes and policies have promoted the MFA model build on its social dimension and its potential to enhance on-farm diversification strategies. These programmes and policies build on the MFA, whereas implicitly, as a new agro-food and rural development model which overlaps supply and demand approach to MFA by focusing on the local capture of

the value of both market and non-market goods and services. Another issue when one tries to relate MFA with multiple-activity is the distinction between concepts such as multifunctionality, diversification and pluri-activity. Van Huylenbroeck et al. (2007) define as multifunctional an activity with multiple outputs, whereas diversification means the combination of different economic activities into the same management unit and pluri-activity refers to multiple activities of the farmer or rural entrepreneur. Therefore, it is important to analyse the multiple-activity strategies of the innovative organisations surveyed within this framework to have a better understanding of what is the meaning of the multifunctionality for them.

3.2. *Multiple-activity: diversification strategies and multifunctionality.*

Table 2 relates the main activity of the surveyed organisations with their complementary activities (up to the third activity).

Table 2 Innovative initiatives by main and complementary activities

Main activity	Secondary and third activity					
	Agriculture	Food Ind.	Forestry	Tourism	Env. Act.	RD, ICT
Agriculture		7	1	2	9	1
Food Industry	3			2		4
Forestry		2			2	1
Tourism	1		1		2	
Environ.-rel. activ.	3		1	1	4	
R&D and ICT	1				1	2
Total	8	9	3	5	18	8

Source: RAPIDO database, 2007

Agriculture appears significantly related with food industry and the environment-related activities. It comes also associated with forestry and tourism. The food industry appears together with activities such as agriculture and tourism, whereas the ICT and R&D appear as the most relevant complementary activity. Forestry comes up related with the environment-related activities and also with food industry. Tourism presents complementarities with agriculture, forestry and the environment-related activities. Environment-related activities appear strongly linked to agriculture and also with forestry and tourism. Further, some organisations reported it as complementary activities when they are also the main activity. This situation reflects the bundling of quite different activities such as bio energy, nature conservation or environmental education. These two later activities like other, such as landscape management, are mostly joint activities.

The data confirm multiple-activity pattern as corresponding also to a combination of multi-sectoral activities. This suggests that multiple-activity strategies are mainly diversification strategies, meaning a set of different economic activities managed by the same unit (Van Huylenbroeck et al. 2007). Yet, a closer look to this multiple-activity pattern evidences its joint character, activities that share resources to supply a common product: a special product or a basket of goods and services.

Some of the combinations and new activities observed within the innovative organisations might be explain as resulting from diversifying strategies in both directions: “deepening activities” (to retain added value) and “broadening activities” (to diversify supply) (Van der Ploeg and Roep 2003, Renting et al. 2009). Yet, often the broadening of activities results from the multifunctionality of land-based activities, such agriculture, forestry and the agro-tourism. The growing importance of the environment-related activities illustrates a striking interaction between multiple-activity and multifunctionality.

The environment-related activities were at begin basically a bundle of non-commodity outputs from land-based conventional rural sectors that farmers (and landowners) were stimulated to provide through the agro-environmental payments. However, they are now became more and more actual activities for many rural organisations. They appear both, as complementary activities of productive sectors, such as agriculture and forestry, or associated to non-productive activities like the tourism.

The greening of European consumers demand (for food and leisure) has converted competitive outputs into complementary products. The “natural” multifunctionality of agriculture and forestry became strategic for activities like the rural tourism, which is increasingly enriching its packages with environment-related services. Therefore, multiple-activity can often be envisaged as multifunctionality strategy from the supply side, with producers offering bundles of outputs resulting from land-based joint activities.

3.3. Multifunctionality as an innovation resource. RAPIDO project (RAPIDO, 2008) concluded that innovation observed in the EU rural areas results at large extent of two (often complementary) strategies: (a) changing land use and/or production processes to answer stimulus from domestic policies (e.g. agro-environmental and biomass incentives); (b) diversifying and developing new activities, products and services to meet consumer’s demands (e.g. environment-related and cultural services for tourists). Therefore, domestic policies and market demand have converged to reinforced on-farm diversification strategies and the advantages of specific-location features to develop new products and services and finding niche markets.

The strategies aforementioned drove many farmers and landowners to develop multiple-activity rural business strategies build on the multifunctionality of land-based activities. Some have focused on especial products defined along different activities of the value chain; other, probably the majority, choose to supply multi-output baskets, responding both domestic policies incentives and societal and consumers demand for quality and safe food, leisure and recreation, and landscape and nature conservation. Thus, they have departed from agriculture (and food industry) and enlarge their supply basket to environment-related activities and leisure & recreation. On the other hand, the environment-related activities and its association with tourism (ecotourism and other nature-base tourism forms) seem to attract new-comers to the rural areas. These are entrepreneurs, in particular young and skilled people, whom appear to have inverted the direction of multifunctionality, using it as a resource (a mean) to develop new projects and business where the tourism is often the main activity, although the non-productive environment-related activities are also became increasingly an important sector by its own.

To sum up, the multiple-activity strategies of the innovative organisations whereas can be envisaged as diversification of activities, show in most of the cases a particular character of joint activities organised to supply multi-outputs baskets. This jointly character of the activities emphasises the role of multifunctionality as an asset/resource for innovation strategies, especially involving product, process and market innovation. Therefore, multifunctionality appears clearly as a source of innovation at the organisation level, creating room for new products and process, changes in existing ones and for the opening of new markets.

However, multifunctionality might show even more powerful as an innovation resource if looked at the territorial level. It can be promoted to enhance the development of a multi-output land-based supply at territory level, build on the networking of organisations, which could be encouraged to cooperate in order to supply multi-outputs baskets at the territorial level, through the development of complementary activities, allowing for scale economies and creating room for global competition potential. Therefore, network/organisational innovation appears as a keystone tool to enhance the potential of multifunctionality as an innovation path for rural areas, build on MFA model of joint activities territory-based oriented to respond to a multidimensional demand.

Concluding remarks

The evidence available about the innovation taken place in the EU rural areas, whereas still scarce indicates clearly a strong link between the diversification strategies and the multifunctionality of land-based activities. It shows also that

innovation in rural areas is mostly the outcome of strategies to overcome constraints, such as a peripheral location and small economic dimension, taking advantage of the uniqueness given by location-specific features and the multifunctionality of land-based activities. Further, it suggests that the synergies between activities and land-uses to overlap the competition for resources between activities within multiple-activity organisations. It shows also that multifunctionality is attracting new-comers, whom are exploiting it as strategic asset within the tourism and the environment-related activities sectors.

This reversal move of entrepreneurs “towards multifunctionality”, instead of the former way “from the MFA” of farmers pulled by public policies, while needing to be confirmed as a path for competitiveness, is very promising in terms of coupling triple bottom sustainability goals at individual and territory level. To get a better knowledge of this “new” trend in EU rural areas is fundamental because it would be very helpful to change the traditional view of a dichotomy between competitiveness and social sustainability (implicit within the rural development strategy for 2007-13).

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**THE IMPORTANCE OF PROTECTION OF AUTOCHTHONOUS
DAIRY PRODUCTS AND POSSIBILITIES TO INCREASE
AUTOCHTHONOUS DAIRY PRODUCTS PRODUCTION
OBSERVED AS FACTORS IN THE DEVELOPMENT OF THE
MUNICIPALITY OF ŠTRPCE**

Arsić Slavica, Kljajić Nataša, Savić Mirjana¹

Abstract

Security situation in Kosovo and Metohija and traffic circumstances - in other words - distance between the municipality of Štrpce and bigger consumer centres in Serbia and other factors restrict milk procession in the existing dairy plant and on agricultural husbandries mostly into durable white cheese and cheese brine. The procession of milk into cheese and dairy products with short term durability is significantly less performed, because of the above mentioned reasons.

Within this paper we presented available natural resources and human potential and also did analysis of the development in the number of heads of cattle and the analysis of the quantity of autochthonous dairy products during the period since 1998 to 2008. Based on the data and analysis, the conclusion was made that the increase in the production of autochthonous dairy products in the municipality of Štrpce would contribute agricultural development on the whole and better employment of the local population. The performed analyses were based on modest financial resources, but on the more efficient participation of Serbian institutions as well, with significant expert and scientific support.

Key words: natural resources, analysis of the development in the number of heads of cattle, dairy products, support of the developmental perspective

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Introduction

The municipality is situated on the north slope of Šara mountain massif, where mountainous regions that reach the height up to 2500 m above sea level are predominant, and where the river valley of the river Lepenica with its river basin represents the middle part of the region. The total area of the municipality of Štrpce amounts to 26.762 ha, where agricultural land covers 55% of the municipal area (13651 ha) with the population of about 12000 inhabitants. Pastures cover 38,8 % and meadows 25 % of the total agricultural land and are dominant in the structure of the agricultural land. Land under cultivation that belongs to a class of land with lower quality covers 18 % of the total agricultural land while orchard area is irrelevant. Formation of agricultural land with crop farming and cattle breeding characteristics was exactly influenced by this kind of terrain configuration and land structure with the characteristics of the Alps mountain range. Agricultural area suitable for the development of cattle breeding is placed on surrounding mountain massifs' slopes and hillsides. An adequate development of complementary branches of agricultural science, along with tourist complex development project would also be a support to the future development of the municipality. Priority should be given to autochthonous dairy products (Šara cheese, Šara hard cheese, Šara white cheese and cheese for making special type of pie made from thin layers of dough and a filling).

Protection of autochthonous cheese is extremely important, because ethnographic wealth of a country that way remains protected, and at the same time it creates remark ability of gastronomic and tourism offer and enables its placement on the domestic and foreign market. Autochthonous cheese production becomes more and more important way of gaining profit in rural households.

Authenticity of autochthonous cheese, according to which the same types of cheese but made in different regions differ, depends, among other things, on autochthonous micro organisms, which are heterogeneous types of lactic acid bacteria. Domination of certain type depends on the type and origin of milk.

Available resources

Wide, pure and high-quality natural pastures and meadows, in other words abundance of healthy and high-quality cattle fodder is restorable natural resource reproduced by itself. Natural resources also include climatic conditions, like solar energy, wind and gravitation.

Increase in the number of inhabitants with permanent place of residence in Štrpce at first brought to insufficiency of natural resources of food, considering the

present production capacity, but on the other side it significantly improved human resources, in other words expert and personnel potential was increased.

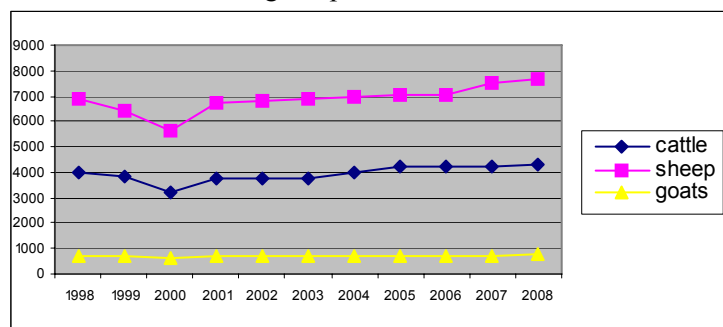
According to the analysis of natural resources and human potential, agriculture in municipality of Štrpce should be based on cattle breeding and within it on the production of milk and dairy products.

Table 1 Development of the number of heads of cattle during the period 1998-2008.

Years	Unit state of cattle	base index	chain index	Unit state of sheep	base index	chain index	Unit state of goats	base index	chain index
1998	3.985			6.920			680		
1999	3.840	96,36	96,36	6.450	93,21	93,21	720	105,88	105,88
2000	3.220	80,80	83,85	5.620	81,21	87,13	650	95,59	90,28
2001	3.771	94,63	117,11	6.708	96,94	119,36	700	102,94	107,69
2002	3.795	95,23	100,64	6.800	98,27	101,37	680	100,00	97,14
2003	3.795	95,23	100,00	6.890	99,57	101,32	740	108,82	108,82
2004	4.025	100,00	106,06	7.000	101,16	101,60	720	105,88	97,30
2005	4.225	106,02	104,97	7.020	101,45	100,29	740	108,82	102,78
2006	4.225	106,02	100,00	7.020	101,45	100,00	730	107,35	98,65
2007	4.250	106,65	100,59	7.500	108,38	106,84	700	102,94	95,89
2008	4.335	108,78	102,00	7.650	110,55	102,00	750	110,29	107,14
Average	3951			6871			710		

Source: Personal calculation of base index and chain index based on the data of Mini dairy "Lahor-Šara", Štrpce, 2008.

Graph 1 Comparative analysis of the number of heads of cattle during the period from 1998. to 2008.



According to the calculation of base indexes the largest increase in the number of heads of cattle was recorded in 2008. and it amounted to 8,8%. Chain indexes show that the largest increase was recorded in 2001. and it amounted to 17%, then in 2004. and 2005. it amounted to around 5% and in 2008. to 2%.

The greatest increase in the number of sheep in relation to the base year was recorded in 2007. and it amounted to 8,4% and in 2008. when it amounted to 10,5%. According to the chain index extract the largest increase in the number of sheep was recorded in 2001. and it amounted to 19,4%, and afterwards from 2002. to 2006. it amounted to 1.5%, in 2007. it amounted to 6.8% and in 2008.it amounted to 2%.

Extraction of base and chain index for goats also showed increase, which reached the highest point in 2008, when it amounted to 10.3% regarding base indexes and somewhat more than 7%, regarding chain indexes.

The above mentioned potential shows justification for the existence of the production line for organized purchase and processing of milk and dairy products. However, mini dairy "Lahor-Šara" in Štrpce with the capacity up to 500 l of daily production, which has been working successfully during the past years, unfortunately doesn't satisfy the present need and real demand.

The production of milk and dairy products

The production of milk in Serbia is still on unenviable level; during the last six years it hasn't been significantly changed, more exactly the quantity of the produced milk was increased by 0,32 % in 2007. in comparison to 2000., therefore certain measures should be taken to stimulate its growth and development.

Serbia's share in the world milk production amounts to 0,31 %, its share in European milk production amounts to 0,90 % and it modestly ranks 22. in Europe, with the production that is higher than the production of milk in Lithuania, and lower than the production of milk in Portugal. Milk producers in Serbia are family households that produce 92 % of the total production, while in agro-industrial plants significantly smaller quantity of milk is being produced. Region that is most successful in the production is Central Serbia, considering that it has an adequate terrain configuration for cattle breeding production.

According to the consumption of milk and dairy products, Serbia is on the bottom of European scale. If it approached European average, it would be confronted to a deficit of those products. Average consumption of milk for 2007 was 60,6 l per capita.

The European Commission Decision to put Serbia on the list of the countries from which it is possible to import milk to the countries of the European Union will have positive effects on the development of domestic agriculture on long terms, since that decision will additionally stimulate agricultural production, because new markets for the placement of domestic products are being opened. The production of milk and dairy products should be stimulated through the measures of agrarian policy.

Table 2 and Graph 2 show survey of milk and dairy products production development since 1998. to 2008. in Mini Dairy "Lahor-Šara". According to the given data it could be noticed that during recent years there has been a significant increase in the production of milk, and therefore a significant increase in the production of dairy products, as well as in the consumption.

Table 2 The production of milk and dairy products during the period 1998-2008.

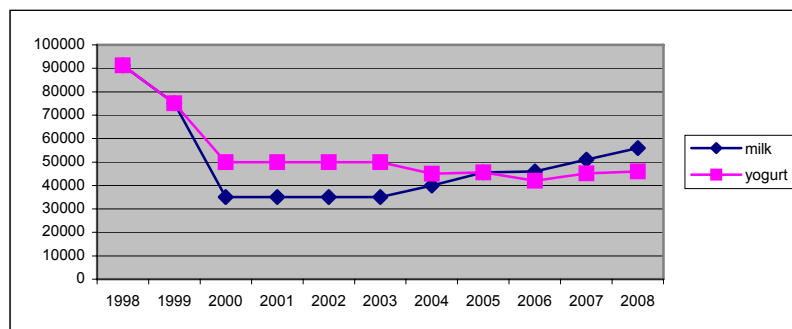
Years	Milk (l)	Litres per capita	Litres per ha	Yogurt (l)	Litres per capita	Litres per ha
1998	91.250	7,6	6,7	91.250	7,6	6,7
1999	75.100	6,3	5,5	75.100	6,3	5,5
2000	35.000	2,9	2,5	50.000	4,2	3,6
2001	35.000	2,9	2,5	50.000	4,2	3,6
2002	35.000	2,9	2,5	50.000	4,2	3,6
2003	35.000	2,9	2,5	50.000	4,2	3,6
2004	40.000	3,3	2,9	45.000	3,7	3,3
2005	45.625	3,8	3,3	45.625	3,8	3,3
2006	46.000	3,8	3,3	42.000	3,5	3,1
2007	51.000	4,3	3,7	45.200	3,7	3,3
2008	56.000	4,7	4,1	46.000	3,8	3,4
Average	49.543,2	4,1	3,6	53.652,3	4,8	3,9

Source: Internal data of the Mini Dairy „Lahor-Šara“, Štrpce, 2008.

Analyzing the Table2. and Graph 2. it could be concluded that the purchase of milk was increased during the period from 2004. to 2008. in the Mini Dairy "Lahor-Šara". Based on that fact, the conclusion was reached about larger procession of milk into dairy products. Also, considering that the production of yogurt was not increased, it could be concluded that the milk was used for the

larger production of autochthonous cheese, which is evident according to the further discussion within this work.

Graph 2 Comparative analysis of milk and yogurt production



The production of autochthonous cheese

Autochthonous cheese is a product that is originally made in a certain area as a result of long term development of the traditional production technology.

Large number of different types of cheese, world-known, is made as a result of autochthonous production, like Emmentaler produced in Switzerland, Gouda produced in the Netherlands etc. Specific taste of autochthonous cheese is influenced by: pasture or hay and geographical area where the cheese is being produced.

To place autochthonous cheese on the foreign market, it is necessary to apply traditional, but standardized technology which assures equal quality and protection of these products, in order to adapt them to the EU market demand.

Taking care of their health, consumers all over the world became more and more demanding while looking for natural products of famous origin. Today, there is a growing number of consumers which want to buy autochthonous products produced in small series according to ecological norms for every day use. According to the data given by FAO sale of ecological food in the world per year is growing more than 20 %. Market research shows that autochthonous food is on average 15 % more expensive than common food. The biggest part of ecological food is placed in the countries of the European Union.

Milk procession, based on small producers scattered all over the map - typical of hilly and mountainous terrain, is also characteristic of the municipality of

Štrpce. However, the existing Mini Dairy could take over an important role in the production and processing of milk for the market, if stimulating means for capacity expansion were provided, because this Dairy is small only regarding its capacity, but in regard to all other functions, this dairy is similar to standard Dairies. In that way, beside an increased milk processing, autochthonous dairy products would remain protected, this is of great importance for this area.

Table 3 shows the production of autochthonous types of cheese in Mini Dairy "Lahor-Šara" from Štrpce. An analysis of the data given in the table shows that the assortment of production consists of 3 types of autochthonous cheese and that the most important products are Šara cheese and Šara hard cheese, of which a significant increase in production has been recorded since 2007.

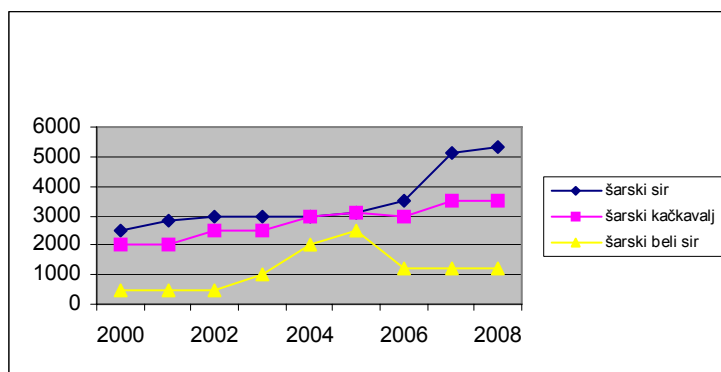
Table 3 Industrial production of autochthonous cheese from 2000. to 2008. (u kg)

Years	Šara cheese	base index	chain index	Šara kachka val	base index	chain index	Šara white cheese	base index	chain index
2000	2500			2000			500		
2001	2800	112	112	2000	100	100	500	100	100
2002	3000	120	107,1	2500	125	125	500	100	100
2003	3000	120	100	2500	125	100	1000	200	200
2004	3000	120	100	3000	150	120	2000	400	200
2005	3125	125	104,2	3125	156	104,2	2500	500	125
2006	3500	140	112	3000	150	96	1200	240	48
2007	5100	204	146	3500	175	117	1200	240	100
2008	5350	214	105	3500	175	100	1200	240	100
Aver.	3486,1			2791,7			1177,7		

Source: Personal calculation of base index and chain index based on the data of Mini dairy "Lahor-Šara", Štrpce, 2008.

General conclusion regarding base and chain indexes and graph survey for the observed period from 2000. to 2008. would be that certain increase in the production of cheese exists, which, according to chain indexes, amounts to 46% for Šara cheese and 17% for kachkaval (hard cheese) in 2007.

Graph 3 Comparative analysis of the production of Šara cheese



Conditions and possibilities to increase the production of autochthonous cheese and to place it on the market

The development of agriculture is usually associated with the provision of additional funds. However, other development possibilities, that are often underestimated, are being discussed within the text, although the funds remain necessary assumption of economic activity.

The number of inhabitants and tendencies in natural population development and in economic structure of the population are important factors which are affecting demand of agricultural and food goods. Level of demand of these goods for the farmers in the mentioned area is conditioned by population numbers and, therefore, more satisfactory prices than in other areas are additional stimulative factors for the production activity. Some farmers achieve different results within the same material, natural and social conditions, because of unequal management skills. To make better work decisions in agriculture one needs reliable information, expert knowledge, data about market conditions and market tendencies...New knowledge could be acquired not only from books, from media, through lectures, but also through exchange of experience. A lot of farmers and agricultural organizations could learn a lot from those householders and organizations that succeeded in some agricultural works. Fear of the unknown slows down the changes, while one first accepts what is useful, but already well-known. In brief, the advancement of production management is a significant reserve for more efficient farm management.

In the era of enterprise society, success in agricultural activity is a result of adaptation of useful changes in the means of production, in production technology, in the choice of genotype and in the presentation on the market. Technical and

technological changes are achieved through financial investments, but not all useful changes are restricted with funds.

Although to succeed in agricultural economy wide expert knowledge is needed, beginning agricultural education of the youth in our country is insufficient. In fact, educational system mainly directs rural youth to education for the professions that are not in connection with agriculture, which in great deal leads to country and agricultural abandonment. Specialized secondary school is a minimum of expert education of future successful householders. Useful information for the youth from villages would be that in spite of growing unemployment in towns, permanent employment on the family farm is possible and promising. Those family farms are in fact family agricultural firms. The future for those firms' activity is certain, especially as long as population grows, and as long as our state imports the food. Since technical and technological changes cause the need for bigger knowledge of farmers, increase in the number of agricultural secondary schools within the total numbers of secondary schools has become the public interest. On the other side, it is suitable to improve in principle the position of youth on farms through bigger participation in production management, earlier law of inheritance regulation and satisfaction of their personal needs.

The new Law of Collective Farms enables foundation of farms that would in a great deal take our ancestors' farms as a model. Our ancestors excelled in the European farmer ship, in contrast to the present situation. To regain trust in the farm, which would be the organization of private owners and which would be founded first of all by farmers using their property upon which they would have all the control while it serves to the economic advancement, it is the present need and our future. Consequently, we need a new farm which wouldn't be a social firm, but an organization of farmers.

Quality marks, which are extremely important, serve to protect trade marks which satisfy all precisely defined criteria, while regulations are not contrary to the Intellectual Property Law and to TRIPS agreement from 1994.

Almost all member states of the European Union strive to protect the production of their autochthonous cheese. The European Union adopted Regulations No.2081/92 and No. 1804/99 in 1993, according to which cheese could be protected by quality marks: originality (Protected Denomination of Origin (PDO)), geographical origin (Protected Geographical indication (PGI) and guaranteed traditional speciality (Traditional Speciality Guaranteed (TSG)).

Conclusion

Traditional technology of the production of autochthonous cheese is simple and completely feasible in modest conditions of hilly and mountainous terrain. Geographical position, climate, height above the sea level and rich mountain pastures are suitable for the breeding of cattle, sheep and goats, consequently they are suitable for the production of milk and traditional products in the municipality of Štrpce.

General conclusion regarding base and chain indexes for the observed period from 2000. to 2008. is that certain increase in the production of cheese in the Mini Dairy Lahor Šara (in that area) exists, which depends on the bigger delivery of milk from private individual farms, and also that there is an indication of stabilized increase in the production and consumption.

Capacity expansion of the existing Mini Dairy, which is small only regarding its capacity, but in regard to all other functions, this dairy is similar to standard Dairies, would stimulate the improvement or change in cattle breeding structure, by adding highly productive milk cows. Also, the conditions necessary for stable milk production would be achieved by introducing modern equipment for automatic and mechanical cattle breeding, and surplus of autochthonous dairy products would appear on the market and those products would after a certain period be placed not only on Serbian market, but on the markets of surrounding countries.

Increase in the level of maintenance of family farms on the territory of municipality of Štrpce, through increase in primary agricultural production of healthy food would bring to the development and promotion of the environment and tourism of Brezovica Mountain, as well.

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PROSPECTIVES OF HOMOLJE AS AN ECO-DESTINATION

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Radovan Lala Davidov, Časlav Lačnjevac¹

Abstract

Homolje with its own heterogeneous and attractive tourist potential, correspond important tourist area of Eastern Serbia. Relief is represented with hills and plains. Climate is moderate continental. Hydrograph is represented by river Mlava with her tributaries. This community is full with different animal and herbal species.

Economy is undeveloped, but natural and anthropogenic fortune, peace, silence, green nature, loveliness of housekeeper, etc., is important potential for development of rural tourism.

Text of roads showing possibilities of sustainable development in area of Homolje, like new possibility for progress in this area. Authors of this work were data collection trough experience on terrain, area monitoring and benchmarking. Homolje can be important eco destination in tourist map of Serbia.

Key words: Homolje, sustainable development, eco destination, tourism

Introduce

In actual conditions of intensive town planning and industrialized, when population is more exposed to noise, pollution, fast tempo of life, we can see need for tourist developments and to keeping natural and cultural worthiness.

Homolje is part of Serbia with preserved natural and cultural fortune; reach every predisposition for growing in important area in Serbia for development of ecotourism.

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Through ecotourism is possible protect local culture off forgetting, but is very important to local inhabitation seriously follow support in implementation for complete effect.

Result of research

Trend from the last century have been made interest modern consumer demand for destination and tourism based on nature. This aspect of tourism is today popularly called ecotourism and has development in ecological sensitive area and a big responsibility in organization.

Homolje is an area in Eastern Serbia limited with mountains. From area Zvizd, north, is limited with Homolje's mountains (940 m), from Resava, on south with Beljanica mountain (1336 m), in east with mountain Crni Vrh (1027 m) and Mlava, on west, open this area for campaign Stig.

Good natural capability is not enough spent and is evident bad condition of infrastructure. Introducing natural – geographic elements and tourist motive is need for harmonizing tourist activation.

This part of Serbia has a great number of caves. It has been explored more then 50 caves. Many of them are really beauty (exp. cave Pogana Pec). In this area river Mlava create Gornjak canyon long 16 km. Entrance in Homolje "over scan" old castle from Roman period. Here are also orthodox monastery "Mitropolija" and "Blagovestenje" from XIV century.

Hydrograph artery of this area represent river Mlava. Mlava is one of longest river in Eastern Serbia (150 km). Characteristic of mountain clean river Mlava is hold in part of valley. This area has a great number of natural healing springs. Heterogeneous of flora and fauna spread good conditions for development of eco tourism in this part of Serbia.

Eco station – specific construction for accommodation in ecotourism. Eco station must represented implementation of concept of ecotourism in construction. This object must be nested in local architecture, natural and look of area. On this area eco station can be specific objects made of wood – characteristic for Eastern Serbia.

Tourist activity in harmony with ecotourism. Ecotourism consider focus in nature and mean guidance of small tourist group with learning and with specialized tourist guide for certain area. Tour should be like excursion and can last half of day, one day or weekend. Avoid motor – car and use bicycle or trekking like aspect of recreation.

Different zone of protection should be assigned and made correspondent maps in correlation with support capacity of certain area. This area has a lot excellent terrain for „normal extreme " sport with a lot affection and adrenaline and without consequence for natural environment.

Friendly host from Homolje are always ready for guest and hospitality. Guest can to taste excellent food from this part of Serbia and take part in life of local population.

Homolje, like potential tourist destination still is not on right way positioned on tourist market. Base for development in that direction represent SWOT analyse (strong, weakness, opportunity, threat).

Strong points produce of ecotourism	Inferior points of product
- this area is remarkable in geographic meaning - nearness of large city in Serbia	- bad tourist infrastructure - deficit of signalling - capacity of accommodation - destination is not enough known - inefficient presence on tourist market - low foreign tourism
Attractive - healthy environment - attractive area in natural look - attractive area in cultural sight - heterogeneous traditional customs - historical heritage	
Typically for this area - Eastern Serbia is remarkable by object from the wood for eco station - Water – mill in country - Traditional customs - Hospitality of local inhabitation	
Culture - specific tradition Source of demand - tourist from Serbia	
Specific segment - sightseeing - visitors of manifestation - recreation - climbing, mountaineering	

Local people from villages: Bistrica and Zdrelo are interested in development of rural tourism. Bistrica is village on river Bistrica, near by Petrovac.

In 1986 this village was proprietary like good of national meaning. In this village existed 12 preserved water – mill still in function (from XIX century). Bistrica is every spring host to many actor of race "Dragutin Tomasevic"; first Serbian runner on Olympic Games 1912.

Few kilometres further is village Zdrelo. In this village there are two dominant mountains top: Veliki Vukan (825 m) and Mali Vukan (732 m). Zdrelo is located near by Gornjak canyon. This place is well – know by healing springs with temperature of water 38°C.

Conclusions

Tourism, like industry, is last years accept undreamed dimension and overtake every part of planet. In this condition mass tourism can cause a big problem to local community. End of 20th century and beginning of 21st century brought new concept of ecotourism, where is tendency on keeping of nature and better conditions for local community.

Homolje slowly entering on tourist map of Serbia through rural tourism, however still there is need for a lot of intercession in this destination.

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ROMANIAN FARMER – OWNER, BUSINESSMAN AND ECONOMICAL GOODS CONSUMER

Bucur Ion¹, Bucur Cristian¹

Abstract

The transition from command economy to competitive market economy brought the Romanian farmer in three aspects: as owner of land and other goods, producer (businessman) and as consumer of economic goods and services. The Romanian farmer could be considered a beneficiary of transition because he became again owner of the land he had before collectivization of agriculture. He could own an unlimited number of animals and technical means. As owner, the Romanian farmer beside benefits from transition has had losses also. He has not recovered the means of production, which he was forced to take to cooperative, nor the value of them. In a competitive market economy, the farmer is also a business man. He can use his family or he can employ labor resources, he can rent the land or he can associate with other farmers. The farmer initiate, on his own or as associate, business to obtain profit.

Key words: agriculture, farmer – owner, farmer – business man, farmer – goods consumer, economic assets

Introduction

Agriculture is a base branch of the producing of economical goods which conditions the existence and progress of human society. It is the only natural source for producing food and agricultural material raw. Vital source of existence the agriculture offers to an important part of available active population the means to utilize the labor force. The transition from command economy to competitive market economy brought the Romanian farmer in three aspects: as owner of land

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and other goods, producer (businessman) and as consumer of economic goods and services.

Romanian farmer – land owner and labor force supplier

The Romanian farmer could be considered a beneficiary of transition because he became again owner of the land he had before collectivization of agriculture. He could own an unlimited number of animals and technical means.

As owner, the Romanian farmer beside benefits from transition has had losses also. He has not recovered the means of production, which he was forced to take to cooperative, nor the value of them. Also a great influence had the losses made when liquidation of cooperatives took place after 1989 when were destroyed or deteriorated many production facilities created with lot effort over the years. Also the technical equipment used in cooperatives, which existed due to common contribution of people, remained in state production facilities. So the Romanian farmer become owner of the land but, without having production means the technical equipment for agriculture he had had in the past and without having financial resource to buy them.

Many difficulties have the people that work in agriculture but not having no land. Their major property is the labor. They offer their services on the labor market to obtain income needed to satisfy different needs. The present conditions on labor market in Romania are unfavorable because in agriculture are many labor resources used insufficiently. The week use of labor resources in agriculture most part of the year means a masked unemployment which has negative consequences as: waste of an important volume of labor resources which could not be used as production factor, waste of production volume due to leak of activity long time during a year, loose of incomes due to inactivity. Because there is not a local alternative of employment many workers from rural areas head to other areas in country or out of the country. Their chances of employment are low because of level of skills and a relative high rate of unemployment that different economies are facing.

The individual households formed by returning the lands to their old owners or to their siblings, after adopting the law no. 18/1991 (the land stock law) revised later by law no.1/2000 ("Lupu law") , are very small dimensions, under 1,8 ha. Also these households don't have the necessary technical means, qualitative seeds or fertilizers and have a reduced productivity which merely assures self consume. Most of them practice subsistence agriculture which affects satisfying the needs of internal market to main agricultural products.

The new land owners haven't benefit by legislative measures to facilitate access to resources needed to have a normal agricultural productivity. Due to this reason the Romanian farmers could not cultivate the land so they could recover at least the production costs. Carrying of superficial agricultural activities on small crumbled land surfaces has favored degradation process of land. Some fertile lands decayed in quality because their owners, not having technical means and resources have abandoned them unexploited. Also to them we add the lands that were in an improvement and amelioration process (preventing land erosion, landslide, draining, a forestation, amelioration of low fertile soil) before giving them back according to Land Law after which the improvement process has stopped.

In Romania, after year 1990, the agricultural surfaces exploited diminished, many of lands suffering a degradation process this reflecting in quantity and quality of production obtained.

Between 1987 and 2007 the arable surface of Romania decreased with 7463 hectares and fruit-growing plantations decreased with 9343 hectares [1].

The cause of surface decreasing consist in the fact that individual small land owners cultivated small surfaces with a diversity of plants due to lack of technical means, financial resources and in the absence of consistent support.

The main causes of obtaining low productivity and above normal quality parameters are:

- the small dimensions of individual land farms
- absence of technical means from producers households
- devastation of technical and material base needed for mechanization, irrigation and fertilizing the agricultural production on large scale
- impossibility of procuring fertilizers, quality seeds by most of land owners due to the low income they obtain
- the majority of individual land owners practice subsistence agriculture, which affects the satisfaction of internal market needs at main agricultural products.

To develop agricultural activity in an efficient manner is needed to increase the dimensions of surfaces owned by individual farmers to optimal level by associating small owners in bigger farms, buying and selling land, land renting and process land surfaces by grant. In conditions of Romanian agriculture, making of agricultural units of optimal dimensions, efficient for production, could be realized by concerting land, by associating individual land owners in bigger units. The profile of these units could be different by the associated members needs, production, services, provisioning, capitalization etc. Functioning based on market

economy principles these associations could prove viability in confronting with competitors. By increasing the dimensions of agricultural units the economical power of associated producers increases also, facilitating conditions for developing irrigation systems and mechanization equipment.

Romanian farmer as business man

In a competitive market economy, the farmer is also a business man. He can use his family or he can employ labor resources, he can rent the land or he can associate with other farmers. The farmer initiate, on his own or as associate, business to obtain profit. In his actions the farmer must have initiative, operative abilities, organizational skills, ability to understand the social economic perspectives.

To produce goods the farmer must supply with goods and services entering in relations with various suppliers. To sell his products for recovering the production costs and obtain profit, he makes contact with various clients. In Romania the climate in which these relations take place is not normal, because usually the farmer is a small producer, the suppliers and clients are large, strong entities with state, private or mixed capital. These powerful clients and suppliers have the ability to determine the prices of goods they buy or offer in their favor. So the Romanian farmer buys at high prices production factors and is forced to sell cheap the goods he produces. He is not supported by state to get through the unfavorable situation he is in. The state intervention in relationships between producers, suppliers and clients in agriculture are weak, made with delay, and could not correct the market imperfection.

The weak economical power of producers in agriculture influences the activity of his clients and suppliers. Because he could not afford to buy machines and agricultural machinery, fertilizers for soil, the factories who produce these reduce productivity, reduce the personal and sometimes they get bankrupt. Many Romanian industrial units producing fertilizers, pesticides and insecticide needed in agricultural production are in difficulty, because the agricultural production could not include, on internal market, their production. Also because of the farmer weak economical power the export of cereals and other agriculture goods reduced and the import increased.

Romania was known as an important exporter of wheat, barley, beetroot sugar, meat, fruits and vegetables. The 1990 year marks the start of Romanian agriculture decline on all plans: vegetable production in general, fruit growing, horticulture, wine growing and animal farms. Devastation of national irrigation system has made the production of agricultural goods to be dependent in majority by natural factors evolution.

The solution for passing the crisis consists in elaborating and applying an active policy, constructive policy for agricultural system and farmers.

The majority of Romanian farmers don't know the conditions they must meet to access European funds. The principal causes are insufficient popularization of these funds. In lack of sufficient information, because don't know procedures and don't have confidence they would be financed, many Romanian land owners are not interested in starting a business or obtaining European funds.

The great majority of village inhabitants practice agriculture only for their needs. For them is almost impossible to access SAPARD funds, because of difficulties implied by making a project and mostly because of impossibility to find funds needed for co-financing. To benefit from not repayable European funds, the farmer must have half of the funds needed in investment, what is an obstacle hard to surpass for many Romanian producers. For soliciting SAPARD funds, the farmer must invest his own funds, half of them could be recovered after a while by the funds benefiter if the use of money is justified by documents.

To extend the access to SAPARD funds is needed to modify, by the European Union Commission, the co-financing rule, so the benefiter to contribute a quarter of project value. In this way the number of farmers willing to invest in zoo technology, fruit growing, agro tourism, enterprises for milk, meat, fruits process.

The lack of financial resources and entrepreneurial spirit prevent development of land owners business. So important land surfaces remain unused because many village inhabitants, who work in agriculture, have insufficient money to exploit the land, to supply with raw materials, in condition of high prices inaccessible to them. The salvation of farms consists in the aids they receive from state.

The low level of organization of agricultural activity is reflected by the low rate of commercialization in Romanian households. In most of cases, the main part of production is used for self consumption and small part of it is for commercialization. Usually commercialized products are sold directly on market, at home to intermediary traders and only in small part to firms.

The majority of Romanian farms don't insure the production, even if frequently confront with draught periods. Their main information source is the television and in a small parts the papers and even less internet.

Now the world economic crisis affects Romania. It is felt in agricultural activity also, the main segments affected are crediting, investments and agricultural production selling. The economical crisis effects will be felt on long and middle term mainly in rural development segment and in zoo technology investments. For this reason the lag registered in present between the agriculture in Romania and the

other European Union countries will increase. The cost raise of credit and lack of financial resources will lead to reducing the investments in rural environment and making more difficult to access European funds. In these circumstances the competitiveness of agriculture will decrease in internal and also on external market.

The agricultural activities are affected by energy crisis, agricultural products price crisis and the ones in financial markets and insurances. Energy crisis restrict the activity in agriculture because of cost rises. The products price crisis lead to impossibility of obtaining profit and not covering the production cost. Financial crisis raise the cost of credits, the absence of money needed by farmers for financing projects.

Romanian farmer a consumer of goods

The farmer is also a consumer of goods and services. He has a variety of product for food consumption many of them from his own production. The farmer food consumption is determined by the use of products from its own household and products bought from the market. For procuring the needed goods the farmer use funds he obtains from different sources. In the third trimester of 2008 the monthly medium incomes for a rural household are:

Table 1 Monthly medium income of rural households in 3rd trimester 2008

<i>Income types</i>	<i>incomes</i>
1. Total income (A+B)	1797.77
A. Monetary income (1+2+3+4+5+6+7)	1303.65
1. Gross income and other rights	546.62
2. Incomes from agriculture	130.31
3. Incomes from independent non agricultural activities	80.13
4. Incomes from social carry	421.39
5. Incomes from property	1.15
6. Incomes from selling actives from household inheritance	64.94
7. Other incomes	59.11
B. Non monetary income (1+2)	494.12
1. The value of non monetary incomes obtained by workers and benefiteres of social labor	
2. The value of agriculture goods from own resources	30.19
	463.93

Source: National Statistics Institute, Press release no. 1/2009, www.inse.ro

In rural environment, the main source of households income has been represented by agriculture production which assured 34,7% from total income in third trimester 2008. The main part of these (25,8% in 3rd trim. 2008) was formed by the value of consumed products from own resources. The percent of monetary income from agriculture in total income of rural households was 7,2% in 3rd trim. 2008. In the same trimester, to total income of households also contributed with 30,4% monetary income and with 23,4% the income from social labor.

Table 2 Structure of expenses in rural households in 3rd trimester 2008

<i>Expenses</i>	<i>Percent %</i>
2. Total expenses (A+B)	100
A. Monetary expenses (1+2+3+4)	72.7
1. Consume expenses (a+b+c)	73.6
a) Expenses for consumer goods	37.1
- Buying alimentary goods	94.1
- Expenses in public supplying units	5.9
b) Expenses for non alimentary goods	43.1
c) Expenses for paying services	19.8
2. Expenses for unconsumed goods	2.9
3. Incomes taxes, share taxes	11.4
4. Other monetary expenses	12.1
B. The value of alimentary goods consumed from own resources	27.3

Source: National Statistics Institute, Press release no. 1/2009, www.inse.ro

The total expenses on a household from rural environment, have represents in 3rd trimester 2008, 94,5% from total incomes. The principal destinations of expenses effectuated by households in third trimester 2008 are: consume expenses 73,6%, from which 94,1% represents expenses for buying alimentary goods; the expenses with tax incomes, share taxes and other expenses represents 23,5%.

In rural environment, third trimester 2008, 27,3% from total expenses are represented by the value of consumer goods from own resources.

The rural households have a reduced consume of bread and bakery products, in compare with households from urban areas, the deficit being surpassed by an increased consume of maize. Also, rural households have the smallest consume of meat, fats (including sun flower oil and soya oil), fruits, melons, sugar and other sugar products. They have above medium consumed on products as: milk and dairy products, eggs, vegetables, potatoes and beans.

The rural farmers have an alimentary consume decreased than necessary and with deficits in its structural aspect. It's based mainly on own agricultural production. The low financial resources, foremost oriented to alimentary consume and strict necessity products place the rural households, beside unemployed and retired households in most disadvantaged category.

Conclusion

Integration of Romania in EU makes Romanian farmer to act in state of land owner, businessman and consumer of goods in conditions of commune agricultural politics. EU integration necessitates adopting some regulations regarding producing, selling, quality and limits between agricultural goods must be produced. Development of Romanian agriculture in accordance with EU regulations implies for Romanian farmers respecting strict phyto sanitary and veterinary standards, production limits etc.

For small Romanian farmers, which own 2-3 hectares of land, worked with rudimentary tools, the agriculture is inefficient and only for subsistence.

Currently, subsistence farms have 45.24% of the total utilized agricultural area (14.3 million hectares of agricultural land), semi-subsistence farms using 13.76% and commercial farms - 41%, shows data of the Ministry of Agriculture. Of the total 4,256,152 farms, a percentage of 90.96% is the subsistence farms, 7.55% semi-subsistence farms and only 1.49% is represented by commercial farms. The figures show the facts in Romanian agriculture: poor productivity and low economic and financial power of Romanian farmers [9].

As a member of EU, Romania must respect principles and rules of commune agrarian politics. These politics would not suffer substantial modifications until 2013, the agrarian budget being stable to that date. After 2013 is expected a drop of agricultural budget in conditions in which the European agrarian products market will be free, the pesticides will be reduced.

The measures aim to obtain products in sufficient quantities, at reasonable prices, maintaining a clean environment, suitable for tourism. Achieving those requires necessitates farmers sustain.

Currently, discussions regarding the commune agrarian politics have various aspects:

1. Direct payments. Several EU member states like: Hungary, Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Slovakia, Romania sustain standardize direct payments. Because financial allocations were established for 2007-2013 period, Romania proposes supplementation of direct payments from the state

budget. Romania has proposed also to European commission to extend the possibility of using rural development funds to pay direct payments after year 2009.

2. Market intervention. In condition of high prices to agricultural products, many states, members of EU would agree to suspend intervention mechanisms. Romania, as an important cereals producer, militates for maintaining intervention on cereals market.
3. Direct support schemes for farmers. For better sustaining of priority sectors is intended to redistribute funds from different sectors, in conditions the funds provided for use are small.
4. Modulation. EU commission aims to reduce the percents of modularization.
5. Cross compliance. Romania, Bulgaria as member states, but also other states, older members of EU, propose debates regarding the list of demands that need to be accomplished by farmers and GAEC list that would be implemented, electively by EU members.
6. Resources management. To this purpose Romania propose creation of a commune fund. This proposal is not accepted by EU Commission and doesn't have sustained from member states, so the chances to be applied are reduced.

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THE COMPETITIVE POSITION OF THE ROMANIAN AGRICULTURE

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Abstract

The development of the national economy competitive position in the context of the global challenges (global economy, opened international markets, fast changes of technology) is both cause and effect for economic development and for life standards improvement. But, the challenges above mentioned have to be transformed into opportunities for Romanian economy. The identification of impact factors on Romanian agriculture competitive position make necessary a close analysis of economy, of business background, of material and human resources, of costs, of investment activities, and of the innovation process.

Key words: competitive economics, agriculture policy, investments, development strategy, global economy, opened international markets.

The Romanian Agriculture – a difficult issue

After the year 1989 took place fundamental changes in the Romanian agrarian structures, after the application of the Land Act 18/1991, besides other regulations and further privatizations of the state farms. Even these regulations represented sound basics for the Romanian agrarian reforms, they had rather negative effects. In this context, we have to point out the government policies between the years 1990-2000 trying, to identify costs of such “modernization” ways:

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- The destruction of the old communist cooperative farms patrimonies (3776 units) – with total losses estimated at 22 billion euros;
- The agricultural real estate atomization: 40 million plots, 5 million owners – annual losses of about 2 billion euros, given the important self-consumption rate, placed between 80% and 100%;
- The inadequacy of equipment endowment, the agricultural surface lie fallow and the late workings – annual losses of about 1.2 billion euros;
- The tractors shortage – there is just one tractor for 56 Ha, and this leads to annual losses of about 1.6 billion euros;
- The inadequate application and the lameness of the Land Act 18/1991 led to about 1 million trials, with a total amount of 500 million euros in court taxes;
- The irrigation equipment non-usage and wastes (2 million Ha) – now there are used only 113.000 Ha, equivalent of 4.2% in total arrangements, the weak usage of pesticides and herbicides – leading to annual losses of 3 billion euros;
- Since 1989 there were not any soil improvement workings, with annual losses estimated at 1.4 billion euros;
- The reduced consumption of chemical fertilizers – for comparison, the annual consumption is 200.000 – 300.000 t, in 1989 there were used 2.7 million tonnes, leading to annual losses of 4 billion euros;
- The clearance of fruit and grape growing – 76.000 ha – with annual export losses of 30 million USD;
- The live-stock slaughter – the present live-stock is about 40% of those from 1989, leading to meat imports and corn exceeding;
- About 15 thousands agronomists, with university degree, passed through professional reversion.

All the above mentioned evolutions were retrieved in the dull agriculture supply are necessary important expenditures. The suitability of these expenditures has to be analyzed in correspondence with the agricultural areas development, in capacity, and these are only difficulties of the Romanian agriculture. That means the current structure of exploitation from the Romanian agriculture does not ensure the economic performance and is not very close to the EU concept of “rural integrated policy”.

The agriculture has still an important role in the Romanian economy, with a share of 7.1% in 2008 [13, 14] in GDP, despite the obvious decreasing trend, from 12.6% in 2004. This evolution is convergent to the EU situation, where this sector has a share of only 2-3% in GDP [17]. Also, under the climatic changes pressure, in the last five years, there were developed trends of new, more efficient crops cultivation in Romanian agriculture, especially in the areas affected by such changes [1]. However, there has to be pointed out the importance of this branch in the context of its' strategic positions on population food safety, socio-economic functions, environmental protection and the export development.

The technical endowment of the Romanian agriculture is poor, with an average of 56 ha per tractor, with important disparities between different regions: for example, in Dambovita County, the average is 33 ha of arable land per tractor [6, 11, 12]. For comparison, the technical endowment of the European agriculture is given by the average of 12.7 ha/tractor [10].

One of the key-issues of the Romanian agriculture competitive force is the excessive land fragmentation. According to the Ministry of Agriculture, about three million agricultural properties have areas under one hectare, so they cannot access the direct payments from EU funds. In this difficult situation are about 60% in total Romanian rural household owners, because they have reduced land areas. The payments are granted, according to the European Common Agricultural Policy, for properties of minimum 1 hectare, divided in areas no smaller than 0.3 ha [10].

On the other hand, the Romanian agriculture, despite it counts over 5 million households farms and more than 3 million active people, cannot ensure the necessary of food for only 21 million inhabitants, in comparison with the EU situation, where 7.8 million people active in agriculture ensure the food necessary for 350 million inhabitants and an important over plus for exportation. This situation above depicted throws important obstacles in the way for Romanian real integration in European economic structures. Romania is the EU country with most agricultural work force, over 30% in total national workforce [4] and 40% in EU agricultural active workforce. The EU agricultural active workforce average is only 5.3%. The causes above mentioned (the technical endowment, the excessive land fragmentation) lead to the reduced work productivity to diminished average yields, more exactly, less than those of the most important EU countries from the agricultural potential point of view.

To a (new) agriculture strategy for Romania

All the considerations mentioned in the above paragraph depict the urgent necessity of agricultural structures reorganization, in order to ensure the competitive capabilities for Romanian agricultural products on the national and international markets. The final result of these transformations would be considered as positive if it will cover

the domestic food necessary and if there will be used the more facile export channels on the EU common market. Also, the European and other international financial institutions stimulus packets are to be used through the agricultural structures modernization and their market orientation.

To ensure the efficiency of the Land Act 18/1991, there had to be followed by financial stimulus and by owners associations support measurements. There is still necessary an well-conducted instruct and promotion press-campaign in order to convince the peasants by the associations' benefits; also this campaign had to focus the changing plots issue, having as objective the plots gathering of the same owner on the same site. The usage of the term 'cooperative' by the old communist regime made this word to have in the peoples' consciousness some inexistent vices. By the cooperative creation painful process, finalized in 1962, the communist state became the owner over the peasants' agricultural land and capital goods, bringing the poverty of the peasants' households. This deeply negative perception in peasants' and generally in Romanians' mind – of the term by itself and by the lack of agricultural technical and management knowledge – in post-communist Romania there were obstructed the development of this organization form. This system, of modern cooperative organization is imperious; this might be the reason for the law giver tried to diminish the negative resonance of the term, collocated by 'agricultural association' or 'cooperative association'. [5]

The process of Romanian agriculture transformation is seen as a participative process; as a parity between the public and private fields, industrial and agriculture politics and regional development politics associate with the "welfare state"; introduction of partnerships and negotiation frames, the new visions regarding the returns/profits growth and the decision for economic reforms may lead to an increase in competitive position. This new strategy, by the perspective of the global depression, may include many significant changes towards the old approaches.

There have to be created a new different participative vision about changes – as opened processes, having as main objectives the economic development, in the context of optimization of the social and transformations costs of equilibrium. The "cutting edge" of the future strategy is the balance between "imperative" or "participative" transformation ways – which may lead to the recognition of systems' plurality on market. The Romanian agriculture reforms comprised many measures of economic policy consisting of: high interest rates of loans, production decrease, exchange rates, the competitive position of Romanian exports in the EU; all of these determined a decrease of agriculture incomings.

After a temporary sustenance of the price, correlated with the EU Common Agriculture Policies, there order to be consistent to the EU concept of "rural integrated policy". These policies correspond to regional development policies and environment

protection policies, giving the above mentioned situation in Romania, with an important number of small agricultural properties [2].

The evolution and the structure of revenue budgets and the structure of the expenses destined to the public support for the reorganization and the modernization depends among the EU member states, due to the local features. Also, the fiscal systems are adapted to them and aim the increasing and stabilization of the farmers' incomes and the achievement of the sector contribution to the development of the overall national economy by establishing a proper system of taxes and duties. The Romanian agriculture policy reforms depend upon the Common Agricultural Policy (CAP) and, in an important measure, by the international situation evolutions, by the forces ratio of forces in European competition with the United States.

The national food safety system establishment has to be placed on a viable agricultural system, able to stimulate the competition, the business environment consolidation, as basis for the domestic agriculture increasing supply power. This would ensure the good functioning of supply channels and might contribute to the sustainable economic growth. The subsistence agriculture generates inflation – caused by the disequilibrium between the demand and supply – creating growths in prices for basic food products, the internal markets fall into decline and increasing dependence of imports.

In this context, there has to be pointed out the concept of CAP mechanisms, the objectives and the principles in the context of CAP reform designed to ensure the adaptation to the new market realities and the EU enlargement to the Eastern Europe. This approach aims are the understanding of the relationship between fiscal policies and the other components of the CAP, the methods of the CAP mechanisms implementation regarding the market and the rural development in Romania in the period 2007 – 2013.

Romania could overcome easier the nowadays economic crisis if, in the past 20 years, there would be care of agriculture production modernization, instead of focusing on consumption. Even the Romanian agriculture potential is to feed over 100 million people [8], the reality is that Romania imports over 70% of the food products [9, 17]. This truth is probably the most significant signal that the policies in this domain have to be changed. Unfortunately, during the years 2000 – 2008, the credit frenzy fought the consumption from import and the old apartments market – this caused turbulences because, in fact, the foreign investments in Romania consisted, in main part, in “hot money” for real estate speculations. Of course, these important financing resources left the country as soon as there were announced difficulties on international markets (because there were other “gaps” to be covered) – we consider that the situation would be significantly different if these resources would be directed, using market stimulus factors, in agricultural investments to create economic growth. The main difficulties for Romanian agriculture in present – the high degree of fragmentation of land, lack of

locally relevant information about the possibility of investment, insufficient number of family farms, outstanding issues in the veterinary sector and the old technology which has urgent needs to be upgraded – might be turned into an advantage if there would be considered increased potential for obtaining biological products, particularly in mountain and hill areas, characterized by less air, water and soil pollution, given the considerable number of traditional products that could enter the European market, under the new economic crisis.

The analysis of the structure and fiscal developments in agriculture at the macro and microeconomic level in Romania highlights that the agriculture might ensure an important support for other sectors, by its capacities to stimulate the production and quality in the upstream sectors (chemical fertilizers, tractors and agricultural machinery and other industries), where, in Romania there are important resources and developed production facilities. We consider that the fiscal pressure would be an important stimulus for the agriculture reorganization, and its turn to the market, because these benefits in terms of small scale farms, can maintain the state of subsistence agriculture. It is necessary a comprehensive process of organization of the small farmers to produce for the market, train and consolidate of the networks involved, particularly the cooperative subsidiaries.

The capacity of absorption increasing of the European structural funds is an essential issue for Romanian agriculture development [3]. According with the last statistic records, during 2007 – 2009, Romania attracted only 453 million euros, which represents less than 8% in the total of 5.6 billion euro – EU structural funds allowance [15]. On the other hand, Romania contributed with 1.1 billion euros per year, representing an absolute contributor to the EU budget – this unsatisfactory situation produced frustration among the Romanian public opinion, which was afraid that Romania would contribute to the EU budget without to receive amounts allotments specified in the projection budgets. The year 2009, characterized by the important shortage of financial resources, brought a new evolution: there were submitted enough projects to cover also the financial allowances for the next year. In these conditions, the expectations that Romania to receive annually about 2 billion Euros per year from the EU budget until 2013, can to be considered more realistic.

There have to be pointed out that, before the Romanian adhesion to the EU, there were state budget subsidies for the agriculture farms, but these were less conditionally in order to ensure the land gathering for economic viable exploitations or to get closer of the small producers to the market, maintaining the agriculture subsistence feature. The excessively large number of subsistence farms based on households makes this sector to show, from an economical point of view, as one with less large viable enterprises, and, as a whole, its performance is reduced in comparison to the period before 1990. In fact, the Romanian agriculture does not currently provide the alimentary security for the urban population from internal resources. The fiscal facilities granted to farmers and the landlords

is often an alternative to programs that involve direct public expenditures, otherwise, if would be not involved any budgetary expense, the public control could be not exercised at all.

Beyond the European funds, the opportunities at local level may arise from the application of a more predictable and stable framework regulatory, as a consequence of the implementation of the Common Agricultural Policy, with positive effects in the prices stability. The full capitalization of the benefits obtained after the integration of Romania into the EU, could open up new opportunities for Romanian farmers, which will supply on a market counting 500 million consumers. The evolution of the prices of agricultural products has a fundamental impact on the profit made by the agrarian units and on the orientation of the entire agricultural activity. The statistical data regarding the prices of agricultural products show that Romanian large agricultural companies obtained competitive prices on wheat and oilseeds, despite the reduced subsidies (only 25%) in comparison with those received by the other European farmers.

Conclusions

Giving the aspects above presented, there might be considered to outline some recommendations in order to improve the competitive situation of the Romanian agriculture:

- There is necessary to increase the agriculture's contribution to the development of the national economy, through the increasing and the efficient use of agriculture contribution in GDP;
- The stabilization of the alimentary prices by increasing the supply of scarce products, particularly the supply of food products;
- In order to ensure that the agriculture production prices would be affordable for the great mass of consumers, and on this basis, to ensure the food safety, there is necessary to build the infrastructure for capitalization agricultural commodities (accredited silos, negotiable warrants laws etc.). This would also contribute in crops establishment financing;
- The reorganization and high farming intensification by increasing the capital stock, diversification and specialization of production;
- The improvement of the production structures to ensure the marketable feature of products, increasing the added value added through the formation of the subsidiaries on product, the enhance of the agricultural production and the utilization of the arable areas, the classification of farms according to European standards;

- The development of small and medium enterprises in rural areas, especially in the field of market products and services, environmental protection;
- The increasing of the agricultural productivity by promoting advanced technologies and a multifunctional agriculture;
- The increasing of the national investment funds (budgetary or private) and the foreign direct investments in agriculture and food sector;
- The increasing of the agricultural competitiveness by increasing the labor productivity and rationalization of the production costs.
- Allocation of funds and facilities to equip agriculture with tractors and other modern equipment with low GHG (greenhouse gas) emissions, which could be the first vehicles to cross the consumption of biofuels;
- Facilitating the introduction of animal husbandry techniques and methods to drastically reduce emissions of methane and ammonia resulting from animal husbandry nonperforming;
- Effective management of water resources in agriculture that would ensure a better use of soil moisture reserves throughout the vegetation season, including choice of sowing periods depending on the degree of soil water supply, and a low energy through the application of irrigation.

The main issue of the Romanian agriculture is its orientation, from the self-consumption purposes to the market purposes. There have to make all the production and distribution legal developments to create the infrastructure to ensure the get access for the agricultural products on the market, to lift up the barriers staying in the way of Romanian products to supermarkets. Also, encouraging the bio-production crops has to be thought as these to reach the market. Especially given the nowadays crisis (and the analysts opinions tend to push its peak far and far away in time), in comparison with other economic sectors, the agriculture potential to remain profitable are important, this would allow to use important resources, unfairly neglected.

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PRODUCERS EDUCATION ABOUT MICROBIOLOGICAL INOCULATES APPLICATION IN FUNCTION OF SOIL FERTILITY

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Abstract

Soil protection against degradation in agricultural production is one of the measurements in the frame of aims and guidelines of integral and organic production. Because of that, there are more and more researches which are directed toward finding the alternative - organic ways in soil fertilization, in the aim of undesirable effects avoiding. Application of microbiological inoculates with nitrogen fixing bacteria with the purpose of soil fertilization, replaces or refill nitrogen mineral fertilizers. Decrement of mineral fertilizers quantities complies with integral agricultural production concept, what represent important step to organic agriculture. Appliance of these new methods requests constant use of available knowledge through education of direct producers. Awareness and habits of producers have to be changed in the direction of multifunctional agriculture and rural development, with spreading of knowledge of soil fertility maintaining by the appliance of all bio-agro-technical measurements.

By inoculates appliance in maize, wheat and soy bean production with certain groups of nitrogen fixing bacteria, soil biogenity is being preserved and maintained, plants needs for necessary assimilation's nutrients are being satisfied, phytoparasites control is secured, healthy food is produced, what satisfied all ecological and economic criterions of viable system.

Key words: soil, nitrogen fixing bacteria, soy bean, wheat, maize, biogenity parameters

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Introduction

Soil represents significant natural resource, with slow process of self creation. For 10 mm of soil surface fattness is needed more than 100 years. In compare with total Earth's crust it is really small mass, but its importance is great for nature and all living world. Ground is completely independent naturally-historic body "sui generis", and represents ecologic sphere which affects on other life spheres: hydrosphere, atmosphere and biosphere, and because of that, with them has to be managed properly.

Degradation and disappearance of soil are among the most important ecological threats to mankind. In world is cultivated only 10% of total surface, where just 3% of this amount is highly productive. Exponential growth of population and technical-technological progress are came to that many surfaces on which was produced food, now are cut off from further agricultural production (building of settlements and infrastructure, as of industrial and miners facilities, etc.). Arable land constantly decreased per inhabitant, and in world it counts about 0,88 ha, in Asia and Europe, which are most jeopardized, it is 0,60 ha. In Central Serbia in 2006, comparing to 1960, decrement is for 180.000 ha, or 10,5% of total agricultural land, in other words for 0,24 ha per inhabitant (Milanović et al. 2008). Having in sight statement that soil is basement of living world survival, as those arable surfaces are limited, it is not strange that soil quality is in focus of all worlds, because food quality strongly depends from it (Čuvarđić et al. 2006). Different ways of soil management brings to different level of its degradation, so securing and protecting of chemical, physical and biological parameters have great ecological and economical character (Milošević et al. 2008).

Soil as natural habitat for microbes

Particularly, it is clearer that natural resources are not limitless so it exist need for coordination of food production relations, with rational usage of basic agricultural resources, so in that case environmental and agro ecosystems pollution would be reduced to minimum (Ladd et al, 1994). For changes identification, which is effect of man dealing, it is necessary to follow and control a bigger number of various parameters which define soil condition, in other words its fertility which is key factor of soil production characteristics (Vasin, 2008). One of the basic parameters of soil fertility is its biogenity, or number of microbes and their enzymatic activity.

Microbiological activity represent link of key processes connection which control intensity of organic matter decomposition, directions of mineralization and liberation of accessible plant nutrients. Besides that, microbes make 0,1 to 5% of total organic matter in soil. In soil with formed profile, microbes keep its structure,

level of organic matter and stability of all others characteristics. They take part in amount of total transformations in soil with 60 to 80% and they are main parts in the processes of energy flow and matter cycling. With their metabolic activities each year is mineralized up to 4% of organic matter in soil, what enable plant nutrition and viability of systems in biosphere. Development of agricultural production in the direction of viable agriculture, which considered elimination of mineral fertilizers and other chemical inputs, enabled usage of knowledge from the fields of biological nitrogen fixation, which significantly affect on balance of nitrogen in soil.

In conventional agricultural production for achieving of higher yields are used large amounts of mineral fertilizers, especially nitrogen one. Usage of high dosages of nitrogen fertilizers in longer time period can cause negative effects from ecological aspect, as from aspect of soil fertility violation. By this, numbers of microorganisms which are taking part in cycle of nitrogen circulation are decreasing. Such like this soil microbes changes affect on changes of organic matter and humus, which determine soil fertility. Because of that in world, as in Serbia too, exists more and more interesting for ascertainment of alternative ways of fertilization, with main clue of undesirable after effects avoiding. With knowing of role and flow of microbiological processes in soil, man can greatly direct appliance of certain groups of microbes in agricultural production. Usage of microbiological inoculates as fertilizers are multiply useful.

For appliance of new methods which are directed to creation of optimal conditions in quality food production, it is needed constant usage of available knowledge through producers' education. In distinction to conventional way of agricultural production, producers' awareness and customs it would be changed in direction of multifunctional agriculture and rural development with spreading of knowledge of soil fertility maintaining by usage of all bio-agro technical measurements.

Because of that as aim is set estimation of micro biotic inoculates appliance influence through various systems of fertilizing on certain parameters which define soil fertility and biogenity during maize, wheat and soy bean growing.

Importance, possibilities and perspective of nitrogen fixating bacteria usage in the function of bio-fertilizers in crop production

By appliance of nitrogen fixing bacteria, symbiotic or associative one, as fertilizer in crop and vegetable production, basic principles of organic agriculture system are satisfied: health principle, ecological and economic principles. This group of microbes which is living on root of leguminous (symbiotic) or on root and in rhizosphere of non leguminous plants (associative and free) simulative affects on

plant growth by production of biological matters (vitamins, hormones, gibberellins and auxins). Also, they affect on useful microbes population number and directions of microbiological processes in ground, and with that on its fertility. By their appliance is decreasing usage of expensive nitrogen fertilizers, and in some way protect and increase organic matter in soil, or quality of soil health (Milošević and Jarak, 2005, Cvijanović, et al. 2007). At beginning of 1990 is recommended biofertilization as addition or exchange to mineral nitrogen fertilizers, and only at leguminous it could be used as only one applied fertilizers. Usage of symbiotic bacteria today is obligated measure, especially for soils on which soy bean was not produced earlier. By usage of selection active types of symbiotic nitrogen fixing bacteria is achieved bigger yields ($3.662 \text{ kg} \cdot \text{ha}^{-1}$, JUS – macro experiment Agro institute, Sombor, 2005), higher content of protein (34,55% – macro experiment Agro institute, Sombor, 2005), decreasing of mineral nitrogen fertilizers appliance ($60 \text{ kgN} \cdot \text{ha}^{-1}$, change for around 130 kg of UREA – macro experiment Agro institute, Sombor, 2005), (Cvijanović D. et al. 2008). By usage of such this fertilizer, soy bean is needed to be fertilized only with $30 \text{ kgN} \cdot \text{ha}^{-1}$, because low level of nitrogen allowed root recognizing and infecting.

By usage of associative nitrogen fixing bacteria (*Azotobacter*, *Azospirillum*, *Derrxia*, etc.) in wheat, maize, sugar beet, sunflower and some vegetables production, shows that depending from type, exists possibilities of exchange in range up to $60 \text{ kgN} \cdot \text{ha}^{-1}$, and even that quantities could be up to $150 \text{ kgN} \cdot \text{ha}^{-1}$. Especially good results of associative fertilizers appliance are gotten in production of seedlings of vegetable plants, which grow up faster and more equal after replanting (tomato leaf surface – around three times bigger; paprika leaf surface – around two times bigger; tomato stem length – around 14 cm longer; paprika root length – around 40% longer. Testing is done by Jugoinspekt Belgrade, 2006.) (Cvijanović D., et al. 2008).

Nitrogen fixing bacteria in bio fertilization could be applied as single type of certain species, or as mixture of types of one or more species in various forms (liquid, wet, dry). Mostly is applied by infliction on seed (seed inoculation) just before sowing, through irrigation system drop by drop, or by direct application into ground. Nitrogen fixing bacteria which are used must have good ability of survival into new ambient, then good competitive relations with host plant and soil autochthonous microbes' population. Because of that in laboratories, nitrogen fixing bacteria selection is done based on long standing researching in indoor and outdoor spaces.

In maize institute Zemun Polje is done researching of influence of selected associative nitrogen fixing bacteria types and species in maize and wheat production, as influence of mixture of symbiotic and associative nitrogen fixing

bacteria in soy bean production, on soil biogenity basic elements towards various dosages of mineral nitrogen. Wheat seed is inoculated with mixture of same quantities of various highly effective types of associative species *Azotobacter chroococcum*, *Azospirillum lipoferum*, *Brijerinckia Derx*, *Klebsiella planticola*. In the case of soy bean inoculation is done with mixture of above underlined associative bacteria with symbiotic bacteria *Bradyrhizobium japonicum*. Maize seed is inoculated with mixture of following associative species: *Azotobacter chroococcum*, *Azotobacter vinelandi*, *Azospirillum lipoferum*, *Pseudomona*, *Bacillus subtilis*. Before sowing is done fertilization with nitrogen mineral fertilizer: for wheat 80, 120 and 160 kg N*ha⁻¹, for soy bean 40, 60 and 80 kg N*ha⁻¹, and for maize 60, 90, 120 and 150 kg N*ha⁻¹. All agro technical measures are being done properly, in optimal time intervals.

Table 1 Effects of associative *Azotobacter* and mineral nitrogen usage on soil biogenity elements at maize

Fertilizer kgN*ha ⁻¹	Total number of microorganisms		Number of <i>Azotobacter</i>		Dehydrogenase activity	
	10 ⁷ *g ⁻¹ soil	Index level	10 ¹ *g ⁻¹ soil	Index level	µgTPF*g ⁻¹ soil	Index level
0	245	100	47	100	407	100
60	355	144	174	369	526	129
90	412	167	180	383	438	107
120	302	123	98	208	440	108
150	158	64	57	123	113	27
Average	307	125	139	294	379	93

In researching was with standard microbiological methods followed dynamic of changes of basic biogenic parameters in rhizosphere soil: total number of microorganisms, number of *Azotobacter* and total soil breathing through its enzymatic activity. In frame of integral and organic production, entering of organic fertilizers affects increment of number of specific physiologic groups of microbes' (Strak et al., 2007). By their total activity are increasing quantum of available nutrients for plant, then microbes biomass, processes of humus creation are going up, soil structure is advanced what contribute to increment of its fertility and more qualitative production. All changes in soil, as biological processes mostly are with enzymatic characteristics. Biggest part of enzymes in ground is from microbes, and they have their dynamic which depends from applied measures in plant production. Breathing enzymes (dehydrogenase) are good parameter of soil biogenity, how they catalyzed all oxidation-reduction processes in soil. Microbes' number, their

mutual relation and enzyme dynamic is reflection of soil biological activity (biogenity). Analyzing gotten results it could be noticed that exists certain regularity of tested parameters increasing under low dosages of mineral nitrogen.

At maize the biggest number and percent of increment of tested parameters is estimated during the fertilization with dosage of 90 kgN*ha⁻¹, while the highest intensity of soil breathing is estimated at the dosage of 60 kgN*ha⁻¹ (table 1). At wheat by the fertilizing dosage of 80 kgN*ha⁻¹ is estimated the highest concentration of *Azotobacteria* and intensity of total enzymatic activity, in other words soil breathing (table 2). If soil breathing intensity is higher, oxidation-reduction processes in soil are more intensive, in other words intensity of organic process disintegration is faster, as process of humus creation.

Table 2 Effects of associative *Azotobacter* and mineral nitrogen usage on soil biogenity elements at wheat

Fertilizer kgN*ha ⁻¹	Total number of microorganisms		Number of <i>Azotobacter</i>		Dehydrogenase activity	
	10 ⁷ *g ⁻¹ soil	Index level	10 ¹ *g ⁻¹ soil	Index level	µgTPF*g ⁻¹ soil	Index level
0	239	100	265	100	553	100
80	254	106	352	132	589	106
120	350	146	272	103	471	85
160	273	114	237	89	553	100
Average	279	117	281	106	541	98

Results in table 3 shows that the highest value of parameters was by usage of 40 kgN*ha⁻¹, what proved that in soy bean production is necessary fertilization with mineral nitrogen in amount up to 40 kg*ha⁻¹, as starting fertilizer while root nodules of young plants are still not developed.

With increment of mineral nitrogen quantum, it came to decreasing of number of researched parameters, except enzymatic reaction which was on same level as estimated in variety without fertilizing, which was at all three cultures referent value (table 3). From result it can be noticed that number of *Azotobacter* with increment of mineral nitrogen had decreasing tendency. This importance species of nitrogen fixing bacteria, because of its sensibility react very stormily, by decreasing of its number, at habitat conditions change, so they are good indicator of all changes, or degradations in soil. High dosages of mineral nitrogen in every soil affects disturbance of microbiological processes balance, and activity of many useful microorganisms are decreased.

Table 3 Effects of mixture of associative and symbiotic *Azotobacter* and mineral nitrogen usage on soil biogenity elements at soy bean

Fertilizer kgN*ha ⁻¹	Total number of microorganisms		Number of <i>Azotobacter</i>		Dehydrogenase activity	
	10 ⁷ *g ⁻¹ soil	Index level	10 ¹ *g ⁻¹ soil	Index level	µgTPF*g ⁻¹ soil	Index level
0	218	100	378	100	505	100
40	251	115	346	93	549	109
60	180	82	331	87	608	120
80	179	82	266	70	589	117
Average	207	95	330	87	562	111

Decrement of microorganisms' enzymatic activity is appeared because of that level of mineral nitrogen determine induction of gene expression which are responsible for nutrient acceptance. Also, big quantities of mineral nitrogen inhibited process of free nitro fixation, because it negative affects on enzyme nitrogenase, what is influenced by number decrement of this group of nitrogen fixing bacteria. This results are overlapping the fact that soy bean has significant place in organic agriculture from the aspect of soil fertility securing, maintaining of nitrogen balance, increment of biodiversity in agro-bio-ecosystem, by unitizing with other cultures or in crop rotation (Lampkin, 2001).

Conclusion

Based on research results it can be concluded that successfully could be used free living and associative microorganisms as bio-fertilizers in the form of microbiological fertilizers. Also, it can be concluded that their application has many benefits. They decrease the possibility of soil and underground water pollution with nitrates, they increase the amount of soil organic matter and they raise economic effect by saving of pure nitrogen in amount of 30 to 60 kg* ha⁻¹.

Also, its usage is in function of soil fertility maintaining, what is in balance with principles of organic agriculture, which are based on careful resources economy and which promotes: improvement of biological cycles, soil biological activity, increment of biodiversity and appliance of bio-agro technical measures which maintain, recover and improve ecological harmony. On that way it would be promoted rural development, production of health food with geographical origin, as total social inhabitants' status in these areas with infallible education of producers.

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EVOLUTION OF THE PRODUCTION FACTORS IN THE ROMANIAN AGRICULTURE AND ITS' POTENTIAL FOR A COMPETITIVE DEVELOPMENT IN THE ENLARGED EU

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Abstract

The present endowment of the Romanian agriculture with technical means, corroborated with the scarce management at the level of the agricultural holdings, cannot ensure the performance of agricultural works on due time, as provided in the cropping technologies. This results both in a low productivity level and in large harvest losses. The paper is analyzing the trend of the main components of the production factors and the main synthetic indicators quantifying labour productivity in agriculture: (i) agricultural output per employed person and (ii) gross value added per employed person. Among the main causes leading to this situation, the following have been identified: excessive land fragmentation, low scale use of the technical-material base, precarious operation of the irrigation system, inadequate management of the agricultural holdings and of the production factors in general. The study is accompanied by a comparative analysis with the situation in the EU Member States.

Key words: agricultural structures, farm management, production factors.

Introduction

Agriculture, the only branch of the economy that creates “primary natural matter”, represents an economical priority domain, considering that a unit of primary product in agriculture creates, by its integration in the food chain, three up to five value units in the production branches of upstream and downstream industry (1). Romanian agriculture has great resources for development, playing an

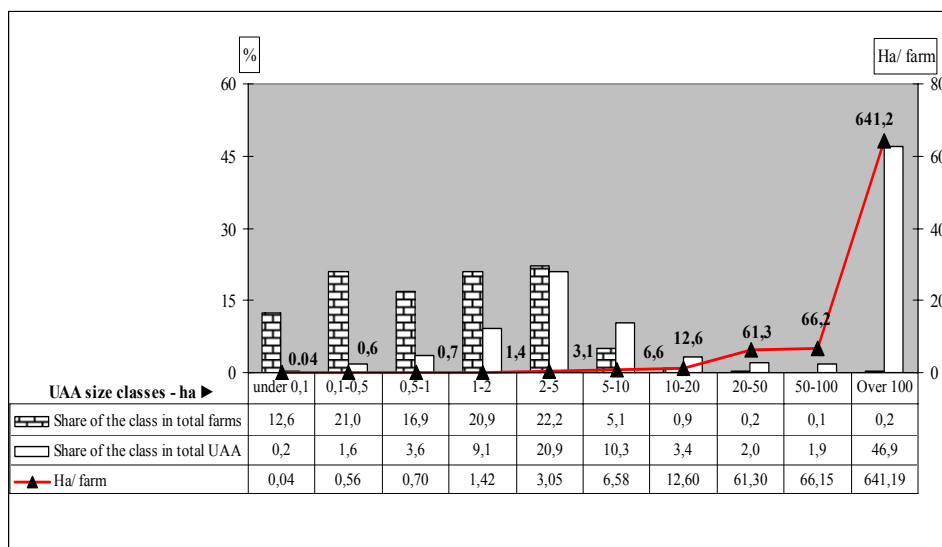
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important role in economic development, both in terms of contribution to the creation of gross domestic product and of employment in this branch. For examining the evolution of the production factors, the working methodology resided in a detailed analysis of the statistical database, illustrating the agricultural production structures, the main production factors and economic efficiency of the agricultural activity, accompanied by an international comparison with the UE-27 countries. The main areas covered by the analysis were: (i) the structural changes in the structure of the utilized agricultural area and its distribution by main land use categories, reflected in the data of the farm structure surveys 2002, 2005 and 2007 and (ii) evolution of the main production factors (equipment, irrigations, fertilizers, labour force) during the analysed period.

1. Trend of the structural characteristics of the holdings

The final results of the General Census of Agriculture 2002, followed up by the results of the Farm structure surveys 2005 and 2007, indicate a severe fragmentation of the Romanian land capital (Figure 1).

Figure 1 Number of holdings and structure of UAA by size classes



Source: General Agricultural Census 2002, Romania, National Institute of Statistics, 2004

According to the surveys results, from the total number of agricultural holdings (over 4400 thou), 99.5% were family farms and only 0.5% were agricultural units with legal status. Family farms utilized 55.3% of the total agricultural area of the country and had an average size of 1.73 ha/holding. At the other pole, the legal entities utilised 44.7% of the total agricultural area of country and had an average size of 274.4 ha/holding².

Out of the total Utilized Agricultural Area (UAA), 38.2% was utilized only for self consumption by 76.5% of the holdings, 30.6% of UAA was utilized by 21.2% of the holdings that were occasionally marketing the surplus, while only 7% of the UAA was utilized by the remaining 2.3% of the holdings for obtaining a production mainly marketing oriented (Table1). This indicates a **predominant orientation of the family farms towards subsistence agriculture**.

Table 1 Destination of the agricultural production

Legal status of the farm	Destination of the agricultural production			%
	Only for self consumption	The surplus may be marketed	Mainly for marketing	TOTAL
Number of holdings				
<i>Share in total Family Farms</i>	76,7	21,2	2,1	100,0
<i>Share in total Legal Entities</i>	32,5	19,7	47,8	100,0
<i>Share in Total holdings</i>	76,5	21,2	2,3	100,0
Total Utilized Agricultural Area (ha)				
<i>Share in total UAA of the Family Farms</i>	52,0	40,6	7,4	100,0
<i>Share in total UAA of the Legal Entities</i>	21,2	18,2	60,7	100,0
<i>Share in Total UAA of the country</i>	38,2	30,6	31,2	100,0

Source: General Agricultural Census 2002, Romania, National Institute of Statistics, 2004

In the period 2002-2007, significant changes were produced in the structure of Family Farms (FF), by UAA size classes and use categories (Table 2). The number of FF in the class under 5 ha, diminished with 14%, with different allocation on land use categories (decline by 11% in arable land, by 19% in permanent crops and by 25% in permanent pastures and meadows). An increase by 45% was noticed in the number of holdings in the class 5-20 ha, by 80% in the class 20-50 ha and by 19% in the class over 50 ha.

² General Census of Agriculture 2002, Volume 1, table 3, pg. 3, National Institute of Statistics

Table 2 Trend in the number of FF, by size classes and use categories, 2002-2007

Thou holdings

Family farms (thou)	Arable land			Kitchen gardens			Permanent meadows and pastures			Permanent crops		
	2002	2005	2007	2002	2005	2007	2002	2005	2007	2002	2005	2007
under 2 ha	2195	2006	1843	2038	1703	1740	927	771	602	792	620	603
2-5 ha	916	985	928	659	659	673	533	529	513	397	382	362
5-20 ha	244	345	355	175	235	260	153	209	232	96	132	136
20-50 ha	8	15	15	5	9	11	3	9	8	2	4	5
over 50 ha	5	6	6	3	3	4	1	3	3	1	1	2
TOTAL	3368	3356	3146	2879	2609	2688	1616	1520	1357	1288	1140	1107

Source: GAC 2002, FSS 2005, FSS 2007, NIS Romania

By use categories the number of FF using permanent pastures and meadows increased, as follows: by 52% in the class 5-20 ha, by 130% in the class 20-50 ha and by 113% in the class over 50 ha. In the period 2002-2007, the total UAA of the FF followed a similar trend as well. The number of Legal Units (LU) experienced a continuous decrease, for all categories of use (Table 3). The number of LU classed under 5 ha diminished by one third, while the ones classed 5-20 ha diminished by 25%, the ones classed 20-50 ha diminished by 4%, while those classed over 50 ha diminished by 17%. A slight increase (+16%) was found only for permanent pastures and meadows.

Table 3 Trend in the number of LU, by size classes and use categories, 2002-2007

Holdings

Legal Units (number)	Arable land			Permanent meadows and pastures			Permanent crops		
	2002	2005	2007	2002	2005	2007	2002	2005	2007
under 2 ha	3048	1975	1571	1766	1279	937	430	331	230
2-5 ha	2386	1899	1749	1235	1013	967	273	208	181
5-20 ha	4049	3516	3069	2020	1830	1756	466	421	325
20-50 ha	801	672	755	342	344	400	137	125	124
over 50 ha	7127	5480	5881	4072	3561	3566	978	611	466
TOTAL	17411	13542	13025	9435	8027	7626	2284	1696	1326

Source: GAC 2002, FSS 2005, FSS 2007, NIS Romania

The same trend was noticed for UAA, with the exception of the LU classed 20-50 ha, where the UAA increased for all use categories. We can associate these trends with the agricultural policy that **stimulated the association**, having also in view the increase of the UAA that was one of the pre-conditions for qualifying the holdings to access development funds.

2. Evolution of the main production factors

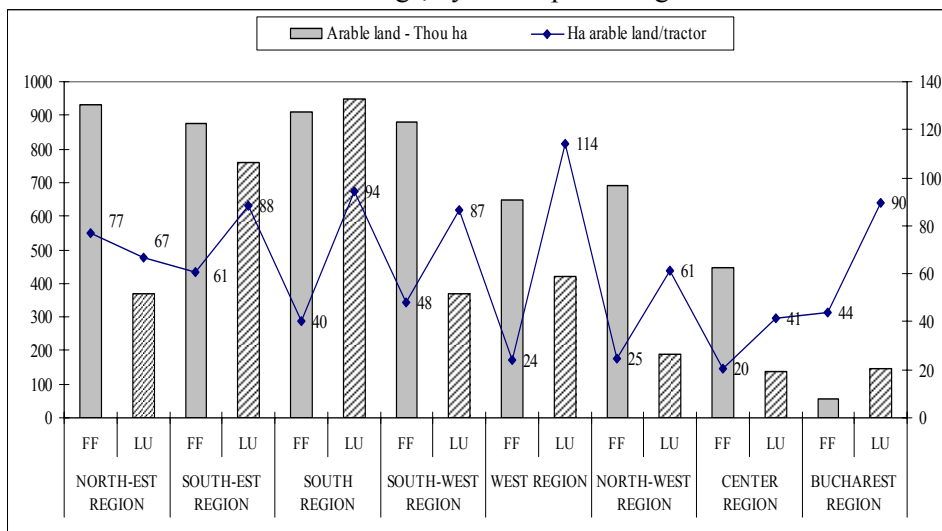
The decisive element in the production process in agriculture is represented by the **production factors**. The mechanization proves to be the main factor of growth in labor productivity and a factor of growth in agricultural production, due to the possibilities it offers to accomplish the agricultural works in the optimal agrotechnical periods at a high quality level, but also as a vital prerequisite in the capitalization of the other factors of production its growth depends on (irrigations, chemical fertilizers, agrobiologic progress etc.).

2. **Mechanization.** In order to estimate the mechanization level of agricultural holdings, the tractor fleet was investigated, by development regions. (Figure 2). The slight increase in the number of tractors in the investigated period resulted in reducing the load of arable land on a tractor, which reached an average of 55.1 hectares of arable land/physical tractor (FSS 2007). The value of this indicator (55.1 hectares of arable land/tractor) is, however, far beyond the normal parameters needed for the current conditions of Romania (25-35 ha / tractor). Also, there are large disparities by development regions: the load varies from 33.2 ha arable land/tractor in Central region to almost 90 ha arable land/tractor in the South-East.

The Western, the Northwest and the Center regions have specific loads below 40 ha arable land/tractor. There are also great disparities by counties: in 18 counties, the load of arable land by one tractor is above the national average, while an optimum level of this indicator is found in Covasna County (20.7 ha/tractor) and the lowest level in the county of Buzau (128.6 ha/tractor) (4). Basically, the low level of equipment in tractors and other agricultural equipment determined a proportionately reduced number in the agricultural machines powered by them, as no one buys equipments if they do not have tractors and vice versa (i.e.: a farm of 50 hectares with cereal grain profile (irrigated), in the south, needs at least a tractor to plow, but also a disk harrow, a trailer, a combine, a wrap up equipment, a seeder). Still big differences remain if we compare to the EU countries: 55 hectares of arable/tractor in Romania, versus 4.2 hectares of arable land/tractor in Austria, 5.0 hectares of arable land/tractor in Italy, 7.9 hectares of arable land/tractor in Belgium, 14.6 hectares of arable land/tractor in France, 12.5 hectares of arable land/tractor in Germany, 10.9 hectares of arable land/tractor in Greece, 11.8

hectares of arable land/tractor in Portugal, etc (7). Using tractors and agricultural machinery cannot be at all times in direct correlation with a qualitative change in the process of production. Raising the quality of agricultural production takes place only in conditions in which investment in tractors and agricultural machinery production creates the possibility of organizing activity based on the use of different machines that complement each other. As well, ensuring conditions for the application of advanced technologies for livestock growth and maintenance requires adequate investments in equipment for disposal and transport of effluents, milking machine, microclimate in housing, batteries for poultry, in facilities for production and dosage of complex compound, in water facilities, etc.

Figure 2 Arable land and arable land/tractor, by legal status of the holdings, by development regions

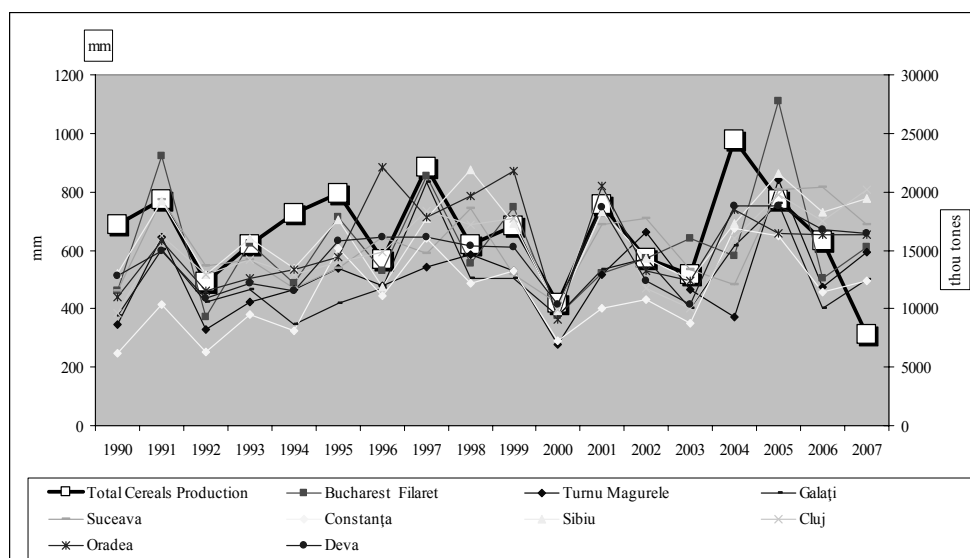


FF = Family farms; LU = Legal units

Source: authors' calculations based on the General Census of Agriculture 2002, NIS, 2004

3. **Irrigation.** Romania's territory is characterized by weather variations, due to the variety of relief units, as well as to the alternation of drought periods and moisture excess periods, on the same land areas.

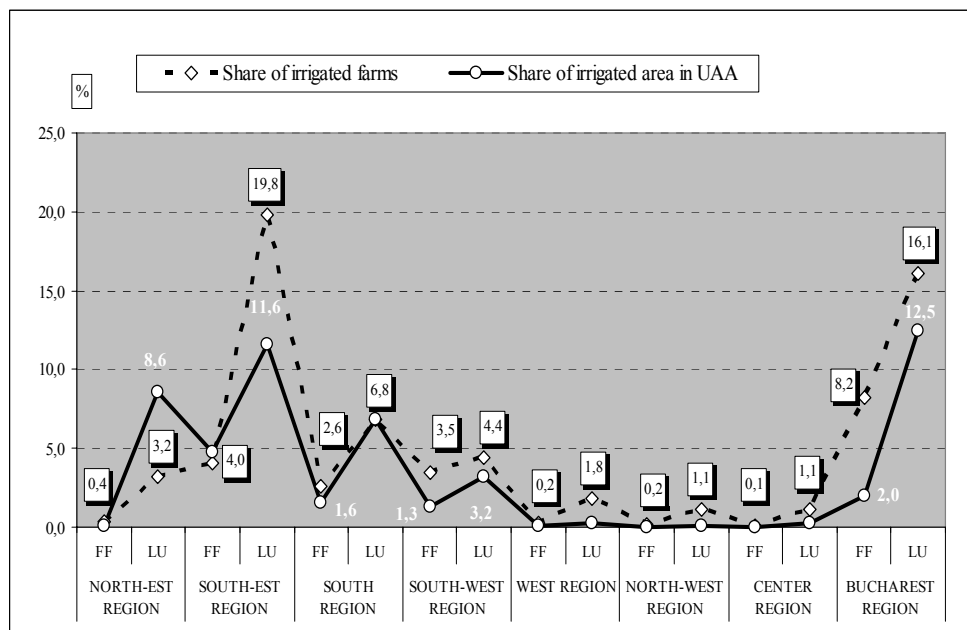
Figure 3 Trend of cereal production and yearly average of atmospheric precipitation in the main meteorological stations, 1990-2007



Source: Romania's Statistical Yearbook, 1990-2008 series

In the last decade, the global warming phenomenon has been more and more obvious. The reality of the last 17 years (in which 9 years were dry and very dry, with little rainfall and high temperatures) seems to confirm this fact (Figure 3). Investigating the total cereal production evolution in an 18-year period, we can notice that this follows the same trend with the yearly average trend of rainfall measured in the main meteorological stations, which reflects a strong dependency on the rainfall quantities. Thus, the danger is that in one year or in several consecutive years, the harvest may be partially or totally compromised. A relevant example in this respect is the winter cereal harvest in the years 2000, 2003 and 2007, when the drought affected almost the entire agricultural area of the country. We expect to have a series of dry years, with a significant impact upon agriculture, forestry and other activities that are dependent upon the weather condition. According to the General Agricultural Census data of 2002, by regions, the share of irrigated area in the utilized agricultural area of the region had the highest values in the region Bucharest (12.5% of UAA), followed by the region S-E (11.6% of UAA), the region N-E (8.6% of UAA), the region South (6.8%) and the region S-V (3.2% of UAA). In the other regions, these shares are not significant in total UAA of the region (Figure 4).

Figure 4 Share of holdings that applied irrigations in total number of holdings and share of irrigated area in total UAA



FF = Family farms; LU = Legal units

Source: authors' calculations based on the General Census of Agriculture 2002, NIS, 2004

By analyzing the distribution of irrigated area in each development region, it can be noticed that the largest share of irrigated areas in total UAA belongs to Legal units (LU). According to the agricultural census data and to the data from the two farm structure surveys of 2005 and 2007, the number of holdings that applied irrigations, both under individual and common operation system decreased by almost 60%, while the effectively irrigated area was down by 57% in the investigated period (Table 4). The holdings from the classes under 5 ha represent more than 90% of the holdings that applied irrigations, and they effectively irrigated about 10-14% of total irrigated area, compared to the holdings with over 50 ha, representing 1% of the number of holdings that applied irrigations, and they effectively irrigated about 80% of total irrigated area.

Table 4 Agricultural holdings and area arranged for irrigation and total irrigated area, by UAA size classes, 2002-2007

			Size classes of the UAA					TOTAL
			sub 2 ha	2-5 ha	5-20 ha	20-50 ha	peste 50 ha	
Area arranged for irrigation	Number holdings	2002	172.434	60578	14.645	1.040	2.354	251.051
		2007	65.262	28.197	7.346	543	898	102.246
	Area - ha	2002	117.025	180.195	107.343	31.443	1.074.813	1.510.819
		2007	53.388	84.148	56.558	16.409	404.826	615.328
Irrigated area	Number holdings	2002	72.053	5.242	1.319	405	803	79.822
		2005	31.352	2.719	1.132	93	146	35.442
		2007	29.223	2.919	741	139	343	33.365
	Area - ha	2002	30.484	14.114	11.128	12.621	332.172	400.518
		2005	14.118	8.052	9.315	2.749	58.960	93.194
		2007	15.511	8.215	7.538	4.471	137.717	173.452

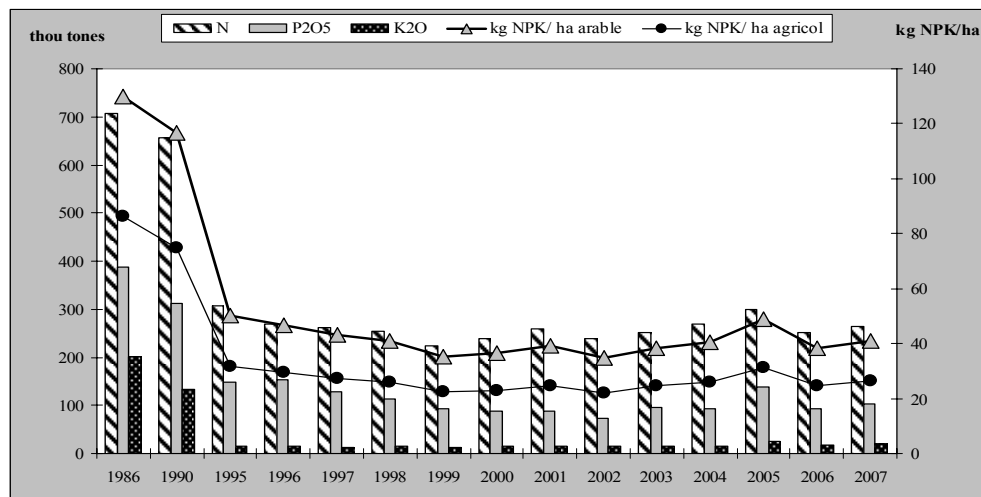
Source: General Agricultural Census 2002, FSS 2005, FSS 2007, NIS

At present, at global level, the projects devoted to the enlargement of irrigated areas are quite limited. The causes of this situation are many: depletion of areas favourable for the construction of these facilities, high cost of these projects, low cost of foodstuffs, the citizens' opposition to such works, strong competition for the water sources from the part of other economic sectors, increased interest for the revamping and modernization of the existing systems, etc. All these add to the ecologic pressures that the enlargement of irrigated areas has to face. This deadlock can be overcome only by making public investments for covering the need of specific equipments for irrigation application on the entire area equipped with irrigation facilities, as well as by maintaining and even increasing the size of subsidies to the prices paid by farmers to water suppliers.

3.1. **Fertilizers.** Compared to the other EU Member States, the amount of chemical fertilizers applied in Romania is **4 times lower**, under the technological requirements (40 kg/ha in 2001). This represents both an asset and a constraint. From the ecologic point of view, the agricultural land from Romania is less polluted with chemicals, yet, on the other hand, the yields per hectare are much lower than those obtained in Western Europe.

According to the data from the Ministry of Agriculture, the total apparent consumption of fertilizers (N, P₂O₅, K₂O) has continuously decreased, from 1295 thousand tons, in 1986, to 383 thousand tons, in 1998, and it slightly increased in the year 2005 (461 thousand tons active substance). The total consumption of N, P, K kg/agricultural ha correspondingly decreased in the same period, from 86.4 kg/ha in 1986, to about 25 kg/ha (1999-2007 average) (Figure 5).

Figure 5 Trend of using chemical fertilizers in Romanian agriculture, by type, in the period 1986-2003



Source: Processing based on Romania's Statistical Yearbook, 1987-2008 series, NIS

The subsistence agriculture practice does not permit to obtain performant yields under the conditions when the average consumption of mineral fertilizers **in the world is 91 kg/ha NPK**, while **in Europe the average consumption is at least 3 times as high**. It is a well-known fact that **each kg of NPK brings about a production increase by 10 kg wheat (3)**.

The situation is similar with regard to the organic fertilizers consumption. The use of organic fertilizers in Romania was closely linked to the number of livestock herds: 2001-15327 tons; 2002-15746 tons; 2003-17262 tons; 2004-17749 tons; 2005-16570 tons; 2006-14900 tons; 2007- 13498 tons. After 1989, due to the diminution in the number of herds, the organic fertilizers consumption also decreased.

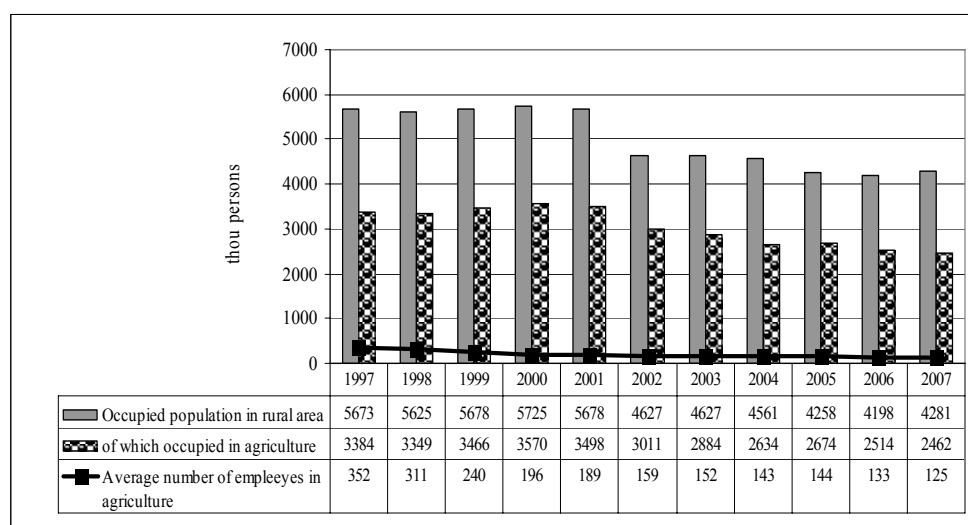
In Romania's agriculture, we can notice three distinct situations: (i) in the first situation, we have the small decapitalized farmers, who own few animals and use only organic fertilizers; (ii) in the second case we have the large-sized farms specialized only in crop production that do not use organic fertilizers; (iii) in the third case, we have the mixed farms, which use both organic and chemical fertilizers.

4. **Labor force.** Compared to the agriculture of the other EU Member States, Romania's agriculture has the highest share of the population occupied in

agriculture (30%), in total occupied population³. At the same time, the population occupied in agriculture accounts for 57.5% of total occupied population in the rural area (Figure 6), while the share of employees (wage earners) in agriculture in total employees is only 3%. Romania's rural population accounts for 45% of the total population of the country. Among the EU New Member States, the only country before Romania, at this indicator, is Slovenia (with 51%), the remaining countries having values ranging from 9% (in Malta) to 42% (in Slovakia) (7). Almost 60% of total population occupied in the rural area has agriculture as main income source.

At national level, 93% of the population occupied in agriculture is found in the rural area (8). Taking into consideration the fact that the average number of employees represents only about 10% of total population occupied in agriculture, it results that the remaining population occupied in agriculture mainly depends on the incomes obtained from the activity on their own agricultural holdings (Figure 6).

Figure 6 Population occupied in rural area, out of which in agriculture, and average number of employees in agriculture (1997-2007)



Source: Romania's Statistical Yearbook, 2005, 2008, NIS

In total occupied population in rural area, effectively working in the rural area (about 80%), the highest share is represented by the people working in

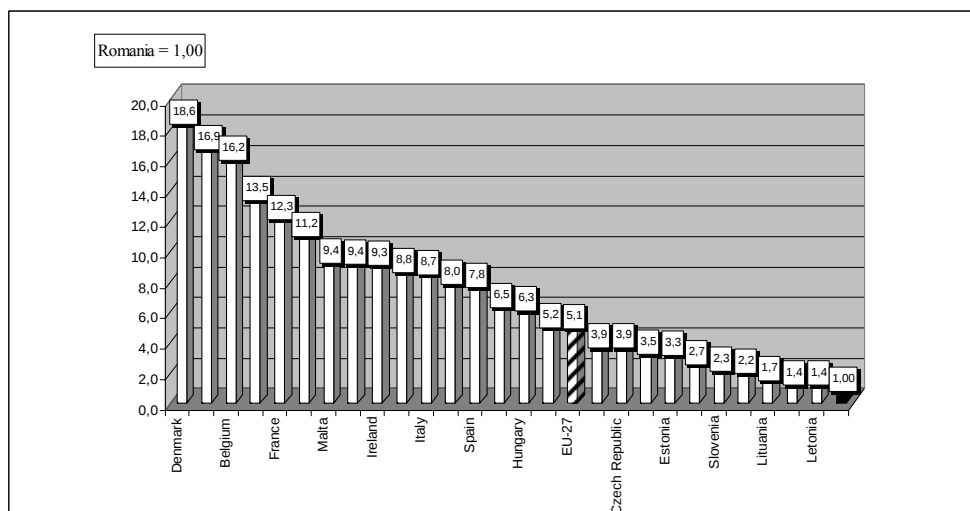
³ The data refer to the year 2007

agriculture (66%), followed by craftsmen and skilled workers (8%), skilled workers in different industrial activities (9%), non-skilled workers (7%), workers in trade and services (4%) as well as in other administrative, economic branches, in education, health system, etc. (6%) (8).

The seasonal character of activities, which prevails in the rural area, also bears an imprint on the effective working time in the rural area. In the rural area, as a result of the prevailing agricultural activities with a high seasonal character, there is available time left for the initiation of off-farm activities, which generate additional incomes. From the calculations made for estimating the full-time labour needs, expressed in Annual Work Units⁴, it results that for the agricultural activities carried out on the individual holdings, only one-third of the total number of people presently involved in agricultural activities would be needed, on a full-time basis (2).

The comparative advantage of cheap labour and of plentiful labour and land resources has not resulted in high competitiveness in agriculture. The absence of competitive advantage and the farm decapitalization trend resulted in a significant productivity gap compared to the other EU Member States and had a negative impact upon farmers' incomes (Figure 7).

Figure 7 Economic efficiency of utilizing labor force (GVA/ person working in agriculture) in Romania, compared to EU-27, in 2006



Source: Processing based on *Agriculture in the European Union, Statistical and Economic Information*, Eurostat, 2008

⁴ An Annual Work Unit (AWU) = 245 days (1960 hours)

The support measures to rural economy diversification and to setting up young people are of extreme importance, both for the present and for the future. As the agricultural holdings get modernized, the agricultural population will have to find jobs in other activity fields as well. The agricultural modernization will also contribute to labour productivity increase, to the increase of labour efficiency in agriculture respectively, an indicator that at present places Romania on the last position among the EU Member States.

Conclusions

The low profitability in Romania's agriculture resulted in the decapitalization of this sector and represented the main factor of agricultural production stagnation. The large gaps compared to the EU Old Member States (EU-15) also stem from the differences in the agricultural support policy. The EU largely supported the farm modernization and the agricultural production for more than 40 years. The New Member States will no longer get production subsidies from the Community, the support will go mainly for rural development and farm modernization. The effects of the new agricultural production mechanisms cannot be predicted yet, mainly for the New Member States. The human factor with a decisive role in agricultural performance increase turned out to be the individual management (the farmers) and the collective management (obtained in the agricultural organizations or societies) in the modern period. The development of entrepreneurial skills among the large mass of farmers remains a desideratum of the success of Romanian agricultural structures integration into the EU structures.

The agricultural production modernization imposes the orientation towards a performant agricultural system, which should take into consideration all the technical, financial and legal measures, oriented towards a secure agricultural production. The main directions and measures that can lead to the diminution of risk factors and to the sustainable development of agricultural holdings mainly refer to adopting certain adequate organizational and management practices, which can result in the diminution of the impact of risk factors upon the activity of agricultural holdings, on the basis of consistent agricultural policies, mainly oriented towards:

1. the need of production concentration into larger agricultural holdings, based on the diminution in number of subsistence holdings and their transformation into semi-subsistence holdings, on one hand, and by providing support to semi-subsistence holdings so as to become viable commercial farms, on the other hand;
2. diminution of the share of population occupied in agriculture and the occupational diversification in the rural area;

3. managerial performance increase on the individual agricultural holdings;
4. establishment of domestic budgetary financial resources and attraction of foreign finance for investments in the rehabilitation of the irrigation systems;
5. revigoration of the technical-material base of agriculture, by adopting certain economic policies that should lead to:
 - a) renewal of the agricultural tractor and machinery fleet;
 - b) reconsideration of the irrigation system;
 - c) reconsideration of agricultural practices with regard to the application of chemical and organic fertilizers; pest control;
 - d) in the conditions when all these factors, on a cumulated basis, mainly lead to the diminution of the fluctuations of average yields per hectare.

In an ongoing restructuring agriculture, both technical and social, faced presently by Romanian agriculture, an increase in the endowment with technical equipment depends mainly on the orientation of public policy to investment activity (by volume of budgetary resources, financing and credit guarantee etc.), but also on the possibility of accumulation and improvement of the loan system facilitating farmers' access to credits.

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AGRICULTURAL REFORMS IN SERBIA

Stojan Jevtic¹, Branislav Gulan¹, Vojislav Stankovic¹

Abstract

After half a century of wandering and neglecting, in 2009 the agriculture in Serbia is again on the crossroads. How and where to proceed? The science created about 1,500 high-yielding varieties and hybrids, and only 30% of its genetic potential is used. Every fourth Serbian village is heading towards extinction (about 1,200 of them). In the Serbian villages, there are 260,000 single men, who entered their fifth decade without having created their own families. In the same time, there are 200,000 empty homes in the villages, and 600,000 hectares of arable land remain uncultivated! Before the crisis, a GDP growth in Serbia for 2009 was projected at 7%, then it was planned at 3.5%, and now, with the reality check we have a drop of more than 5%, and in agriculture, we can expect a zero rate. The State has still not recognized that agriculture is its strategic sector of economy. After elaboration of each new strategy, the production was reduced.

Key words: agriculture, resources, production, underdevelopment, reforms, strategies

Global agriculture achieved the highest progress in the 20th century. The progress resulted not only from the development of agricultural science and technical – technological progress, but also from improved management, operation and organization of the production processes. Huge changes occurred in all areas of agriculture in the world at the end of the last century and the beginning of this century in the process of intensification of agricultural production, which is based on increased investments per unit of arable land (it is decreased in our country), agrarian production efficiency and improved trade with agricultural products. The European Union invests into agriculture 130 USD per inhabitant annually, and

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Serbia invests only 29 USD. With such investments, Serbian agriculture cannot be competitive with the European agriculture.

The world population today is more than six billion and the potentials of agriculture can produce enough food. However, every year more than 30 million people die of starvation, while at the same time almost a billion are hungry and undernourished. If food were distributed adequately, which is impossible in the new world economic order and in the period of globalization, hunger would be eradicated! We entered the new millennium with the same problems, which have existed until today, where a part of the world remains hungry, and food will be the most powerful weapon! Therefore, the countries that manage to produce enough food for their population, will ensure their economic independence and, in the same time, political independence.

Unexploited potential

Serbia disposes of 5.11 million hectares of the agricultural land. 4.25 million hectares of the said agricultural land is arable surface. These Serbian fields are made up of furrows and vegetable plots on 3.35 million hectares, fruit groves on 244.000 hectares and vineyards on 69.000 hectares, while pastures and meadows make up for more than 1.4 million hectares. On this surface it is possible to produce sufficient quantities of food for domestic needs and food reserves as well as for export. The expert projections are that with intensive production practices on this surface we could feed 80 million inhabitants. However, due to the inadequate economic treatment of agriculture over the last half a century, this economic sector has, by and large, been the buffer zone for the economic and political events.

During the last half a century of the existence of the SFRY on its territory, eight million people have migrated from the rural regions into the urban environment. Thus, we experienced the most accelerated transformation of rural population into urban population in the world, where for such a process to take place, it was necessary 150 years to pass by! The rural inhabitant has always been on the margins of events, while his work has been and remained neglected. He was always, and still is, the person who worked hard on its land, had work worn hands and has never forlorn his furrow without the seeds. The powers that be always approached him with promises of well being during the electoral campaigns.

The best example of the state of affairs in the Serbian village is that out of 4.800 villages, very soon, every fourth one will disappear (within one decade the life will continue in only 1.200 villages). Annually, in Serbia, 40.000 people more die than are born! This data is further endorsed by the fact that in 702 rural settlements in Serbia, live less than one hundred people. Precise data is that 352 settlements have less than 50 inhabitants, 350 have between 50 and 100

inhabitants. To the above data it should be added that almost 500 settlements, according to the results of the 2002 population census, have between 100 and 150 inhabitants. On the other hand, in the rural areas currently lives nearly half of the total population of Serbia. One of the manifestations of the disappearance of the rural settlements are deserted homes that number close to 50.000 according to the results of the 2002 population census. Were we to add to the above number another 145.000 homes that were registered then, but designated as temporarily uninhabited, it would mean that in Serbia today, there are circa 200.000 empty homes where no one lives! This represents the opportunity for new jobs, in particular for the urban dwellers that lost their jobs. The return to the rural areas would not only mean the work in agriculture, but also in the accompanying activities such as crafts. The result of this state of affairs is the reduction in the production and forever decreasing numbers of livestock in the barns. Animal husbandry in Serbia, with the present day livestock numbers, is at the level of 1910!

Table 1 Livestock numbers in the Republic of Serbia

(in 000 units)

	2001.	2002.	2003.	2004.	2005.	2006.	2007.	2008.
cattle	1.162	1.128	1.112	888	1.079	1.106	1.087	1.067
pigs	3.615	3.587	3.634	3.634	3.165	3.999	3.832	3.594
sheep	1.490	1.448	1.516	1.586	1.576	1.556	1.606	1.605
poultry	19.290	18.804	17.676	16.280	16.631	16.595	16.422	17.188

Source: RBS

Table 2 Meat production in the Republic of Serbia

(in 000 t)

	2001.	2002.	2003.	2004.	2005.	2006.	2007.	2008.
Meat production	426	457	430	445	459	458	473	464

Source: RBS

With the reduction of the livestock numbers there is less meat, so the production, for instance in 2007, stood at only 440.000 tons which is 205.000 tons less than in 1990. The results of the smaller market are not felt to a great extent due

to diverse reasons. Above all, less meat is bought and consumed due to poverty, while at the same time, an uncontrolled quantity of imported cheap meat of low quality is flowing in.

The world, rather the EU, which is our orientation, is emptying its own reserves, so the meat that is above eight years old is not given for consumption to its own population, however it is being sold to us cheap or is simply given to us!? The reason is not an increased production and better standard, but an overall slaughter of pigs (when half or close to half of 400.000 breeding stock sows are slaughtered) and low price. At such a time, the State or commodity reserve did not react. Had they bought off the surplus from the farmers when one kg of live weight pigs was 50 RSD, the breeding stock animals would have been preserved.

Such state of affairs in Serbian agriculture, above all, in livestock breeding, has converted Serbia from the former meat and food exporter into a regular importer. Only a decade and a half ago, Yugoslavia exported to 40 markets annually up to 50.000 tons of meat in the value of 450 million USD, with the participation slice of Serbia in the quantity of 30.000 tons. Nowadays this is only symbolic. In 2007, 2.200 tons were exported only, while in 2008 only 1.700 tons were exported! The reasons behind such low export figures are the non existence of the livestock animals.

In order to fulfill the quotas for baby beef it is necessary to have the breeding stock of 100.000 annually, while Serbia only has circa 15.000 bullocks! This branch is burdened with 70% of grey economy! In Serbia there are 1.700 slaughter houses. For a country such as Serbia, only 10 slaughter houses would be enough. Only 6 slaughter houses have exportation number for the placement of their meat on the EU market.

Further testimony to the fact that the affairs are not conducted as they should be, is the smuggling of meat from Brazil and Canada which is being sold as „Proscutto from Zlatibor“. It transparent that we have more cured meat than live cattle in Serbia!

The forgotten world of the none aligned countries

In Serbia we boast with the food exports in 2008 in the value of 2 billion USD and with the food imports in the value of 1.5 billion USD and realized surplus of 500 million USD. However, the creators of the economic and agrarian policies do not mention that the realized exports in the share of 62.5% were to the markets of the former SFRY. We are not returning to the old markets and we are not conquering new markets.

Just recently we have started to remember the markets of the non aligned countries where 1.7 billion consumers live, where annul turnover of the halal foods

are in the value of 600 billion USD! Our opportunity is on this market, in the return to the products demanded on this market since we have products to offer while being competitive at the same time.

Also, a great number of the Ministers of Agriculture, or other high and profiled positions are being occupied currently by persons who have, during the time of the non aligned engagement of the SFRY, pursued university studies here...

Due to large oscillations in the production in 2003, it so happened that after a catastrophic draught and damages of 60 billion RSD, *FAO from Rome has included our country among countries threatened by imminent famine and stated that Serbia will become a net food importer!*? Genetic possibilities of our crops are being used by 30% maximum. Plots are being sown with the seeds from the loft, they are being badly furrowed...We use the least amounts of fertilizers in this part of the world, only 50 kg per hectare...

The government in Serbia does not recognize that agriculture is the strategic activity. The best testimony to this is the smallest agricultural budget since its inception in 1996. In 2009 it was initially established at 20.5 billion. After the first budget rebalancing it is 17.5 billion RSD which corresponds to 2.75% of the total state budget. At the same time, the agricultural sector contributes with one quarter of the total exports, while with the inclusion of the accompanying activities, it contributes the same amount of revenues to the budget. At the same time, fresh and processed fruits with the average 59.3 kg it means that we eat three times less than the population in the developed countries.

Case in point that the agricultural sector is on the bottom of the governing structures is that finally after three years in the Serbian Assembly (at the end of May 2009), 15 laws were adopted in the area of agriculture. However, they are not being implemented since the accompanying regulations were not adopted yet. *Another interesting point to consider is that since the existence of Serbia this is the first Assembly that does not have a single farmer amongst its ranks!*

We are eating more and more bread

The average inhabitant in Serbia eats three times more bread than the inhabitant in the European Union! At the same time we consume four times less milk and dairy products while the consumption of meat is just as low. The numbers are unforgiving- we eat 109 kg of bread per inhabitant per annum, by far the largest quantity in Europe, where the average is up to 30 kg to 40 kg. Due to high prices, bread is the food product that „compensates“ everything else.

The consumption of milk and dairy products averaging 87.1 l per capita, we lag behind. Germans, for instance, annually consume 308 liters, while the European average is 245.1 liter. In Slovenia, the average is 228 l, in Croatia 162

liters, in Bulgaria 145 liters, while in Bosnia and Herzegovina 168 liters of milk per annum per capita. We are always ahead where it is not desirable to be ahead-the consumption of the edible oil in Serbia stands at 11.1 l per annum, while in the EU countries the average is between 4 and 5 liters.

Science, the brightest point of economy

The brightest point of Serbian economy and agriculture is science. Our scientists have created more than 1.500 high yielding varieties and hybrids of wheat and corn, sunflower, soybean, sugar beet...All of these cultures are being sown on furrows in our country on circa 70% of surfaces, while in other parts of the world they cover close to 5 million hectares of surface. Elsewhere, a cattle breeding is the driving force of the agricultural development. The proof of such circumstances is the fact that around the world cattle breeding generates a minimum of 70% of the GDP of agriculture, while in the case of Serbia only 42%. Over the last decade and a half, annually, in Serbia, the number of livestock had been shrinking by one to two percent. The consequence of such agrarian policies is that the meat consumption per capita in our country has decreased from 65 to 36 kg per annum.

At present after the slaughter of the livestock in Serbia this amount is just fictionally increased to 43 kg. When we make comparison with the countries of the developed world, since the objective of the present government is to become the EU member country by 2014, we see that the meat consumption per capita in the EU is 87 kg, in Hungary 92 kg, Slovakia 65,7 kg, Check Republic 73,5 kg, Bulgaria 62,3 kg, Latvia 74,9 kg, Latvia 49 kg, Romania 47,3 kg and in Slovenia 90 kg. The largest quantities of all types of meat consume the inhabitants of the USA 115,6 kg per capita per annum, second ranked are the Austrians with 105,2 kg, while third ranked are Canadians with the consumption of 100,3 kg. The least amount of meat consumes the inhabitant of Egypt - only 13 kg per annum. The consumption in Serbia is significantly lower than our possibilities and our desires.

American intelligence services CIA and NICA, in an analysis of the global economic trends in 2005 projected for Serbia to be at the economic bottom of Europe until 2020. According to their assessment Serbia will become the EU member country in 2020.

Each incoming government promised wellbeing to the same target group i.e. the farmers. This voting body numbers a few million voters (there are 778.000 farms). Almost all of the Governments adopted strategies, while after their implementation, there usually came about the fall in the production!?

Nowadays, most of the farmers keep livestock for their own needs, while they would offer to the market the accidental surplus which makes for self sufficiency production. Our objective must be to have the farmers who would feel secure and earmark their production for the market.

It means that Serbia should be declared a GMO free region. When this type of food is produced and sold abroad, it is between 30% to 50% more expensive than other food! 10% of the EU population chooses to consume the GMO foods. In such a case we would need to have circa 300.000 farmers with 15 hectares of land each and organize them in the cooperatives which is the practice around the world (with 800 million members), thus accessing the global market in this organized manner. Were this to take place they could double the production of raw materials for the food processing industry which is presently being used from 30% to 50% of the potential.

Ministers - the creators of agrarian policies

Over the last half a century the agriculture has always served as a social buffer for the governing structures who used to address it most often during the electoral campaigns. Agrarian economists, who over the last two decades usually occupied the most salient positions in the former federal government and later in the republican governments, are:

Milorad Stanojević Ph.D (1982-1986), **Sava Vujkov** (members of the former FEC & presidents of the Federal Agricultural Committee), **Koviljko Lovre Ph.D** (Federal Minister of Agriculture 1993 and 1994 after which this ministry was terminated), **Milan R. Milanović Ph.D** (Deputy Federal Minister of Agriculture 1997-2000), **Žarko Kalezić Ph.D** (Deputy Federal Minister of Agriculture 1992-1994), **Milan Prostran** (Assistant Federal Minister of Agriculture), **Tihomir Vrebalov Ph.D**, **Stevo Mirjanić Ph.D**, **Nedeljko Šipovac**, **with one acting Minister of Agriculture Vlastimir Matejić Ph.D as a Minister of Science until the appointment of Ratko Lazarević Ph.D**, post 2000 democratic changes the Federal Minister of Agriculture was **Saša Vitošević...** As for the Republic of Serbia, in the most recent times, the agricultural sector was led by **Jan Kišgeci Ph.D**, **Jovan Babović Ph.D** who was the Minister of Agriculture from 1997 until 2000, then **Dragan Veselinov Ph.D**, followed by **Stojan Jevtić Ph.D**, **Ivana Dulić – Marković Ph.D**, **Goran Živkov**, **Slobodan Milosavljević Ph.D**, **Saša Dragin Ph.D**... Since 2000 Serbia reshuffled ten ministries of agriculture and had eight Ministers of Agriculture!

At the beginning of the penultimate decade of the last century, in Yugoslavia became exposed serious signs of the long-term structural instability in all sectors including the sector of agriculture. Everything that was undertaken at the time,

made it obvious that political objectives dominate rather than the economic objectives.

The Government of the Republic of Serbia has adopted the *Strategy of the agricultural development of Serbia* (2005) that was elaborated by the ministry that was led by Ivana Dulić – Marković. The strategy was the result of the imported «expert» brains. It had never been adopted by the Parliament. However, it is still being implemented. After that, the Ministry that was led by Slobodan Milosavljević also elaborated the Strategy of the agricultural development until 2013, but this one had not even reached the Government. At the end of March 2009, the Ministry led by Saša Dragin elaborated the Serbian national program of agriculture until 2011 – this one, too, is waiting to be adopted by the Serbian Government...and then...?

The objective must be the adoption of the Strategy of the agricultural development in the Parliament with the implementation deadline of at least five years!

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SUSTAINABLE AGRICULTURE AND FUTURE CHALLENGES FOR AGRICULTURAL RESEARCH AND EXTENSION SERVICES

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Abstract

Development policies in agriculture have been very effective in addressing the problems of agricultural productivity. However, this process caused a global growth in consumption of pesticides, inorganic fertilization components, animal feed-stuffs and heavy machinery. The transfer of technology, usually produced in developed countries, caused a depletion of natural resources and produced social and economic problems that, by neglecting the local knowledge and tradition together with applying not adaptive breeds and varieties, in fact, increased the problem of food insecurity worldwide. Nowadays, many evidences show that resource-conserving technologies and practices, incorporated into the framework of sustainable agriculture, can provide many benefits for farmers, even improved yields and productivity, with introducing only few, or no external inputs.

There is a need for clear national strategy for agriculture and rural development with clearly defined points of sustainable agriculture. The role of research and extension services in implementation of such a strategy is irreplaceable. The present system of extension services has to be reformed in order to achieve the goals of sustainable agricultural development.

Key words: sustainable agriculture and rural development, research and extension

Introduction

Adoption of sustainable agriculture will inevitably involve losing money. This sentence illustrates one of the myths about sustainable agriculture, promoted

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by people who stubbornly stand at the position of supporting conventional agricultural production. Money! Profit! Is this the main life motive? A man, professor, who spent all of his life investigating the honey-bees colonies once, said something that completely corresponds to the main driving force of sustainable agriculture. He said: The main thing forcing people to work hard and that organizes the life is the “fear”. Fear for those and that they care for. So, concern for the future is the main postulate of sustainable agriculture movements which was set out in Chapter 14 of Agenda 21. Meeting the needs of the present without compromising the ability of future generations to meet their own needs is the key principle behind the concept of sustainability.

Actually, the fear for feeding the hunger after the World War II, was the initial factor of launching a transformation process of agriculture, known as a Green Revolution, that increased the agricultural productivity, but at the same time, has had major social and ecological impacts and side effect that, in turn, installed the base for the new approach to agricultural production. Sustainable agriculture tends to address these side effects, so that there are three pillars of sustainability as a commitment to future generations that they will be able to live in economically prosperous, socially just, and environmentally healthy communities.

We should ask ourselves why practices consistent with sustainable agriculture are not adopted more widely. It is obvious that many production questions about sustainable agriculture are unanswered, partly because of continuing low levels of research funding available for directly addressing sustainable agriculture issues. Additionally, higher education institutions do not pay adequate attention to that issue and the conventional agriculture still persists as the focal point of their work. And finally, transfer of knowledge from educational and research subjects to the farmers stayed challenging even regarding the regular activities already incorporated into agenda of research and extension services. There is a lack of strategic planning that indicates future directions. These institutions remains oriented towards the large scale production systems, while small farmers stay away of adequate institutional support. Farmers and households are in the center of sustainable agriculture philosophy, so it is necessary to adopt new principles and to reform research and extension system in order to support agricultural development in as much as possible sustainable way.

Sustainable agriculture principles

The concept of sustainable agriculture represents a response to the decline in the quality of the natural resource base as a result of introducing modern, intensive agriculture (McIsaac and Edwards 1994). The multifunctional nature of agricultural production and repercussions of intensive agricultural production redefined the

concept which has evolved from a technical one to a more complex one characterized by social, cultural, political and economic dimensions. Agriculture jointly produces much more than just food, fiber or oil, having a profound impact on many elements of local, national and global economies and ecosystems (FAO, 1999). The mentioned impacts can be negative or positive and the green revolution agriculture, so far, exerted to many negative ones. The negative environmental and human health effects of conventional agriculture are dominating in scientific literature (Pretty, 1995, 2005; Altieri, 1995; EEA, 1998), and include:

- Water contamination by pesticides and fertilizer
- Contamination of food and fodder by residues of pesticides, nitrates and antibiotics; ecosystems disruption and harm to wildlife;
- The atmosphere contamination by ammonia, nitrous oxide, methane and the products of burning, which contributes in ozone depletion, global warming and atmospheric pollution;
- Overuse of natural resources, causing depletion of ground water and loss of wild foods and habitats, and of their capacity to absorb wastes, causing water logging and increased salinity;
- The tendency in agriculture to standardize and specialize by focusing on modern varieties, causing the displacement of traditional varieties and breeds.

In addition, there are many negative social impacts associated with modern agriculture. European countries suffer from land abandonment as a result of farms enlargement and consequently farms number decreasing which also brought a dramatic decline in the numbers of people working in agriculture. During the 1980s it was recorded a 10% fall in total agricultural labor force across the EU that means 1.93 million jobs (Bollman and Bryden, 1997; Eurostat, 1997). Large-scale farming causes smaller number of farms, jobs and also contributes to the rise of rural poverty and economic disadvantage (Pretty, 1998; MAFF, 1999).

It is obvious that natural processes and resources have been replaced by external inputs. Inorganic fertilizers have replaced livestock manures, composts, and nitrogen-fixing crops; pesticides have replaced biological, cultural, and mechanical methods for controlling pests, weeds, and diseases; information for management decisions comes from input suppliers, researchers, and extension agents rather than from local sources; and fossil fuels have substituted for locally generated energy sources. Thus the basic goals of sustainable agriculture are to make better use of internal resources, both by minimizing the external inputs used, and by regenerative technologies introduction (FAO, 1998).

The current excessive use of nonrenewable resources will not be possible for future generations. Sustainable agriculture means greater reliance on renewable methods and enhancing the resource base for future generations by exploiting useful biological cycles, thereby saving money spent on externally purchased inputs. Sustainable agriculture is able to survive in the current economic ambience by working with nature's biological cycles (through diversification); reducing expenditure for purchased inputs, relying on income generated through human creativity, labor, and constant sources of energy, especially the sun (Savory, 1988). Even in highly industrialized agriculture countries, farmers adopting regenerative technologies have maintained yields at the same time as substantially reduced use of external inputs (Kamp, 1993; UNEP, 2005, Pretty et al, 2006). The evidences of profitability maintained even though input use has been cut dramatically, are coming also from Europe (Vereijken et al, 1994; Van Weeperen, 1995; FAO, 2003, Damljjanovic, 2006).

We can say now that advocates of conventional agriculture have no real arguments. In sustainable agriculture money stays at the farm, while in conventional farming it goes to the multinational companies, who exploit the created "vicious circle" in which resistance of different species created by their products, constantly requires new and expensive treatments, giving them opportunity to expand new technology packs which will require new ones, and so in a circle. So who wins? For sure losers are farmers and the nature. Expensive deteriorating inputs in conventional system should be replaced by internal resources in which we can also assort the ingenuity and innovative spirit of farmers. Self reliant farmers able to adapt to the changing reality are the key factor for sustainable development. However, success of sustainable agriculture depends not just on the motivations, skills, and knowledge of individual farmers, but also on action taken by groups or communities as a whole. This implies the need for greater empowerment of farmers and their families and emanates the need for their involvement in decision making processes and adequate transfer of knowledge (Milosevic, 2006). In this process the role of agricultural research and extension services is essential.

Research and extension services - key elements for sustainable agriculture

Agriculture can only be persistent and sustainable when resource conserving technologies are developed and used by local institutions and groups, who are supported by external research, extension and development institutions acting in an enabling way. For sustainable agriculture to spread, the wider policy environment must too be enabling (Pretty, 1995). This sentence clearly identifies the importance of enabling external institutions, at first, research and extension services, in supporting local institutions toward achieving sustainable agricultural

development. The agricultural research and extension system is one of the primary tools for spreading the knowledge and technologies and therefore has a very important role in the development process (World Bank, 2005). The framework of Community Strategic Guidelines and Rural Development Axis, associated with jobs creation, economic growth and environmental sustainability, requires from the EU member states to have a clear national strategy for agriculture and rural development with clearly defined points of sustainable agriculture. However, clear agriculture and rural development strategies with measurable and benchmarked performance indicators and specific targets generally do not exist or have been inadequately formulated (Lamberti et al, 2006). The system of research, education and extension still performs its previously defined role to support the needs of large scale technology, intensive ex-state or commercial farms. Most small farmers are used to obtaining information and guidance from informal and predominately local sources and seldom view the existing extension service as a supportive institution for development (FAO, 2007).

Table 1 Key features of research and extension transformation

Feature	Conventional agriculture	Sustainable agriculture
Driving motive	Efficiency; maximize productivity and profit/return to limited resources; competitiveness	Productivity, achieving food and nutritional security, poverty alleviation, ecological sustainability and equity
Assumed causes of problems	Lack of knowledge Farmers are irrational	Political-economic roots of problems, neglect of ecology and farmers' needs (and knowledge)
Postulates and key features	Crop/commodity specific monoculture, uniformity/homogeneity, reductionism, simplification of system	Agro-ecosystems, polycultures, multiple and high value crops and resources in system, diversity, holistic approach
Institutional relations and actors	Top-down (linear) technology development and transfer model Research to extension (or private sector) to farmers	Collaboration and networks, horizontal relations (farmer to farmer); innovation systems, pluralism (research, extension, NGOs, education, civil societies, private sectors)
Main beneficiaries	Private sector, formal institutions	Public interests, communities and farmers (especially poor), women and children, vulnerable groups

Focus of innovation	Single technologies (seeds, agro chemical, bio-technology) Production technologies	Agro ecological principles, institutional innovations, empowerment and capacity building, relationship among partners and actors
Main types of research	Unidisciplinary, reductionist, scientists or private sector generate knowledge, mainly done in laboratories and research stations	Both production and R&D technologies; Multidisciplinary, farmers are researchers and innovators, on-farm, participatory, in communities
Common view of farmers	Passive audience/partners, irrational seen as conservative and ignorant	Active, rational, key partners in the innovation process with valuable knowledge; Farmers are active in adopting new research findings
Skills required	Specialization in technology, biological/agronomic sciences, business/finances, bio technology	Biological systems management, social and institutional relations, people/partnering skills, facilitating skills.
Policy arena	Political agencies form rules, close connection with private sectors	Community actively involved in setting agenda and decisions environmental/social/ interests

Extension workers are selecting key farmer “leaders” supposing that technologies and approaches will be disseminated to other farmers. However, they tend to select “suitable farmers” so it is not possible to achieve “farmer to farmer” extension of obtained experiences. Finally, maybe the main constraint factor for effective research and extension services represents a lack of accountability. There is no feedback on effectiveness of extension program with no developed system for measuring and monitoring the impact. This problem still persists not only in this part of the world (Richardson, 1999).

Evolution of development philosophy, experiences in agricultural extension and development have indicated that traditional top-down approaches will need to transform in order to move toward sustainability. It is necessary to change attitude towards farmers who were treated as a simple, stubborn, receiver of what others regard valuable. Yet, examples of innovative and research oriented farmers are coming from Serbia where an extensionist published a brochure about the innovation and all the measures that follow the removal of the young sprouts in order to obtain high yield and good quality raspberry, that originally was developed

by a farmer (Treskic, 2006). Such example of extensionist approach recognizing the farmers as an intelligent partner in the development process should be the basis for future reform of agricultural extension.

Consequently, one of the new challenges for extension services is to become learning organization (Leeuwis, 2004), with ability to continually expand capacity to create their future and future of entire society. Public agricultural extension organizations in the Western Balkans countries are disrepute due to poor progress in achieving policy aims such as export, food security, sustainability and social well-being. Now, Extension systems should be much broader and more diverse, including public and private sector and civil society institutions that provide a broad range of services such as advisory, technology transfer, training, promotional and information on a wide variety of subjects (such as agriculture, marketing, social organization, health and education (World Bank, 2005). So it means that pluralism, as a key element of new paradigm, provides framework for multiplication of actors providing services, either autonomously in response to farmer demand or facilitated by government policy measures (Ponniah et al, 2008). Decentralization is one of the most important aspects in agricultural extension restructuring toward green agriculture. Decentralization could be defined as the reassign of planning, decision making and management functions from the central government to field organizations, secondary units of government, semi-autonomous public corporations, regional development organizations, specialized functional authorities or non-governmental organizations (Rivera, 1997). So, the goal of decentralization would be better tuning of public services to the needs and demands of local people. Ability of local institutions and organizations to actively participate in agricultural development based on SARD principles has been proven in Serbia. Emerged associations of agricultural producers in the area of Sandzak, established very good connection with the local government in defining their own future. They know what their needs are. They are ordering and financing the specific advisory services from those who are the best. This area is very specific with specific demands so that official extension system is not able to answer in a proper manner (Milosevic, 2006). Consequently research and extension institutions need a strategy that will incorporate regional production, cultural and social specificities. Research information and results need to be better summarized, presented and exchanged nationally and regional research programmes identified and developed in areas such as for, pests and disease (IPM), forecasting and water management. Farmer innovations need to be identified, documented and disseminated regionally. It is necessary to provide environment for extension stakeholder multiplication with a stable accreditation system and network of information, together with farmers' active participation in decision making. In such a sector competition of extension providers could be established, which means that farmers can eliminate those who do not respond to their demands (Volker et al,

2000). Finally in discussing about the financing of these institutions there are many who say that farmers and processors should pay for delivering of advisory services. But government should stay primary source of funds for promoting the sustainable agricultural practices. There are evidences that adoption of these principles in agricultural production minimizes the negative externalities of agricultural production that could be expressed, let's say, in expenses for provision of health services (Pretty, 2001). Besides that, there are also irreplaceable positive externalities of sustainable agricultural practices, such as landscape and aesthetic value; water supply; nutrient fixation; soil formation; biodiversity; flood control; and carbon sequestration (OECD, 1997), great arguments for governmental support.

Conclusions

Sustainable agriculture offers progress toward forgotten, green agriculture. It seeks technologies that are environmentally friendly, economically viable and socially just. In promoting and disseminating the idea of agricultural production sustainability, research and extension services role is crucial. However, these institutions need a reform that should include decentralization and shift to farmer centered approach. An interdisciplinary, holistic approach is needed in order to address the problems derived from intensive, conventional production. That means development of innovative training delivery methodologies tackling ecology, natural pest management, minimum tillage, team working principles etc. Research and extension will need to build on communication systems and involve farmers in the process of extension making the process really participatory and demand driven.

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TRANSFORMATION OF RURAL POPULATION VITAL STRATEGIES

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Abstract

Transformation of rural population vital strategies and current period peculiarity of its adaptation to economic reforms in agribusiness are analyzed in this paper. Special attention is dedicated to the problems of readiness of different social groups to new professional knowledge acquisition, their commitment in it, and to analysis of modern life strategies and employment preferences of rural youth.

The paper is based on sources of sociological researches conducted by the Institute of Agrarian Problems of the Russian Academy of Sciences with personal involvement of the author in one of the Russian regions (Saratov's oblast) in 1993-2007, dedicated to the problems of rural community adaptation to changing socio-economic conditions. The research included polls, budget studies, and "deep" interviews with the budget study respondents.

Key words: rural population, agrarian sector, adaptation, vital strategies, innovations, professional training, raising the level of one's skill

During last fifteen years a sizeable amount of rural economists and sociologists' research was dedicated to the problems of adaptation of rural community to new economic conditions. At that the authors noted that successful socio-economic adaptation, i.e. working-out by large enough amount of people productive models of socio-economic conduct goes as necessary condition for the transit of rural economy on real trajectory of sustainable development [1, p.5].

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For the eight straight year in a row there in Russian agriculture the economic growth is observed. Positive changes take place in social sphere. For the years 2002-2007 the wages in agricultural enterprises increased more than three time [5, p.110], the overdue volume of salaries decreased twenty time [5, p.1143, p.446]

In the country are maintained high rates of growth of summarizing indicator of material wealth – the available resources per household member (in 2007 by 30.6 per cent in comparison with the previous year, in 2006 by 24,76%, in 2005 by 26,4%) [5, p. 237].

As it can be seen from data of sociological research conducted by the Institute of Agrarian Problems of the Russian Academy of Sciences (laboratory of rural social structure and socio dynamics) in 1993, 2002, 2007, and together with Saratov Inter-regional Institute of Social Sciences at Saratov State University in 2005 in one of the Russian regions (Saratov's oblast) for relevant sample², a sizeable part of rural population succeeded to adapt to new economic conditions thanks to working-out a productive strategy of adaptation, which made it possible to conserve or increase the living standards. Now new positive tendencies are not only fixed by statistics, but are as well embodied in results of polls.

In 2007 for the first time for the last fifteen years of our polls among those respondents who answered on the question 'How had changed the financial position of your family during last 2-3 years' quantity of those who marked the improvement exceeded the quantity of those who marked worsening. (Table 1)

Table 1 How had changed the financial position of your family for the last 2-3 years?
(%to the number of those who answered on this question)

	1993.	2002.	2007.
Without change	32,0	37,4	33,7
Improved	13,1	12,3	30,5
Worsened	42,7	41,3	20,2
Difficult to say	12,2	9,0	16,1

It became visible the growth of satisfaction with some aspects of life – dwelling, provisions with foodstuff and manufacture, incomes, first of all it is peculiar to the group of respondents who consider themselves “living worse than many others”. These are able at present moment to improve essentially the financial position of rural family (according to the respondents opinion): the enlargement of fore-household farming (in 2007 this

² 1993- 486 respondents, 2002 - 457 respondents, 2005- 287 respondents, 2007 - 197 respondents

alternative was chosen by 30,6% polled, in 2002 – 26,0%, 1993 – 17,0%), attempts to earn more on major job (20,7%), employment opportunities in the city or migration to the city (2007 – 15,0%, 2002 – 10,5%, 1993 – 1,9%). The claim to the state for just pay has lost its former popularity (44,4% - 1993, 32,2% - 2002, 11,9% - 2007). Though family farming is understood today by rural population as the main source of reliability for existing only 11,4% of respondents want it to be their main sphere of occupation.

In spite of all the changes relatively stable for already fifteen years stays a fraction of willing to conduct individual farming (20,0% - 2007 and 2002, 18,8% - in 1993), while the amount of those who want to start own business increased substantially (21,0% in 1993 and 2002 vs. 37% in 2007). With this there arrived more respondents willing their children to start own business (20% in 2002 up to 31,4% in 2007). Per cent of those who want to see their children and grandchildren as farmers also increased and reached 5,2% after declining more than threefold from 2002 till 1993 from 7,6% to 2,4%. It is evident that there in the country the social base for the development of small and medium entrepreneurship is forming.

In the process of adaptation to new economic realities among rural population there have been accepted a broad range of new vital strategies often based on more intense usage of inter-family social support networks. The role of such a traditional form for vitality support as mutual aid among relatives and familiars increased sharply. Nowadays when labor potential of one separate rural family is practically exhausted the increase in output in households is possible perhaps first of all due to usage of family network resources, emerging of different forms of inter-family cooperation.

One of the main problems of the country is still the situation in the sphere of employment and first of all very low popularity of agricultural jobs. The main reasons are low level of salaries and hard labor conditions. In spite of the outrunning increase in wages in the country (plus 10% points to national average) wages themselves in agriculture remain extremely low and were only 45,2% from national average in 2007. That same year as well as in 2002 only 3,6% of parents wanted their children to work in agriculture (27,4% in 1993). Just as in 2002 30 per cent of respondents were satisfied with their work and only one of ten was happy with the conditions of work. Today the majority of agricultural enterprises have no inner resources to successfully compete with urban counterparts for attracting and attaching of qualified personnel. At the same time today peasants are more often afraid of unemployment. 50,6% of respondents confirmed this issue which is respectively 9 and 15% increase in comparison with 2002 and 1993. More often than others think that they can find themselves without job not only respondents of pre-retire age but also youth of pre-30 years as well.

A sustainable mood to migrate preserves in rural community. Today rural habitants are much more often ready to seek for a job or move to the nearest urban dwelling if the job lost than in previous five or fifteen years ago (1993 – 4%, 2002

– 5%, 2007 – 21%). Every sixth poll participant considers such a move as a necessary condition to improve the financial welfare of his family. In 2002 this opinion maintained every tenth and in 1993 only one on a hundred. The highest per cent of potential migrants is among young people younger than 30. Every third respondent dreams his children to leave for the city to live and work.

Having evident positive changes in agro-sector development, the state's attitude to social problems of the country great influence on rural inhabitants' preferences, their plans on own future and the future of their children press' the unfair lagging of the country from the city according to consumer standard, the process of increasing of the "scissors" in incomes of town-dwellers and their rural counterparts, which takes place continuously during all 'after-reform' period, the absence of the necessary amount of jobs with the level of pay and labor conditions relevant to modern requirements. Under these conditions the transition of the agribusiness on the way of innovations comes not only the main factor of the agro-sector's economic effectiveness, but the most important condition for the further growth of the level of life of rural households, perfecting of the rural socio-labor sphere. At the same time the process of technical and technological re-equipment, modernizing the productive relations on the enterprises of the branch inevitably implies the change in vital and labor strategies of important part of rural population and probably would be followed by deepening of socio-economic differentiation in country's community. In its turn the rural community potential, its traditions, values and interests of peasants predetermine a lot in velocity and results of planned transformation.

The increase of a skill level of workers of the agricultural enterprises goes as one of the basic preconditions of transition of agriculture on an innovative way of development, and as well as a consequence of this transition. However, today workers themselves differently estimate the personal potential, the opportunities and interest in obtaining new professional knowledge. In these conditions allocation of groups of workers of the agricultural enterprises with different level of orientation on increasing of qualifications and improvement of professional skills, the analysis of numbers of the given groups, their social characteristics and features of vital and labour strategy is a necessary condition of development of effective personnel selection and measures on prevention of growth of social tensions during technical and technological re-equipment and perfection of relations of production at the enterprises. Most part of the respondents employed on agricultural enterprises (58,5%) do not see any possibilities to increase their qualification. Only 13,0% of poll participants consider it real. Its evident that answering this question respondent took into account not only the fact of external presence of conditions for qualification increase but also his internal factors and first of all such as age and health.

Thus, among the respondents, the age of whom do not exceed 40 years, every fourth believes that is possible to raise his or her proficiency, while in the age groups

from 41 to 50 years and from 51 to 60 years, this alternative have been chosen respectively by 11.5% and 6.0% of respondents. If we analyze the situation with respect to separated socio-professional groups, we can see that the absence of qualification improvement prospects have been noted by ordinary personnel of large-scale agricultural enterprises more frequently than others. More optimistically (more than 40% of interrogated in this group) estimate their possibilities in getting professional knowledge the employees who consider themselves as high- skill workers and having such a profession with which they have an opportunity to get the job at the enterprises of other sectors (electricians, motor mechanics, drivers, etc). It is significant that just only among the given group of respondents a readiness to qualification improvement is not affected by the age.

Readiness of a person to get a new professional knowledge is undoubtedly depends on his or her basic professional background, experience of qualification improvement or new profession obtaining. 42.4% of inquiry participant's work by a profession obtained during training, 64.5% of respondents do not have an experience of any additional training, 21% passed the courses on getting a new profession and only 13% were trained on raising their qualification. 63% of inquiry participants noted that qualification they got complies with their job's requirements they do at present, 20.4% consider their qualification much higher than the required, and 16.6% – lower. (Is interesting the fact that the third alternative was selected by no one specialist or manager of large-scale collective farms. More frequently it was chosen by farmers and young people at age from 20 to 29 years employed at working positions at large-scale collective farms) Meanwhile, in general en masse, only 39.6% of interrogated believe that their work requires new knowledge acquisition and qualification improvement. Nevertheless, frequency of this alternative selection by separated socio-professional groups is strongly differentiated. To this opinion are adhered 84.6% of farmers, 63.2% of general speciality workers and 17.0% of ordinary employees working at large-scale collective agricultural enterprises.

It is impossible not to note that erudition factor for countrymen occupy the increasingly major weight in the system of their values. As one of the main reasons of significant part of population's low standard of life, 43.6% of interrogated consider the unwillingness to work, unwillingness to raise their qualification and 73.8% note that the opportunity to get a good education is an important factor of wealthiness growth. Meanwhile, the qualification improvement opportunity closely links not only with the need for salary increase, but also with a requirement for professional and career growth. The higher the respondent estimates his opportunities to obtain additional professional skills and knowledge, the more often he is assured that he has real chances both for increase of a post, and for career growth.

Along with a part of highly skilled workers (mainly in the age of 30-45 years), the young workers focused on continuation of education and career growth are also interested

in receiving a new professional knowledge, while the general body of agricultural workers feel very concerned to any innovations. In this way, today, it is possible to distinguish a significant group of agricultural workers with a low orientation to labour mobility and professional skills improvement. First of all, these are the ordinary employees, both workers, and specialists, who are mainly senior than 45 years and have a great working experience at the given enterprise. They, more often than others, are satisfied in general by their work and are afraid to loose it. In case of job loss, the representatives of the given group consider themselves being forced to become occupied with a work on a personal farmstead and do not see other prospects of employment for themselves.

Peculiar attention during research was paid to modern life strategies and labour preferences of rural youth. For the last 15 years, it was grown a whole generation of young people, the socialization process of which having been passed in new socio-economical conditions and who, by themselves, tested many pluses and minuses of market economy. In the village, the objective processes of generations, age groups and professional groups' changes are taken place. Economical behaviour of the youth, their readiness to carry out, along with traditional ways of activity and behaviour, the innovative ones connected with progressive changes in the society, will determine to a large extent the prospects of agricultural sector development.

The youth is still one of the most vulnerable social groups in the agricultural job market. During 2004-2007 years it can be traced a tendency to a growth of employment rate of rural population younger than 30 years, and in November, 2007 it came to 45.1%. However, the general unemployment rate in November, 2007 amounted 23.3% in respect to young people younger than 20 years and 13.8% in respect to people in the age from 20 to 29 years, that is respectively 2.5 times and 1.4 times higher than the correspondent indicator in respect to the rural able-bodied population [4, p.164]

According to the data of sociological researches provided by the experts of the Institute of Agrarian Problems in 1993 and 2007, in the year 2007, the same as fifteen years ago, every second respondent younger than 30 years was afraid to loose his job. But the intentions of the young people in case of job loss have been undertaken the definite changes. The popularity of answers linked with job seeking in the town has been grown dramatically. Such alternative as "I will transfer to live and work in the town" was selected by 2.2% in 1993 and in 2007 – by 30.1%, and "I will find a job in the nearest town" – by 2.7% and 7.5% respectively. The readiness to stay in the village and become occupied with a work at a farm was expressed by every third young man, the same as fifteen years ago. Though modern youth is much more better aware, than their peers of the beginning of nineties, of all difficulties and risks linked with carrying out business, the portion of the youth who want to create in case of job loss their own farm, all these years have been remained at the same level (i.e. 5% of interrogated young people younger than 30 years and in general en masse), and the number of people willing to open the private non-agricultural business even grew (from 4.0% in 1993 to 7.9% in 2002).

The willingness to change a job was expressed by 60.9% of poll's participants not senior than 30 years, that proves a high level of potential labour mobility. 14.6% of young people are going to quit in a year that is 1.5 times higher the correspondent indicator in general en masse. The fact that more than half of the young people who participated in inquiry are sure that getting a job based on the obtained qualification is easy, while only every tenth consider the opportunity to change a job to a higher position, qualification, tells about the lack of vertically labour mobility opportunity and domination of horizontal one.

Though many respondents estimate their career development chances as bad, major part of the youth (65% against 43% in general en masse), nevertheless, strive for it, and 79% believe that they are able to realize all their life's perspectives. In the meanwhile, the growing number of young people, in order to achieve this, is ready to change not only a place of work, but also a place of living.

Modern rural youth, in their desire to improve the material well-being, first of all, rely on expansion of fore-household farming and transfer to the town. At the same time, working at a personal plot is more frequently considered as the only available way of accumulating means, needed to get an education and move to the town. Recognizing the necessity of fore-household farming expansion for rural families' wealthiness improvement, the real opportunity to achieve stable wealthiness, as estimated more frequently by the young people, is linked with transferring to the town or more wealthy villages, where are available working places with acceptable conditions and level of salaries. In spite of all the negative consequences of agrarian reforms at the beginning of nineties, the Russian village, today, maintain a social potential for the agricultural technological upgrading that is proved by the results of the last researches. More than 40% of rural population at able-bodied age today are not senior than 30 years.

At the same time, the rural youth is not only aware about the necessity of getting professional training, but also considers it as necessary condition to achieve a high material well-being. It is great an interest of rural population not only in expansion in the village of non-agricultural employment spheres, but also in own enterprises creation, for example, in services sector.

It is especially important, in our opinion, to provide a comprehensive approach, a one-time creation of conditions not only for technical and technological transformation in the agricultural sector, but also for diversification of rural economy, road transport infrastructure development, increase of accessibility to high-quality professional training for the rural population. Under these conditions it is essential not only to create conditions for attraction and fastenings of specialists in the village, but also to transform forms of training and improvement of professional skills, keeping in mind opportunities and requirements of various social groups of agricultural population, specificity of a rural way of life.

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DESIGNING THE COLLABORATIVE PLATFORM MEANT TO INCREASE ORGANISATIONAL COMPETITIVENESS IN AGROFOOD RESEARCH

Gabriela Nedita¹, Mirela Stoian², Anca Elena Rădulescu

Abstract

This paper presents the premises and coordinates of realizing a collaborative platform meant to increase organizational competitiveness and knowledge management, expertise and partnerships in agro food research and development. The web collaborative platform may be accessed by organizations who are partners and it has as purpose to use at high levels the intangible resources of the research and innovation community, respectively to accelerate the process of innovation. The platform ensure building a network of information and knowledge in electronic format, in order to optimize time and costs of accessing information, to reduce the impact of personnel who work in research migration, young researchers integration into the system, the possibility to interconnect the network to other similar networks of the outsiders' communities of research.

Key words: collaborative platform, innovation, information, knowledge management

Collaborative platform

Collaborative platform aims higher valuation of the intangible resources of community research and innovation, and accelerate the innovation. Web platform provides:

1. Building a structure of information and knowledge in electronic form, filed on different areas or areas of interest so as to optimize time and costs of

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accessing reliable and relevant information required in the various activities the organization;

2. Development of a collaborative web platform to a system of incentives and trading knowledge to support the innovation process;
3. Management of information flows and communication between members of the defined community;
4. Quick access management to documentary resources of the defined community and others, reducing search times and speed of information processes of research;
5. Identified contextual information useful for research programs conducted in the defined community;
6. Evaluation value of the contributions of community members;
7. Documentation of performance research community and foster collaboration;
8. Reducing the impact of migration research staff, by keeping the value of contributions, and accelerate system integration of young researchers;
9. Sustainability and continuity of research through maintenance and continuous updating of management data;
10. Possibility of interconnection with other similar systems research communities abroad.

The research process can be assimilated, in theory, a production process, the tools and means of production are replaced with documents and information. The results of production processes, and process research are assets of the company. The major difference between the two is the means, the tools work: whether in the industrial production means and resources, mainly natural objects or materials, in processes such equipment and research resources and information movements. Efficient administration of those means of working in the research is the subject of *knowledge management system (KMS)*.

Knowledge management system (KMS)

KMS system uses objects to define the shape, configuration and management methods and resources used in research. Modelling objects relate to each other, as follows:

- activities are components of the processes;

- work flow sites have meaning only in relation to documents, information;
- organizational structures may include or be included in the community;
- products are results of processes, etc.

Employment rules and procedures KMS architecture in the current user organizations. KMS must not create organizational structures and functions parallel to the current realities in partner organizations.

In terms of volume of work by the KMS user communities, as have additional tasks arising from the project should occupy a volume of work less than unproductive tasks removed from the system. Other general rules on the role and use of KMS:

- KMS should serve as an informal architecture, cross within each organization;
- KMS should be a tool to facilitate / accelerate research activities and not an end in itself, consuming resources;
- KMS must be configured with roles that customize access rights and restrictions in use, set for different categories of users;
- users, especially members of the research will use the KMS to streamline research, especially documentary research; amount of work saved by using KMS must be used for the production of intellectual;
- KMS will allow a transparent and objective results highlighting various collective research so as to stimulate scientific competition; the valuation / marking individual contributions, but must take into account other achievements: doctoral theses, scientific communications, etc.

Human, financial and material resources

Information activities are coordinated through collaborative web access. KMS system presupposes the existence of at least one server to provide support hardware platform. Access to the platform is restricted and monitored.

The partners will use this project a team of researchers and consultants with experience in research and implementation of information systems. The consultants are experts in programming, analysis, testing and configuring systems. Assigning the project consultants will be based on concrete needs arising from the stages of documentation and analysis.

Communication

In order platform management, communication can be made between partners, through:

- conventional ways of communication:
 - formats: hard copy mail, registered, by facsimile correspondence;
 - Informal: telephone, e mail, verbal communication.
- unconventional ways of communication, informal;
- using collaborative and predefined work flow .

Technical communication and operational management for the purposes of the project can be made through any means of communication, as long as there is confirmation of receipt.

Communication of a contract may be made only by means of formal communication. Formal communication between project partners is the only leader of the project, ensuring that such information is transmitted to all interested. Leaders of institutions involved in the project must ensure the transmission cascade of communications of those persons that the project team should be informed accordingly.

Document management and workflows

Document management The platform has an efficient way to manage documents (including the design workflow - flow of work). This system provides structure and circulation of documents within an organization quickly, easily and accurately.

Workflows The system allows the transmission of documents and tracing flows of default - routes / destinations predefined document under the internal procedures and quality management system, giving the actors involved, the type of action (information, approval) and deadlines due.

By configuring these flows and default routes, advocated compliance communication and collaboration with internal management system and quality are reduced as much as possible the various errors of communication and cooperation due to the human factor. Work flow can be several ways:

- editing;
- information (the user is informed of the existence of a new document created or assignment of a task);

- approval (through acceptance can see whether aware or not);
- negotiation (negotiated and recorded the value of a document).
- Management Process

Management features of the processes allow:

1. access and quick view of all the economic processes of the company, represented by a consecution of activities from which to obtain the product or service for sale;
2. integration of all the documents of the quality management - the system integrates all of the procedures, manuals, standards, methodologies, templates and other documents on quality management, etc. (including updates and revisions); allows the creation of new such documents and workflows in accordance with quality management;
3. integration of all operating procedures and note the configuration of applications, with a direct impact on the total cost of maintenance of applications;
4. rapid dissemination of changes to employees;
5. identify necessary skills required to list activities and correlating this with the necessary skills available in the organization;
6. expressive manner, uniform, integrated presentation of functional areas, processes, activities, organizational structures, documents, necessary skills, performance indicators.

Management skills

Rapid pace of change in organizations which are subject generates an evolving business almost continuous. Evolution of activities held in the company and leads directly to a development of skills and knowledge of employees. Managing them effectively is a prerequisite for sustainability and success of companies.

The term competence encompasses two components:

- component related to the "job", i.e. specific and general knowledge acquired through training, qualification, specialization, experience, etc.
- component related to individual traits, behaviour (CONAT traits, education, general culture etc.).

For each employee may be defined in the platform, which powers it has, with related grades. Competencies are directly related to company activities, activities which are described in referential activities. For each activity in this reference, may be defined competencies and level required for each competence, the necessary implementation.

Skills required at each activity is cumulative automatically groups the activities defined in the system. Through group activity means one or more activities, grouped by certain criteria, which are conducted by a community of employees.

Benefits of implementation management skills:

- structuring the reference of competency of the organization from the requirement of skills required for specific activities and processes of project company;
- identify individual skills and provide activities for individuals through the relationship with the skills required for these activities;
- interactive evaluation of the possibility of employee skills through online tests;
- ability to quickly identify employees who possess a specific skill needed a new business.
- *Performance Management*
- This platform has the main role as providing strategic support for a company or group of companies. This thanks to the two major categories of functionality:
- features for measuring and reporting the extent of achieving the strategic objectives and the operational;
- feature modelling and informational support circuits - making support decisions and actions of the management team.

Board of paintings and Performance Indicators

The indicators of board and panels provided by the platform measured the progress made by the organization in meeting the strategic objectives defined (own vision) or elements that underpin the success of long term.

Through Board Paintings (financial, management and valorisation of information, management and productivity improvement skills etc.) organization

monitors both its current performance (financial, customer satisfaction, the business processes) and its efforts to improve processes and, and to motivate and educate employees to improve decision-making information system, ability to learn and improve their performance.

An efficient reporting system should provide a full picture of the organization work through performance indicators built to reflect both the current and the company strategy and long-term. Information obtained by reference must be transformed into knowledge, to take decisions and to achieve solid business results. How to view the indicators are based on the "traffic light" guideline: red - unfavourable situation, yellow - neutral situation, green - favourable situation.

Presentation of information circuits - decision making

The portfolio of integrated solutions aimed primarily to support information and decision-making circuits of the organization.

Obtaining the best results in conducting any activity involves access to a set of needed information. Necessary information is made available through the reports (particularly for operational activities) and through board panels (especially in the case of strategic).

Information flow is the flow of information transmission from the bottom up on the pursuit of activities / economic processes.

Decision making flow is the flow of transmission of decisions and tasks from the top down on the pursuit of activities / economic processes.

For each decision factor, it will identify decisions and tasks that can be given in area of responsibility of employees and the communities that they are addressed. Information modelling circuit starts to identify the necessary information for carrying out activities within the organization, thus being possible a linkage of information administration activities.

After determining needs, it's identified data sources to obtain such information. In terms of data sources, we can discuss two major groups: data are derived directly from information systems and data are provided by employees (activity reports, summaries, analysis, etc.). Qualitative reports will identify the employees or the communities of employees for whom information contained therein.

Conclusions

The main benefits of implementing informational decision circuit are:

1. structuring information and decision circuits;
2. the structure manner of the input information using predefined forms;
3. easy retrieval of documents containing information needed by storing them in folders in predefined collaborative platform;
4. rapid distribution of information, with the possibility of validation, where appropriate, the communities of employees who need them, using the mechanism of flow work sites;
5. automating information capture and transmission; e.g. For periodic reports of activity to be performed by an employee, can be set so as collaborative platform, periodic employee to open a report form of activity which, after completion, to send automatically to the one who sent the request;
6. automatic setting information for the employees on the loading platform in a collaborative document that contains information necessary for their activities (egg the sales representatives to be informed automatically on loading a report analyzing the competition);
7. rapid distribution of tasks and decisions within the project.

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1. Research contract collaborative platform for organisational competitiveness and knowledge management, expertises and partnerships in research and development in agro food field

NON - CONFLICTUAL COMPETITIVE OBJECTIVES IN THE ECOSYSTEM MANAGEMENT

Constanta Popescu¹, Constantin Popescu¹, Silvia-Elena Popescu¹

Abstract

The objectives that the ecosystem management aims at should not ignore the public's options, but instead should find fundamental scientific arguments satisfying them. These solutions should be the result of the democratic institutional decisions that are explicit or implicit in legislative regulations, ordinances, decisions and budget provisions. Consequently, it can be considered that the general purpose in the ecosystem management is to maintain the ecosystems' characteristics in a broad sense, including both their social and their biophysical components, while the human values include the normative purpose of maintaining the integrity of both the natural and the cultural ecosystem.

Key words: ecological evolutive processes, biodiversity, ecosystem, resources durable administration, ecology, productivity, viability

In a broad context, people study the ecosystems for different objectives that actually reflect different cultural perspectives. In general terms analysts use anthropocentric and bio centric that describes 2 major cultural perspectives behind decisions that affect growth (economic and physical), species (identification, culture protection) and habitat (primarily for people and then other creatures).

Anthropocentric prospects utilities or claims therefore that natural resources exist to satisfy human needs, while bio centric prospects considers people as one of the many species that benefit from the ability to support the resort. In these

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approaches, neither of these perspectives does not provide satisfactory solutions to issues of diversity resources - major source of conflicts.

It noted that the real challenge is the need to take decisions in difficult situations, which take account of different viewpoints, often contradictory, backed by members of society. We must be realistic and recognize that the priorities are both economic and ecological, and people sometimes behave anthropocentric, sometimes bio centric. Diversity exists at the individual level is reflected clearly in the company, and management of ecosystems must confront the need to make decisions without ignore the various systems of values. Until the latter issue is therefore to find what kind of territorial management can satisfy the wishes of the people, respecting local values and scientific perceptele. Usually chosen by the actions of individuals and institutions that care in which he manages, and with increased understanding of ecological problems, economic and social, will certainly increase the ability to make decisions to satisfy more and more variables so that ecosystem management is a crucial step in the planning.

Legislation relating to management of land administered by the "Service (Forestry) and the Bureau of Local Management" for example, at the beginning of last century aimed primarily protect resources for mid-century moved towards the provision of goods and stabilization the labor market as the main priority for 70 years since, the focus should move to establish a schedule based on specific environmental objectives. As a result, current laws require mandatory procedural regional and local agencies to identify and announce the decisions on the territories. Current both FS and BLM, for example, establish management plans for territories and resources (standards, goals and specific objectives) for each district received. Legal mandates require territorial and federal managers to take care of habitat so as to maintain biodiversity. By law, federal territory managers are required to develop the diversity of plants and animals through naturalization in accordance with the general objectives that are set for a given area and the agreements signed by the federal government with local communities. It is currently drawing up a detailed program of normative all developments that will affect every field goals and objectives with clear and precisely defined territory and with express indication of the role of forests in the arrangement. It can be concluded that the purpose, general management of ecosystems is to maintain their characteristics in respect broad, including both the social and Biophysics, and human values include normative purpose for maintaining ecosystem integrity of both natural and cultural heritage. We consider that in this sense it is obligatory to understand the ethical side of ecology, and to use it in order to find the optimum inter-relations, defining integrality as a permanent tendency of self-correction, of dynamic recovery, in the anticipated social context.

The care for ecological integrity started with the American forestry specialist Aldo Leopold who, in 1944, put an equal sign between ecological integrity and the stability of the biotic communities in the long run. “A thing is integrated (good, in its place) when it tends to keep the integrity, stability and beauty of the biotic community where it penetrates. Otherwise it is not integrated (bad).” Starting from this thesis, it results such ecosystem management objectives that comprise social values and options oriented towards the ecosystems’ integrity and the viability of the society, considered non-conflict objectives, such as:

- maintaining the evolutive ecological processes, that is the ecological functions, of annihilation of the perturbations, of positive influence on the water circuit in nature, on the energy flows and the nutrient recycling flows;
- ecosystem administration, interweaving numerous ecological disciplines and their permanent relation to different temporal manifestations, evaluating their parameters;
- maintaining a viable population of autochthonous or acclimatized exotic species;
- encouraging social prosperity without affecting the sustainable resource management;
- an ecosystem management ensuring the goods, the functions and the conditions required by the society and in harmony with the legislative regulations.

Maintain ecological and evolutionary processes

Maintaining evolutionary processes must ensure the genetic diversity of populations and to give them a chance to adapt to that environment is changing continuously, and maintenance of species throughout their habitat ecological or geographical, especially towards the edges.

Ecological processes include the distribution of nutrients biotic and abiotic, materials and energy in an ecological community. Species affect viability and productivity of ecological communities by their functions that going from production and consumption of biomass to the movement of nutrients, objective which assumes conditions to maintain key ecological functions in the course of time.

And because judgments about the desired ecological conditions must be made within the circumscribed human ecological system studied, so the notion of

integrity, with an emphasis on full integrity can not be lent social or economic system. For these systems the emphasis is on sustainability and adaptability. Therefore, managers generally resist the inclusion of environmental issues and social values in defining and assessing ecological integrity.

You must however emphasize that the main goal is preserving the integrity of the managerial environment and under these conditions defining this purpose should reflect the values of managers as well as users, managers generate solutions otherwise conflicting states. In this context, maintaining the integrity of the ecosystem includes:

- maintaining ecological integrity;
- viability - maintaining social and economic system.

Other processes include environmental disturbances, movement of water, of nutrients and energy in ecosystems, processes very difficult to keep under control, given the large areas which is the periodicity and hard to predict.

Goal of maintaining ecological and evolutionary processes include maintenance of natural ecosystems in different environmental conditions. Concern is to maintain genetic material and ecological processes in as many environments, to ensure their time. Of course the question that what is reborn natively or in a natural environment and how can it is preserved. For some natural means pre-European settlement, accepting such actions very erosion and environmental practiced by American Indians (e.g. burning of pasture for cleaning). Conservation of the environment in landscapes at risk of disturbance such as forests on the coasts of the Mediterranean, Adriatic and the Pacific, requires different types of management, the strict conservation at super-intensive management. To maintain evolutionary processes and environmental managers must pursue priority:

- eco-communities to locate rare or endangered;
- location-endemic species;
- areas with a high concentration of species (called "nuclei of biodiversity");
- remote areas of the human assets.

This management can assess whether existing or proposed land division and the wild areas, research areas, biosphere reserves, while ensuring the conservation of these areas. Achieving this objective would have facilitated if it had taken into account the possible harm caused by strong winds and even small disturbances of the atmosphere to rapidly evolving disasters.

Management reported in multiple ecological domains and the evolution of ecosystems in the course of time.

This target reflects the management of ecosystems, taking into account the need for managers to be aware of the existence of structurally different areas and different manifestations of subsystems at different time intervals. For example, the sequence of species is usually described at the local level, for several centuries. The evolution of climate and biome are usually studied for large areas and time intervals of several centuries. Evolutive Ecology may therefore be studied area larger or smaller, but very long periods of time. There is also a time-space dimension of territorial management. For example maintaining the productivity of forests and pasture over time is a question on the geographical area of forests & pasture highly variable in time. Consequently soil must be protected, and the process of pedogenesis must be permanent to ensure continued renewal of the soil.

On the other hand, understanding and directing biome effects on climate change, acid precipitation and ozone layer rarefying are problems that require extensive studies over several years and the continuity of many centuries. Multi-level planning can be used to solve problems in space and time. For example, planning is usually done for small areas (up to 15,000 ha) and short period (1-5 years). The analysis provides the context for landscape planning and is the area of 15,000 ha and over periods of up to 10 years. The plans of the national forest fund all or pastures, or plans of the federal district are designed for large million ha and the period up to 10 years.

For general purpose, that of solving local problems, a eco regions or a district or nation it is necessary that the different levels of assessment, management issues and regional planning efforts to form a whole. Uniting these problems and conditions in a single study will be very difficult. Factors such as the rights and desires (needs) co-owners will complicate decision-making process, particularly regarding the potential economic and social management of endangered species. Things can be solved only through a gradual implementation starting with the creation of "centers of crystallization, which play the role of refuges for the top, then, the example will be determined and the impact of implementation will be gradually alleviated.

Biodiversity conservation as a management objective

It is claimed that the public generally wants to ecosystem management is concerned about the maintenance of viable populations of species. Legislative definition of sustainability populations expressing possibility of existence of endurance power to live. In effect, environmental sustainability is considered as a

continuing possibility of an optimum population distributed throughout the area for a period of time.

A viable population is maintained over long periods on numerically and is able to survive fluctuations in demographic, genetic and environmental, and maintaining the vigor and ability to adapt evolutionary time. There is no effective to designate a "minimum viable population and hence there is no universal measures to ensure all species. It is better to make a distinction between risk analysis for viability, the chances that an estimated population persist or disappear in a certain time on a certain area (1) and risk management for sustainability, who chooses a certain conduct in action, the decision is determinative in this election. These two separate operations are part of the scenario and planning alternative that we present below.

Because some species are rare and unusual nature, the management of populations with high viability is determined in part by the ability of ecological environment and species. Risk analysis for viability can help finding this capacity, assessing the environmental adaptations of species, how to change due to environmental factors and management to be the answer to these changes of populations. Considering the lands management must satisfy many objectives, the adoption of risk management for sustainability may help in the formulation and adoption of best social decisions, managerial and even political, for the ecology.

Two from the faces of viability are abundance and distribution. A population must exist in sufficient numbers to survive and ongoing growth they are positive. In addition, populations should be distributed in space and time so as to ensure the interaction between individuals and to avoid the demographic and genetic isolation. Due to limited information about most species it is impossible to numerically evaluate the risk or chance of extending survival. Discussion about viability is behaving in terms of persistence, but not consumption. Needs often involve human consumption and it is especially important when you are a cultural and regional relevance. Necessary for a surplus of population over the viability of species that can be provided without affecting the stock in the controlled (case management funds hunting and fishing). The crop factors and disturbances must be well controlled, otherwise the geno found is endangered, and the situation becomes conflicting.

Encouraging social and economic sustainability

Ecosystems, is universally recognized, providing a wide range of goods and services from the satisfaction of social needs and economic needs of consumption and quality of life. They have not only size but also economic and cultural nature. Communities containing human social, cultural, economic and institutional joined

more or less coherent or consistent. This structure provides for the citizens a certain predictability and stability that allows them to organize their lives.

However some smaller rural communities are dependent on external factors which threaten the stability and the capacity of governments to maintain economic stability at the local level is often limited. Therefore, as I noted above, management of ecosystems, although the principle should not ignore the realities of local capacity, and especially rural communities, dependent on certain resources, to respond positively to changes, so that there is a risk that these communities to habitats and affect (the example of isolated settlements in inaccessible areas who have grubbed up in the forests nearby by unleashing the true disaster of massive sliding). Are eloquent in this respect shares the timber allocated for local needs in the past that were never sufficient, but not observed.

Management must ensure the feeling of "home"

This objective recognizes that cultural values and beliefs are often related to certain landscapes and their symbolic significance. An environmental change that may be prejudicial to his home causes a decrease cultural attraction, especially for groups that are closely related to their natural environment. Territorial management, concerned about the maintenance of ecosystem processes and functions can lead to a change of the role of settlements (land). The roles and specific human cultures interpenetrate creating distinctive places, however, this objective requires management to allow ecosystems to human needs and desires are more diverse than previously thought.

Therefore the services should be recognized spiritual, cultural and health services that forests and natural environment in general makes them human.

Results several ways in which people attach meaning sites:

- scenic/aesthetic;
- activity/objective;
- social/cultural;
- individual/expressive.

Meaning the first two is pretty well satisfied and the management (landscape), but last 2 meanings were little studied. Demonstrated that attachment to a link instead of the feeling of belonging to that place, namely the importance of the physical environment in maintaining self-identity. People get emotionally attached to natural environments and landscapes, which in this case a different meaning from that seen Ecology, which define the criteria biophysics. Understanding the values that people place award is important, because managers

can study and evaluate the values that people attach environment. Taking into account the territorial management actions can be more easily accepted in society.

Appointing a "home" to create some immediate implications, and the site is attached primarily a social significance. Second, the significance of a place that depends on what it means for the dominant group uses. Understanding the implications of this can help managers to identify social groups that will suffer as a result of changes induced by regional management. Opening a workshop interweaving in a town with an old tradition in this respect - Nucet, Dambovita County - besides the fact that an action has been successful for the organization is very beneficial for the local community, which does not have many alternatives for income, but also for the nearby forest, which fell on the local pressure.

In conclusion the objectives which they propose to ecosystem management should not ignore the public's choice but to find scientific arguments fundamental to satisfy. These solutions must be the result of democratic and institutional decisions explicit or implicit in the legislation, orders, decisions and budgetary provisions.

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EFFICIENT TRANSFER OF KNOWLEDGE IN AGRICULTURE THROUGH COOPERATIVE STRUCTURES

Gabriel Popescu¹, Florentina Constantin¹, Menda Teodora¹

Abstract

In broad, deep and dynamic process of knowledge transfer, the cooperative structures can have a decided role in improving the information as a factor of production in agriculture. The process of defining a cooperative structure, as the intermediate link between producers and consumers of information and taking in consideration the principles of economic liberalism requires going through several steps which well-define, in the implementation of projects with European funding philosophy, can become self-standing actions.

In this context, it is important to establish criteria through which are defined the target group, tools for promoting the new, and patterns for managing market relationships of agricultural markets.

Key words: knowledge transfer, cooperative structure, information, market, efficiency

The World of today is marked by a new planetary dimension, given being by the circulation and putting into value of the information, regardless the geographical area this is coming from. To have information and to use it in real time at its entire value has become today one of the criteria for assessing the development degree of one society.

The major advantage of the information is that it is not finite. It seems to regenerate itself. Information creates information. Out of knowledge it results more knowledge. Knowledge is a public good. Once it has been discovered, it is practically free for everybody (except for that protected by the Law). Sooner or later, everybody will take advantage from the new discoveries. Once they have

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been made public, the addenda of new users to that knowledge have a null marginal cost. Two key points are generating major costs in the information circulation: first, the transmission network for the new knowledge, and, second,, the process of educating the people for the use of the new knowledge and its application in the economic activity, as knowledge is best assimilated through its application and not through its memorizing.

On these grounds, of general order, having information as a central point, our study starts, which has in view the determination of the role of the agricultural cooperation in the accession and putting into value of the new information by the farmers, within the big and modern concept, personalized by what the knowledge transfer means. The operationalization of the knowledge transfer implies a series of structural elements: the approach of the philosophy the concept is based on, the operational structures which manage the process of knowledge transfer, the means by which the knowledge transfer is ensured.

Conceptually, the knowledge transfer represents a process which is responding to an increasing social need of putting into value the research results, by their quick integration, be it in practical applications or in the policies elaboration. In the European Commission vision the knowledge transfer resides in a series of activities which wish to collect and transmit the knowledge, the skills and competences from those generating them to those which will transform them into economic results. They include both commercial activities, and non commercial ones, as the collaboration in research, consultancy, the researchers' mobility and publications. The knowledge transfer is a more comprehensible concept than the technology transfer. It includes other transfer channels also, as are the mobility of the staff and the publications. The knowledge transfer is beneficial for all the stakeholders among whom we mention universities, the research centres and economic organizations. The efficient knowledge transfer is a key mechanism for the European Research Area and contributes to the increase of the research impact upon the European Union competitiveness.

Naturally, in a modern society and economy the knowledge transfer is followed by the knowledge exchange, the so called the know how exchange, which represents the process that facilitates, on one hand the population access to the academic expertise or to the services it needs, and on the other hand the inter university collaboration for the improvement of the academic services ensured to the business environment and to the community in its whole. The activities the knowledge exchange imply are comprising the establishing of connections among universities and between these and the business environment, the management of the theme data, organized by the specific of the activities in view, the dissemination of the information regarding the interest events, the development of partnerships with the local or professional organizations in view of increasing the

capacity of funds absorption. In essence, the transfer, respectively the knowledge exchange, is processes which contribute to the optimization of informational flow through the ensuring of its continuity. The social need, to which the knowledge transfer/exchange responds, reflects the economic particularities of information.

In the context of the present socio-economic structure, the main knowledge suppliers are the research institutes and the university centres. These academic actors are confronting themselves to a series of problems:

- the increase of the research sector attractiveness;
- the better exploiting of the research results;
- the access to financing;
- the orientation of the research efforts towards demand.

The solution to these problems depends on many factors, but the getting closer to the beneficiary by the release of information, on one hand, and on the other, by its education, represents a determinative element in their activity efficiency. As result, both the rural actors and the academic ones are motivated to initiate collaboration activities, cooperation, which should contribute to the research results transposing into successful economic activities. The ensuring of the access to information is made by an institutional structure, which could take very different forms, in function of the way its constituting was initiated, and taking into account the size and the characteristics of the rural space it serves to.

The European model most frequently encountered, especially in the UK is represented by the centres of rural development, constituted through the cooperation, collaboration between the research or academic institutions and the information beneficiaries, represented often by an agricultural cooperative structure. The centres of rural development are representing real “information nuclei”, where the incomes are represented by the research results, the information supplied by the rural actors, the political and legislative information of interest, the financing opportunities, and the outcomes are the responds to the farmers and rural enterprisers needs. In this nucleus there takes place the assembling of the consumption with the information supply, by the adjustment of both the components. For example, the supply is adapted by initiation of applied research, proposals of political or legislative measures, and the consumption, by processes of instruction, information, etc.

A major element that differentiates the rural knowledge centers is the philosophy their construction is based on. Thus, this can be a traditional approach, where the starting point is the information supplied by the research, integrated afterwards into governmental programmes, wishing their implementation (the top-down approach), or on the contrary, an innovative, pragmatic approach, initiated by

the rural actors or university centres, which have as a starting point the needs of the final beneficiaries, where there is wished not only the implementation of the governmental programs, but their improvement also, their adapting to the realities with which the rural space is confronted (bottom-up approach).

The final beneficiaries of the information transfer are the farmers, in Romania especially the small farmers. It would be nonsense to think that in a world where the changes are extremely quick, the actions of overtaking and putting into value of the new information could pertain exclusively to the producer farmers. The arguments, given being the environment these are manifesting themselves, are no needed. This is the role of the cooperative in the equation of information transfer, a socio economic structure, which by its status and organization can represent the farmer's interests in the chain of information transmission. The agricultural cooperative has a double role in the field of information transfer:

1. The ensuring of the access to information of the farmers;
2. The farmers' education, in their quality of consumers, for using the economic and natural potential of information.

In addition, the cooperative should respond also to the needs and rigours of information ordering. Through ordering, the information does not amplify itself, but it puts into a maximum value the economic advantages of its logical algorithm (Georgescu Roegen, 1996). In fact this is determinative also, from point of view of the role and importance of the cooperative in the equation of information transfer, the biggest effort in the transfer chain being generated by the information consumers and none the way the suppliers of it. Obviously, the agricultural farmer is the main information consumer in the rural environment. The agricultural cooperative has to be a portal to a series of incentives for the development of the entrepreneurship action- information, consultancy, funds accession, instruction. In addition it has to help the rural entrepreneurs be more innovative through the showing of the new opportunities and through their training and assistance in their valorification. The agricultural cooperative must facilitate the group work and collaboration, including through the support of newly developed companies into collaboration and favour the development of the partnership culture.

Conceptually, the cooperative is forming an "information nucleus", where the incomes are represented by the information supplied by the rural farmers and enterprisers,, the researches results, interest legislative and political information, the financing opportunities, and the outcomes are the responds to the local actors. In the "information nucleus" there takes place the assembling of the needs with the information supply, including through applied research and answers formulation. The information flow is enclosing, being thus created the premises for a continuous improvement. In order to fulfil its role of the knowledge intermediary, it is wished

that the cooperative units involved, should ensure free services or strongly subsidized.. This way they avoid the competition with the consulting firms and they ensure a large access. As regards the capacity for support, the funds, necessary for the activity development can be obtained on project basis from the development regional agencies, from the European funds, etc.

At world level there were developed many initiatives following to ensure the access to information and the preparation of the information consumption in the rural space. They were based on different approaches, have managed spaces of different sizes and accessed various financing programs. Many of such initiatives were replicated for the stimulation of the rural regions in Africa, South America, and South East Asia. Although the names differ rather much – centre, portal, initiative, network, the intermediary of the knowledge transfer could assimilate to an information centre or node. Remarkable results in the knowledge transfer were obtained in Great Britain, Germany, France and The Netherlands. In Great Britain, the most efficient system was that based on the bottom up approach. At local level, either the farmers or the enterprisers, or the University Centres have initiated cooperation actions meant to ensure the knowledge transfer in the rural space. These initiatives have contributed to the development of over 10.000 rural businesses through the facilitation of the training of their members into instruction, planning and business administration programmes, in actions of collaboration and innovation and entrepreneurship action. There was this way formed a way of connection, within some cooperation networks between the final users and the governmental agencies. In ensemble, the initiatives were a success, and their role becomes more and more important for the implementation of the change and the valorification of the opportunities brought by it.

The rural initiatives for the knowledge transfer are functioning on the basis of some financing obtained through projects from national funds administered by the regional development agency and from European funds: The European Social Fund, The European Agricultural Fund for Rural Development (EAFRD), the Objective 2 Programme. A representative example, and a successful one, in the field of research networks and agricultural extension, with multiple partnership, but where predominant are the producers cooperatives are Business Link and National Rural, in Great Britain.

From spatial point of view, the two networks were projected at regional; and sub regional level, each having in administration 5-7 administrative units and 1.000 – 4.000 of local businesses, which are mostly to be found in the farmers' cooperatives. The management group of one initiative is made up of 10-15 members, representing governmental agencies, faculties, ministries, professional associations, producer groups and agricultural cooperatives. In each centre there operate 5-7 extension officers, respectively one for each administrative unit

subordinate to the region. The premises of the success could be identified in the characteristics of these initiatives, among which are:

- the adoption bottom-up approach;
- the collaboration with many organizations on non competitive basis for the organization of events and activities of dissemination, so that the limited financial resources be efficiently used;
- the assistance ensuring for all types of rural businesses;
- the professional accrediting of the extension officers for the quality of counsellor and mentor of the rural business;
- the use of incentives to encourage self determination in the group work of the farmers and rural enterprisers;
- the sustaining of diversified theme groups, which are representing the rural businesses;
- the organization of information events;
- the reduction of the effort duplication among the rural; organizations, by their involving in the management group;
- the attraction of the reticent or isolated farmers;
- the ensuring of adjustable instruction and assistance;
- the attraction and support for the businesses with big value added and with high growth rate;
- the help given to the young farmers-enterprisers.

Each initiative is supplying different services, adapted to the local; requirements, but all are practice oriented, they promote mutual help and self determination. The way of action, the staff particularities, the means of communication used led to the winning of confidence on behalf of the enterprisers the mentors of which they are. The needs specific for the knowledge based society are manifested in the rural space also, because, mainly this is in front of an ample transformation process. The survival of the rural businesses is conditioned by the diversification of the activities as answer to competition increase and to the requirements of the sustainable development as regards agriculture role. The rural entrepreneurship action is the means by which the structural change of the rural space will happen. The development of this action is an intensive process under information report, and in addition, it has to take place in a space, which is structurally disadvantaged from point of view of the access to information.

In Romania's agriculture, the agricultural cooperative, in European meaning, is still in an incipient development stage. For example, at the end of the year 2006, there were no more than 108 agricultural cooperatives, an insignificant number, if

we refer to the branch potential, but especially to the performing opportunities, which these organizations are offering, mainly to the peasant households. To this big minus, of quantitative order there are added the qualitative aspects also, which are mainly of profile genre, because in our country, the orientations of agrarian policy are totally different from the European ones, as they push these economic structures towards the land areas farming, and none the less towards market activities or knowledge transfer with address to the agriculture in the peasant households. That is why, the role of cooperation in the knowledge transfer within Romanian agriculture is, at least in the present a theory order issue, but not yet a practical one.

We could support such a formula, which could help the development process in the branch, only for the future strategies. But, for this action to be also viable we need a positive perception on behalf of the public dissidents, and only after that, a real instruction of the information beneficiaries. In the end, we hope that our approach, founded greatly on theoretical grounds, lead to that wing beat, which in the chaos theory is known as "the effect of the butterfly", according to which, out of the chaotic and uncontrolled movement of the wings of a butterfly, should emerge the essential changes in the Romanian agriculture. This is, it seems, the only way, as the failure of the actions of the new development strategies is so obvious.

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AGRICULTURAL SYSTEMS – ROLE AND IMPORTANCE IN THE ENVIRONMENT PROTECTION AND SUSTAINABLE RURAL DEVELOPMENT IN BANAT, ROMANIA

Florin Sala¹, Alin Dobrei¹

Abstract

Researches were conducted in the Western area of the country, in the Banat Plain and concerned the sustainability of agricultural systems as production systems and means of sustainable rural development. Categories of use of the agricultural land in the county of Timis have suffered changes in the studied period with different amplitude from one category of use to another, also finding uncultivated and temporarily abandoned land. There were recorded changes in the structure of crop plants with implications on crop rotation and agricultural environment. In the studied viticulture systems we observed a high diversity of biological material but technologies show some malfunctions. During this period, the technical park has undergone an improvement both in number and quality even if an optimal level of endowment hasn't been reached yet. Through some indicators the increasing of performance and productivity of the agricultural systems are observed, but much too slow to ensure prosperity to farmers.

Key words: agricultural systems, environment protection, productivity of agricultural systems, rural development

Introduction

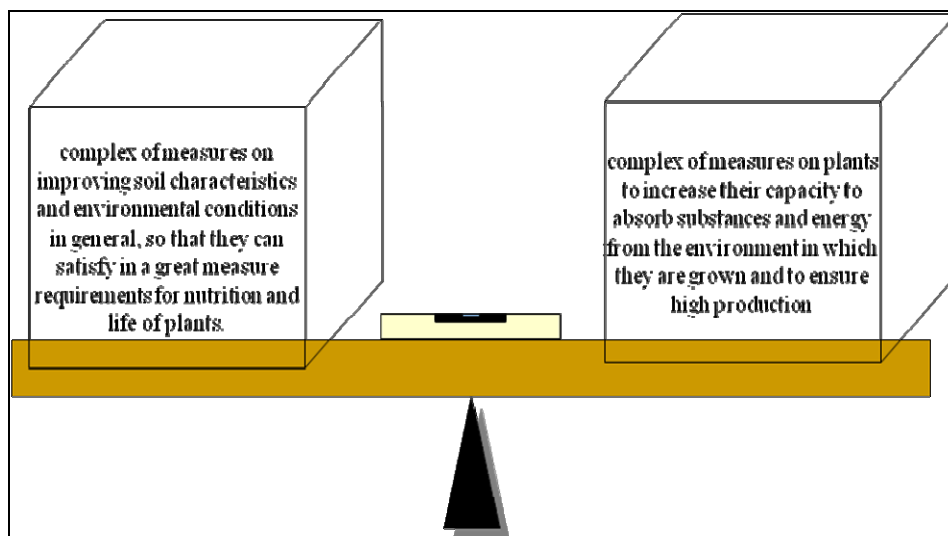
Sustainable development gives a special attention to managing the territory - considered as a whole environmental complex system – and to optimizing processes of agricultural production, starting from an evaluation of their compliance [6].

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In the concept of sustainable development of the territory, a key element is to adopt a general development strategy that integrates and correlates the ecologic, economic and social issues as major elements of the agricultural systems and rural environment, in temporal sequences of short, medium and long duration [6].

In this context, agricultural production systems can contribute to sustainable development of rural settlements [3, 5]. In the vegetal agricultural systems, as a set of ecologic, economic and social elements, man acts in two directions in order to increase system performances, (Figure 1). It is necessary and very important that these measures should be taken differently in relation to the pedo-climatic conditions and agro-biological particularities of cultivars and cultivated varieties, but also unitary, in order to the agro-phyto-technical treatments to complete their effectiveness and to determine the increasing of the quantity and quality of the production, to maintain or increase soil fertility, to increase exploitations' efficiency and preserving natural balances [2, 3, 6].

Figure 1 The set of measures undertaken by man to harmonize the process of agricultural production.



On the general background of economic changes in the country, agriculture has registered changes concerning the fertilization, technological and capitalizing the agricultural production level, facts that led to different types and performances of the agricultural systems [1, 4, 5].

Material and method

The analysis of agricultural systems is a complex activity consisting in dividing the analyzed system in subsystems and its component elements for the purpose of quantitative and qualitative examining and in order to establish the intra- and intersystem relations, including the ones with the external (surrounding) environment in order to identify the system's malfunctions and optimize its functionality. For this scientific paper, the analysis was based on statistical data concerning the categories of use of agricultural land, the structure of crop plants, the technical equipment and the average yields obtained at the main cultures in the West region of Romania, making a post factum analysis on vegetal agricultural systems [5].

Results obtained

The way of using the agricultural land has registered changes of different amplitude from one category of use to another, in terms of a change of the land's property form, (Table 1, Figure 2). Out of all categories of use, the situation of uncultivated, temporarily abandoned lands was also met. Under the circumstances of a transition situation of Romanian agriculture, with all the effects that resulted from this fact, the structure of crop plants experienced more extensive changes.

Table 1 Structure of the lands per use categories

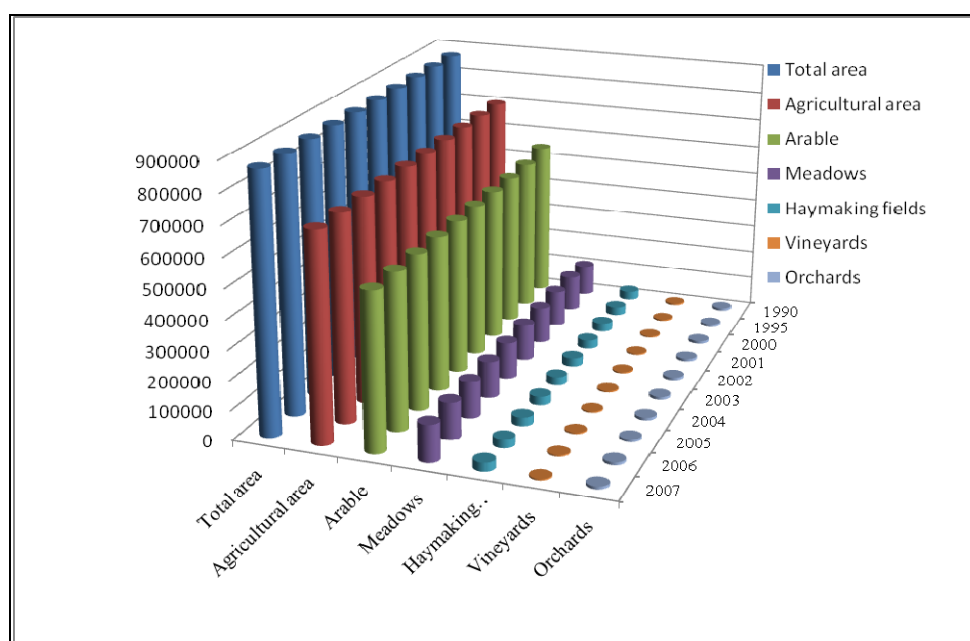
Year \ Use category	Total area	Agricultural area	Of which:				
			Arable	Meadows	Haymaking fields	Vineyards	Orchards
1990.	869,665	702,424	549,866	108,002	29,511	5,757	9,288
1995.	869,665	702,369	534,789	124,008	29,244	4,987	9,341
2000.	869,665	702,326	533,018	126,149	29,505	4,313	9,341
2001.	869,665	702,262	532,954	126,150	29,503	4,314	9,341
2002.	869,665	702,168	532,858	126,152	29,503	4,314	9,341
2003.	869,665	702,066	533,124	125,875	29,503	4,313	9,251
2004.	869,665	701,640	532,869	125,720	29,499	4,310	9,242
2005.	869,665	701,225	532,206	125,626	29,498	4,354	9,241
2006.	869,665	701,031	532,211	125,692	29,524	4,363	9,241
2007.	869,665	701,256	532,218	125,714	29,517	4,566	9,241

Source: DGGA Timis, timis.insse.ro [7, 8]

Leguminous plants (annual or perennial) were removed from culture or they have occupied in some exploitation reduced areas in the absence of a well represented animal breeding sector, or some deficits in the agro-alimentary chain, where the capitalization of efficient production would have been possible.

The predominant plants in culture remained wheat and maize followed by sunflower and completed on restrained areas – ranging from one year to another – with barley, two-row barley, sugar beet, potato, vegetable of minor importance in the achievement of sustainable crop rotations (Table 2, Figure 3).

Figure 2 Graphic representation of the land fund structure in the county of Timis

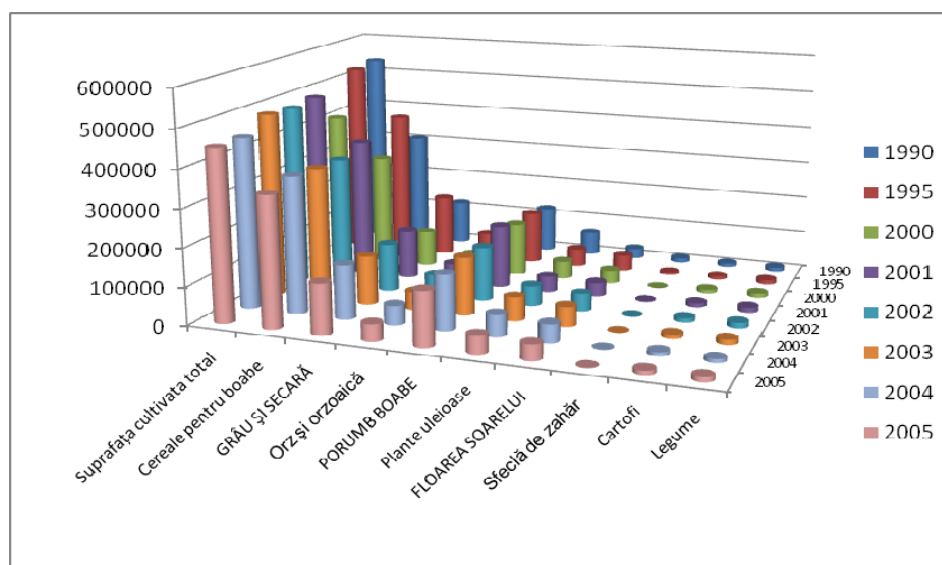


The predominance of wheat and maize cultures resulted in crop rotation with simple wheat-maize rotations, sometimes even monoculture leading to a number of imbalances in the agricultural systems. As a result of the reduced share of annual and perennial leguminous cultures, in many agricultural systems, plant structure is simplified resulting in crop rotations with simple rotations wheat-maize or monoculture.

Table 2 The structure of specific agricultural systems in Timis County during 1990-2005.

Culture Year/period	Cultivate d area total	Grain cereals	from which:			oleagin ous plant	from which:	sugar beet	potato	Vegeta ble
			wheat and rye	barley and two- row barley	maize		sun- flower			
1990.	535690	307622	119276	55060	123336	63197	26954	11342	9359	10787
1995.	526204	394614	164416	68459	140310	47188	42406	6824	8828	11464
2000.	407537	298160	95214	42411	141300	47377	35099	739	9162	12990
2001.	487476	370339	131691	50131	168415	41901	37909	1164	10728	13724
2002.	479494	347844	126965	56642	143954	53543	46142	1506	11424	14517
2003.	485829	352760	130341	48218	153342	62677	51958	690	11120	13993
2004.	449561	360697	143161	50782	145824	57340	48646	365	10295	9762
2005.	450720	343855	133221	45085	143955	47016	41537	1098	10853	12359

Figure 3 Graphical representation of the crops structure in Timis County during 1990-2005.



By unilateral consumption of the nutrients, soil fertility and nutrient balance are disturbed; supporting the agricultural production is only possible by using fertilizers that due to the lack of breeding sector and organic fertilizers are frequently mineral. In many cases fertilization mainly based on nitrogen fertilizer affected the quality of soil resources by secondary acidification, reduction of organic matter content, changes in soil chemistry and nutrient balance and small quantities of fertilizer led to low yields in many agricultural exploitations.

Concerning the viticulture systems, Romania is one of the major European viticulture countries, with potential and tradition of grapevine cultivation. The evolution of viticulture systems in Romania must be observed and analyzed in the context of socio-economic situation and current policy. Consequently to discussions with E.U., Romania's viticulture potential comprises several categories, presented in Table 3.

Table 3 Viticulture area of Romania

Viticulture area recorded in the registry	189.338,0 ha
Viticulture area occupied by parcels <100 sm	8.648,9 ha
Replanting rights (HPD replacement set in negotiations)	30.000,0 ha
Additional planting rights (granted in negotiations)	2.830,5 ha
National reserve (area cleared in the past 5 years)	9.182,6 ha
TOTAL	240.000,0 ha

The main viticulture centers from this area are: Recas wine-growing center, Silagiu wine-growing center, Teremia wine-growing center, Tirol wine-growing center, Minis wine-growing center. After the data provided by www.timis.insse.ro the western region of Romania includes the following viticulture areas (Table 4).

The grapevine culture is economically efficient through application of advanced technology but depends very much on how the ecological resources of the area of culture satisfy the biological requirements of the cultivated biotypes. There are well organized exploitations, on large areas with a good varietal assortment and proper culture technologies, while at the same time there are usually small and medium sized exploitations with insufficient funds, which own vineyards with different degrees of biological degradation, with inappropriate varietal assortment and a minimal culture technology.

Table 4 The area with fruit bearing grapevines in 2007 (in ha)

Region/ County	Fruit bearing grapevines-total		Grafted and indigenous grapevines		Hybrid grapevines	
	Total	Of which: private property in majority	Total	Of which: private property in majority	Total	Of which: private property in majority
Arad	2524	2524	2104	2104	420	420
Caraş-Severin	554	554	350	350	204	204
Hunedoara	11	5	6	-	5	5
Timiș	2644	2644	2249	2249	395	395
Total West Region	5733	5727	4709	4703	1024	1024

In Table 5 it is presented a synthesized comparative study of some technological elements applied in grapevine exploitations with outstanding economic results and also in less profitable exploitations.

Table 5 Comparative analysis of some technological elements applied in various viticulture exploitations

Technology element	Exploitations with outstanding economic results	Less profitable exploitations
Cultivars and biotypes	ameliorated, autochthones, universal, zoned	direct producing hybrids, old local cultivars
Soil work	complex systems of soil maintenance	1-2 weeding
Pruning	Rational, depending on the cultivar, vigor, applied at the appropriate time	Variable, with uncorrelated loads over or under dimensioned
Phyto-sanitary treatments	Preventive, after a complex scheme, correlated with the climatic conditions	1-2 random treatments, usually with cheaper phyto-sanitary products

The main elements that determine the effectiveness of the grapevine culture are the biological material, technology of culture, obtained yields, production quality, wine making technology, production marketing. In the studied areas of culture these elements are uneven in terms of observed exploitation, so that in Table 6 are shown the obtained average results with the specification that in each

investigated area there are different viticulture exploitations as degree of efficiency.

But the geographical distribution of the arable land and tractors is uneven, which generates large limits of expression of the load. Analyzing data from several countries it can be observed that the lowest load is in Japan of 3,63 ha/tractor, Switzerland 3,45 ha/tractor, Austria 4,11 ha/tractor, Netherlands 4,63 ha/tractor, Italy 6,19 ha/tractor (these reports resulting in many cases by association with reduced agricultural-arable land).

Table 6 Comparative presentation of some elements
in the studied viticulture systems

Analyzed element	Investigated area				
	Buzias- Silagiu	Recas	Minis- Măderat	Teremia	Tirol
Biological material					
Ameliorated cultivars	75%	90%	70%	60%	70%
Direct producing hybrids	10%	4%	5%	20%	5%
Local populations	15%	6%	25%	20%	25%
Technology					
Pruning	Well executed	Very well executed	Well executed	Satisfactory	Well executed
Fertilizing	Insufficient	Balanced	Moderate	None	Insufficient
Phyto-sanitary treatments	Insufficient and satisfactory	Sufficient and well executed	Insufficient and satisfactory	Insufficient and inadequate	Insufficient and satisfactory
Production	Low, medium quality	High, qualitative	Low, medium quality	Low, low quality	Low, medium quality
Wine-making technology	Unsati- sfactory	very good	Satisfactory	home-made type	Unsati- sfactory
Production marketing	Inadequate	Very good	Satisfactory	Inexistent	Unsati- sfactory

Conversely there are countries with large load on tractor, such as Hungary 112,75 ha/tractor, countries of former USSR with 86,97 ha/tractor, Romania with 70,98 ha/tractor, European average having 11,98 ha/tractor. Analyzing and

comparing data from Timiș county concerning this indicator, it shows an average load of 52,26 ha/tractor in 2005 compared to 74,73 ha/tractor in 1990.

Conclusions and recommendations

After the study and analysis of some indicators of Timiș County agriculture, it results a number of changes, with different amplitudes and trends in the functioning of agricultural systems that are specific to this region. Favorable changes, although slow are observed in modernizing the tractors and agricultural machines park, average load reaching approx. 52ha/tractor similar to the average European level, but a lot behind the developed countries.

The structure of cultures shows an accentuated simplification, maize and wheat cultures being predominant in crop rotations, which led to the reduction of biodiversity, the modification of the tropic chains, simple rotations and similar specific inputs for the agricultural production with nutritional disorders, unilateral fertilization with mineral fertilizers, changing soil fertility, etc.

In what concerns the viticulture systems we believe that it is necessary to maintain all autochthons cultivars in the assortment and even to discover or rediscover other local cultivars in order to create the diversity and variability that we need to enter, in terms of the best cultural and wine-making technology, in the world market of wine. We consider necessary the development of appropriate technologies to maximize and improve the local biologic potential.

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SIGNIFICANCE IN INNOVATION AND KNOWLEDGE APPLIANCE IN SYSTEM OF ORGANIC AGRICULTURE IN SERBIA¹

Svetlana Roljević², Radojica Sarić², Boris Kuzman²

Abstract

Organic production is a specific system of food production determined by a set of very strict standards which protect natural resources and cultural identity. It requires greater effort on the side of producers in the implementation of the innovations. It also contributes to opening of new areas for scientific research, so special attention in this paper was given to application of bio-pesticides in organic production, as one of new and, in environment sense, harmless form of crop protection. The use of biological pesticides increases the size of organic production, but contributes to better quality and look of organic products, too, making them more attractive for consumers. In a way that management in organic agriculture confronts decision-making, based on ambiguity which comes primarily from natural surrounding, there was pointed out also on significance in using information technologies, in order to manage the production in more easily way. The aim of this paper is to point out to a need and importance of correlation between the science, technology and producer in our country in unique entirety, because only then the science and technology could be useful and the organic production – efficient.

Key words: Organic production, bio-pesticides, information systems, knowledge, innovations.

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Introduction

The application of knowledge is inevitable in all aspects of human life, first of all, in food production, which represents man's existential base. In 90's of XX Century, marks the first contour lines of organic agricultural production, together with inflow of ecological sciences in conventional agriculture system. This food production form has been based on increased consciousness on preservation of environment quality and ecological model of crop protection, which had encircled tradition, innovation and science. In all high developed countries, the organic production expands, while the government plays important role in supporting it by better cooperation between scientific institutions and producers. Namely, modern model of food market is quality-oriented, not quantity, because choosy consumers, especially in high developed countries, require permanent and increasingly better quality of food. Therefore is necessary constant education and improvement of our organic producers regarding advantages in applying innovative methods in production and suitable food quality standards, in order to fight elemental force of competitive products, both from organic and conventional agriculture.

1. Definition, function and importance of organic agriculture

Organic agriculture is defined as the unique production system, based on exploitation and improvement of its own resources and preservation of the nature balance, which part it is as well. According the „Organic Trade Association“ organic agriculture is a complete system of production management which promotes and stimulates healthy agro-systems, biodiversity, biological cycles, biological ground activity, to sum up, organic agriculture and organic production, understand the use of methods and means which are in conformity with nature and which do not disturb it in no case.

The role of organic agriculture, disregarding if it is the matter of production, processing, distribution or consuming of food, is to support and to create strengthen the ecosystem health and creation of balance between market demand and preservation of life environment. Organic agriculture is led by the traditional way of production, however, application of new scientific knowledge elevates it to much higher level since it must be based on modern comprehension of ecology, with the use of adequate technical solutions and mechanization.

General principles in organic production are based on use of the means and in discovering the way which leads to the ecological balance of natural systems. This system of food production understands the maximum use of regenerative energy sources, maintenance of agro and ecosystem genetic diversities and protection of living environment, reduction of all kinds of pollution which can be

the result of agricultural production, in order to create the conditions for covering the basic life needs for agricultural producers, for acquiring suitable income and satisfaction of their own work.

The food produced by principles of organic agriculture is safe from any artificially synthesized ingredients. Beside that it enables nutrition with products of richer nutritive value from those of conventional production.

Organic agriculture is important for the state and social community, specially the rural one, form several reasons:

- Stimulates healthy food consumption within the region;
- Reduces the production and transport costs;
- Realizes the base for development of eco-tourism, for it is possible to create, within the national and natural parks only organic agricultural production;
- Maintain the diversity of living creatures; but also
- Social and cultural heritage of the rural areas (Šiljković, 2002).

2. Application of bio-pesticides and information systems as innovative methods in organic system of food production in Serbia

Application of new knowledge and technology in organic agriculture is justified under the condition that leads to the increasing of products quality together with protection and regeneration of natural resources in the same time. One of the methods for work productivity increase in organic agriculture, production volume and quality of product is introduction of information systems, which use in, so called, „precise agriculture“. However, using GPS (Global Positioning System) and GIS (Global Positioning System) alleviate production management, while those systems contain data on soil, climate, grown plant, previously grown plants and all other parameters significant for product's quality and quantity, as well as for preservation of natural resources (Gavrić, Sekulić, 2004). Use of this technology alleviates proper selection of plant cultures which can be grown by organic production system in some region, determines place of the plant in crop rotation, accurately doses a quantity of fertilizers and protective substances, but also decreases dependence on additional labour and costs. However, introduction of new discoveries in the field of agriculture into efficient *on-line* supporting systems is a matter of utmost importance for potential use and benefit from information technologies.

Harmful consequences of chemical pesticides use aimed the man to turn to natural bio-active potentials in the battle against harmful insects. Biological

control, as a discipline, had significant rise in XIX Century and kept rising, as regarding its achievements, as well as its importance for agricultural production. The significance of natural enemies, as components of efficient management of agro-ecosystem, has been more and more understood. The joint name for all bio-active potentials is „*bio pesticides*“. Bio-pesticides are bio-synthetic, bio-active materials used for elimination of harmful organisms and within which three categories can be recognized:

1. Living organisms (invertebrates and microorganisms);
2. Bio-chemical pesticides (insect hormones and pheromones, plants and microorganisms extracts);
3. Protective materials incorporated into the plant (GMO).

Advantages in using bio-pesticides are: they are less toxic than conventional pesticides, have specific affect on the target group of harmful organisms. They are effective in small quantity, have faster wrecking, do not pollute the living environment and less data and time is needed for their registration (up to one year).

Disadvantages of bio-pesticides: short time of preservation, noncompetitive economy comparing to conventional pesticides, inadequate formulation, narrow spectrum and slower affection and the higher knowledge of those who deal with them is necessary so the permanent education of agricultural workers is indispensable.

By application of such preparations in the system of organic agriculture the basic assignment is fulfilled and this is the protection of living environment, eco-system balance, respectively preservation of biodiversity. It is important to mention that those preparations can be used also in conventional system of agricultural production, aiming at decrease of chemical pesticides use, and therefore quality increase of got products. Their usage in green houses and plastic tunnels (polythene green houses) represents the significant advantage for organic production, for in controlled conditions some of the problems that follow those preparations in the field, such as negative conditions of living environment that reduce the efficiency of biological preparations, do not exist. In protection of crops from harmful insects most frequently are used the insects kinds (Copping LG, 1998) out of which the most frequent are:

1. Predator bedbug (*Orius minutus*) which is applied indoors for wiping out trips, red fruit mites (*Panonychus ulmi*) and leaf louses;
2. Ladybirds (fam. *Coccinellidae*) are let on crops outdoors and are successfully used for wiping out colonies of leaf louses;

3. *Encarsia Formosa* - parasite of the butterfly white louse (*Trialeurodes vaporariorum*) and for the time being is successfully used for protection of crops indoors.

Predator species of mites used for commercial purpose are used indoors where they reduce the number of harmful mites, most frequently the common cob-web mite (*Tetranychus urticae*). The highest success in crops protection, for now, is achieved with preparations based on bacteria *Bacillus thuringiensis*³ (Copping LG, 1998) with subgroups:

1. *B.t. kurstaki* - with activity against butterfly larva;
2. *B.t. izraelensis* - with activity against butterfly, mosquito and fly larva;
3. *B.t. aizawai* - with activity against butterfly larva;
4. *B.t. tenebrionis* - with activity against butterfly larva, coleoptera larva and imagoes and above all potato beetles.

Different kinds of virus and fungus have their role in biological control. The virus species of the family Baculoviridae offer most promises due to their specificity for the host. New species of fungus are registered in Europe and USA that control phyto-pathogen fungus species. One of them is *Apmelamyces quisqualis*, (isolate 10), produced for control fruit, vegetable and above all vine rust disease (*Uncinula necator*). Micro insecticides are slow in action, several to 48 hours are needed to create the infection, the higher humidity is needed for spore-creation and demand more frequent application.

Pheromones are unstable and evaporable substances that are formed in the insect body and are used for communication on great distances. They are very specific within one species. These compounds have different functions and influences and are named according the shown reaction (sexual, alarm and aggregation). Its alarm pheromone the common cob-web mite (*Tetranychus urticae*) emits in natural conditions when the population is threatened or is attacked by predators. With application of synthetically produced pheromone, analogous with the natural one of this mite, they are disturbed, increase their activity and in the same time they are more exposed to the impact of applied acaricides. Beside that these disturbed mites take less food than the undisturbed ones.

Each of mentioned kinds of living organisms formulate on specific way and with more or less success represents to the market. For needs of conventional agriculture advises also mixing with some sorts of chemical preparations for their

³According to the different percents Bt preparations represent 80 - 95% microbial pesticide and 80 - 90% biological preparations at the world market

better efficiency, however, as the use of chemical pesticides in organic agriculture has been forbidden, the bio-pesticides apply independently. For their utilization is necessary to have more knowledge and readiness of producers to study permanently and to receive advanced training, so in developed countries, where is no lack of science and practice correlation, the application of bio-pesticides realizes along with control of scientific institutions, while the producers ready to protect their crops by those preparations, educate adequately.

3. The significance of effectuate application and expand of scientific discoveries and technological innovations in Serbian organic production

In Serbia is noticeable increase of demand for food, which is marked by organic trademark. It is characterized by quantitative increase of exported quantities and increase of number of countries interested for our organic products. Nevertheless, on production aspect, there are various problems and limitations, such as:

- 1) Insufficient knowledge and information on methods and certification of organic production (missing the science and practice correlation),
- 2) Un readiness of agricultural producer for excepting innovations and lack of entrepreneur's spirit, marketing orientation absence of agricultural producers (insufficient activities on brand development, finding foreign markets, missing more significant and mutual participations on international fairs),
- 3) Insufficient financial power of agricultural producer for new investments (expensive certificate for organic production, as well as insufficient investing possibilities for organization of production on larger surfaces).

What hinders development and expansion of organic production here is, before all, weak cooperation of scientific institutions with producers and therefore weak informing as producer, as well as consumer, and also low social and political conscience about significance of organic agriculture for nation's life and health, like as economic advantages of this agriculture aspect. Than follows that education and adopting new knowledge are crucial factor of organic agriculture effectuation in these regions, so, by making appropriate infrastructure, the organic production would draw merited attention.

One of the weak points of organic production in our country is quality, while misses use of means for protection from various pests, so realized yields are very low. The practice is to remove all undesirable organisms from crops, mechanically, by engaging the labour, in order to protect grown plants and insure yield. In such circumstances, with support of scientific institutions and educative offices, the bio-pesticides have a chance to present, as better as possible, to agricultural producers,

as new and easier method of crops protection. However, one of possible obstacles during application of biological preparations in organic agricultural production is additionally increase of initial costs. Major biological preparations on the market are more expensive than chemical preparations, which use in conventional agriculture, but observing long-term, those preparations are profitable, because they protect plants from diseases, pests and weed, providing therefore planned production size. Besides, their use would avoid engagement of additional labour, necessary for removing weeds and pests from the crops. Here follows that the production would be more efficient, the fruits (yields) would be without damages, nice coloured and symmetrically shaped, and therefore more attractive to buyers. Except for that, carried on stored yield, it could prevent their decay, i.e. effect on quality.

The biological pesticides apply in our country, but only at minor producers of organic food, before all, the preparations based on bacterial type *Bacillus thuringiensis*. The products based on these methods are relatively new and unknown and for their commercialization is necessary to prepare the market carefully, as well as consumers' education on characteristics, advantages and deficiencies of the bio-pesticides (Filajdić et al, 2003). The experts' guarantee, that use of these preparations would be profitable through yield increase and better quality of product, would certainly stimulate the interest of organic producers for their application.

Besides a need for expanding knowledge and education of organic producers about new methods of crop protection, there is necessary to spread consciousness on advantages in using information technologies, poorly present in this region. The producers confront with decision-making based on ambiguity, which originates from three main reasons: ambiguity due to lack of data on current nature condition; the ambiguity due to incomplete knowledge on biological and physical systems and the ambiguity for extraordinary accidental (random) processes, so the information technologies provide possibility of more precise decision-making about specific operations in productive process.

Conclusion

Beside the fact that it protects and saves natural resources the organic agriculture contributes to introduction of innovations in agricultural production which are based on the systems of natural balance. One of the basic problems, which block development of organic agriculture in the Republic of Serbia, is non-existence of strong relations between the science and practice. We already have fertile ground areas, numerous personnel highly educated and experienced, high quality hybrid maize, wheat and other agriculture plants and numerous ecological

associations which hamper the spreading of bio-technological products and genetically changed food but it is of utmost necessity that all this knowledge and experience be transferred to interested producers willing to produce in conformity with nature. From all quoted facts on insufficient informing of organic producers in Serbia about new techniques of crop protection and technologies, which alleviate decision-making on necessary operations in productive process, it is clear that the support of science and technology to producers is inevitable. In order to point out to necessity of cooperation between the science, technology and producers, it is inevitable to say that introduction of scientific discoveries in the field of agriculture in efficient *on-line* supporting systems, is of crucial importance for potential use and benefit of information technologies.

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AGRICULTURAL ECONOMICS DIVERSIFICATION AND ALTERNATIVE EMPLOYMENT IN RURAL REGIONS OF RUSSIA

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Abstract

In the article the problems of rural population alternative employment and the problems of agricultural economics diversification are studied. The author suggests the development of country tourism as the solution to the problem of agricultural economics diversification in the regions.

Key words: diversification, rural tourism, employment, rural farms income sources;

Introduction

Rural economy is characterized by historically created low diversification degree. Small entrepreneurship and cooperation growth rates indicators are insufficient. The switchover from mono functional pattern of rural economics development to diversified economy based on the creation of maximum possible set of various farm forms and activities is urgent.

Investigation of rural economics' structure shows that its diversification is mainly connected with the development of small business in nonagricultural spheres, especially in agro- and ecological tourism, minor industrial businesses and crafts, social, transport and market infrastructure.

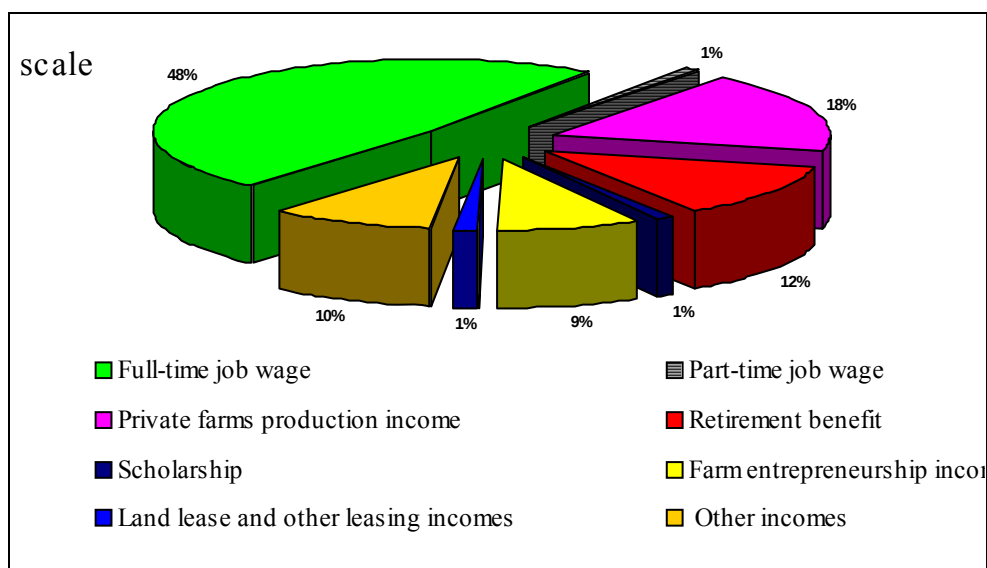
Rural farms alternative employment investigation

With the aim of evaluation of rural population readiness to master other, non-agrarian activities, and search for the major problems restraining the

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development of alternative rural economics we have conducted sociological poll where the respondents were the members of rural farms of nine municipal settlements in eight districts of Saratov region. It proved that incomes from farming and other entrepreneur activities make at present less than 10% in the income structure of investigated farms (Chart 1).

Chart 1 Income structure of farms in Saratov region



It follows from the chart that the income structure is poorly diversified; the main income source is still wage which remains extremely low in comparison with other economic spheres. In 2008 it was 43,1 % from the level of employed in construction sphere, 34,9 % from the wage of employees involved in transportation sphere, 51,9 % from the average wage level in the region.

Two groups of factors influence the degree of rural population alternative employment – demand and need factors. Demand factors form diversified rural economics and describe the situation when full of advantages possibility to be employed in non-agricultural sector for rural inhabitants occurs. Need factors reflect agricultural activities' insufficient profitability, forcing people to look for any additional and, as a rule, also low paid source of income in the non-agricultural sector (gathering and retail of mushrooms and berries, "shuttle" trade, building garages and baths(the so called "banya" in Russian) for the inhabitants of megapolises,

fishing, small services to the neighbors -sewing, knitting, repairing boots, shoes, technical equipment, home appliance and other part time jobs).

We are interested in determining of alternative employment: is it a form of family survival in the region or a reflection of the rural economics diversification tendency. The investigation made it clear for us that alternative employment more often develops under the conditions of need factors influence. But certain institutionalization of non-agricultural activities also takes place. Entrepreneurship is characteristic of rural families possessing economic and educational potential for further development. The possibility to get incomes from non-agricultural activities increases in accordance with:

- presence of unemployed members of family farms;
- availability of farming equipment (possibility to perform services for the neighboring farmers);
- farther distance of the settlement from the district centre,
- availability of places of sightseeing in municipal community;
- lesser economic degree of development of the given district.

The pool showed that only one tenth of the respondents would like to have their own business, would be ready to organize their own farm enterprise and make independent decisions in case of losing the main full-time job. As for the major causes preventing from organizing their own business the respondents name the habit of working together in a group (collectively), unwillingness to change the mode of life, as well as small land parcels, the lack of capital to start up, the lack of access to credit resources, the fear of risk failure, the lack of knowledge, health and assistants. Thus, barriers against the development of entrepreneurship are of both economic and social character.

Suggestions on stimulating rural economy diversification

The state possesses various methods of doing away with the development barriers. Rural economics diversification stimulation may be done through beneficial crediting and taxation, increasing the access of rural population to information and consultation resources, educational services, especially in the areas with unfavorable for farming natural-climatic conditions and the regions of intensive agro holding structures development, promoting agricultural industrialization and reduction of agrarian sector employment. This set of measures should be differentiated in accordance with the distance of settlements from administrative-cultural centers and infrastructural conditions.

There is also need in simplified registration forms of small business in rural area. It goes without saying that possible tax losses from small businesses rise can't be compared with much greater state-scale losses from such business if not being organized.

One of the conditions of rural economics' diversification problem solution and innovative production development must be more efficient use of the tool of targeted programs on the development of enterprises in rural area processing agricultural production, forestry, wood processing, fishery and fish processing, production of building stuffs from local raw material, gathering and processing of wild growing plants, recreational activities and tourism, developing various handicrafts and folk trades.

Rural tourism remains an important untouched resource of diversification of rural economics in Russia on the whole and particularly in Saratov region. Prerequisites for the development of rural tourism are:

- unique natural conditions of Russia, more suitable for tourism than those of the neighboring tourism-oriented countries;
- cultural potential of rural settlements, national colorful customs and traditions of rural inhabitants;
- urban population necessity to change their lifestyle and surroundings during vacation, their wish to get closer to the original world of nature;
- relatively low prices for the rest in the countryside;
- opportunity to use in their food ratio ecologically clean products, gather forest berries, mushrooms, plants used in medicine.
- Among the basic forms of rural tourism we may define:
 - lease of the rooms and cottages in rural areas in ecologically successful natural regions;
 - organization of rural tours including the living and taking food by tourists in a rural(farmers') house, acquaintance with traditional rural mode of life, trades, handicrafts;
 - creation of tourists' villages on the base of existing rural settlements with traditional folk wooden architecture situated in picturesque location.

It is necessary to objectively evaluate tourists' potential of the districts and municipal communities, give the centralized grounds for their specifics and specialization and form investment projects' joint bank. The selection of suggestions is to be made advisably in the context of targeted regional and municipal programs aimed on changing the profile of private farms involved into agricultural production, into agricultural tourist business in addition to the main agricultural activities.

As well as ensuring employment, the development of rural tourism performs all-regional and nationwide tasks:

- conservation of smaller settlements, villages, accordingly rural mode of life;
- improvements in the life conditions of rural population;
- raising of life standard and farm incomes;
- development of cooperation and commodity exchange in rural areas;
- improvement of rural areas infrastructure owing to the development of adjacent to rural tourism industries;
- cessation of migrations to towns and cities by youth settling in rural areas;
- stimulation of getting acquainted with folk rituals and customs;
- revival and propaganda of traditional cultural values and lifestyle;
- development of handicrafts;
- regulating and limited utilization of natural resources promoting preservation of environment;
- conservation of cultural and historical heritage on these territories.

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EDUCATION OF PARTICIPANTS IN MAP SECTOR WITH AN AIM TO IMPROVE MARKET COMPETITIVENESS AND RURAL DEVELOPMENT IN SERBIA

Svetlana Turudija-Živanović¹, Tomislav Živanović², Tatjana Marković¹

Abstract

There are many problems appearing in MAP sector during collection, growing and marketing of medicinal and aromatic plants, such as: decrease in number of plant collectors, absence of licensed plant collectors, decrease in the surface under medicinal and aromatic, absence of subventions in large-scale production, ignorance and restrictiveness of the low regulations that treat this field, etc. All of these directly influence concurrency of the MAP sector on domestic and foreign market and indirectly slow down rural development of Serbia. Special attention in education of MAP sector participant should be devoted to the low regulations. It is normatively regulated by many lows and low regulations (more than 130 different low regulations). However, the environment and nature protection is the filed where many regulations are not yet harmonized with European Union regulations. Following adoption of the low on the nature protection the application of Decree on control of use and turnover of wild flora and fauna ("Službeni glasnik RS", no. 31/2005 from 8.4.2005).

Key words: MAP, education, resources, low regulations, market.

Introduction

Traditional use of medicinal plants is well preserved throughout the history and in the last decade it is in expansion. Trend known as a "return to the nature" and an increased application of phytopreparations (herbal remedies and plant-based

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products) in prevention and treatment of various ailments is also recorded. Field of medicinal and aromatic plants (MAP) belongs to economic activities that for a longer period of time have no great significance for economy of Republic of Serbia. However, there are all preconditions to change such a situation and to improve use of MAP field potentials what will also bring about an increase of MAP export, more efficient use of MAP processing equipment as well as rural development of the country. Parallel growth of MAP consumption, apart from pharmaceutical industry working with plant raw materials, it is also recorded in food and dietetic product industries. Industrialization of the agricultural production (application of additives, hormones, antibiotics, pesticides, etc) brought about discontent of food consumers in European Union. In order to improve the entire situation in EU countries the new legislation is implemented in the system of food quality control, started from the year 2002. (General Food Law; Farmers Guide to GLOBALGAP 3.0). Consequently, GAP principles were "reshaped" into integral protection, control and inspection. It is also developed the concept of organic production. According to the law, standards in agriculture production are not obligatory but they are very important if we want to export on EU market. In order to adapt to all EU market requirements it is very important for us to educate all actors in the MAP sector (pickers, purchasers, processors and consumers). Last fifteen years, in accordance to ecological trends in the world, we also started implementing some protection measures for natural resources, better-known as "Concept of sustainable, rational usage of biodiversity" (Kovačević, 2008). Further, the Ministry of Environment and Spatial Planning, according to a certain Decree that regulates usage and trade of wild flora and fauna (*Službeni glasnik RS no.31/05, 45/05-correction and 22/07*), every year announce an open competition in order to issue permissions for collection of protected species.

Resources in MAP sector

Serbia represents a rich source of a number of plant species. In flora of Serbia, medicinal plants are of greater economical significance. MAPs also represent very important raw material for pharmaceutical, cosmetic, food, alcohol and beverage industries. Also, they are important export articles that may bring about significant foreign currency income to our economy (export of dry herbs, extracts, essential oils and phytopreparations). This wealth made possible their exploitation but also imposes necessity for protection from their irrational exploitation. In the flora of Serbia, 420 medicinal plant species were registered (belongs to 89 families) out of which 280 species are in trade (Prodanović and Šurlan Momirović, 2007). In Serbia, there are ca. 50 species that we use grow and ca. 250 are collected from the nature (few thousand tons of plant material, annually). This quantity might be significantly increased without jeopardizing

biodiversity. However, quotas that might be obtained only with permission are far below real state in the nature. Also, the number of pickers gradually decreases from year to year, since this job use to do mainly old people (Helberg, and Dajić. 2001a). Our pickers do not hold appropriate license (certificate on picking skills) since it is not required by our legislation (as it is case in EU countries). Very soon, it might present one of limitations for exporting MAPs in EU countries. Also, pickers with their nonprofessional picking (picking of reproductive organs) or excessive collection (picking all plants found at a natural stand) sometimes endangers survival of some species, especially the most demanding ones on the market. Well-known example of nonprofessional collection of Yellow Gentian lasts more than 60 years. This plant almost disappear from this area and its collection from the nature is forbidden. Apart from the control of collection by the law, the best choice to protect natural resources is orientation to cultivation of endangered species with high economic importance (eg. Yellow Gentian, Calamus, Yarrow, Plantain, Marsh Mallow, etc, Institute for Medicinal Plant Research, „Dr Josif Pancić“). Some of these plant species are already introduced into culture (small scale production), their growing technologies are known and reproductive material is available (seeds and or nursery plants). Rural village inhabitants in hilly-montaneous region of Serbia that are already engaged in collection of wild growing medicinal plants might also take part in cultivation of these endangered MAP species and increase their incomes.

Low regulations as a factor for MAP resources preservation

In order to be allowed to collect certain MAP species from the nature it is obligatory to obtain permission. The right to apply for permission have juristic person and/or entrepreneurs that commercially deal with collection of wild flora, fauna and fungi, provided that they have no penalty regarding this subject. The applicant, apart from registration form, is supposed to submit following informations: data on protected plant species with their latin names, quantities of plant material to be collected (fresh weight), how collection of protected species is going to be organized, localities of collection (name of community and the neighbouring settlement), number and distribution of purchase stations, data on objects, installations and machinery for plant material storage, processing and turnover, degree of processing of protected species as well as certificate on registration obtained from the Serbian Business Register Agency. The right to apply for permission have juristic person and/or entrepreneurs that have plantations, nurseries or other types, as well as collection of protected species due to scientific research purposes (paragraphs 5. and 7. of the Regulation). Integral part of an open competition is a table presentation of protected MAP species and their quantities that are to be collected.

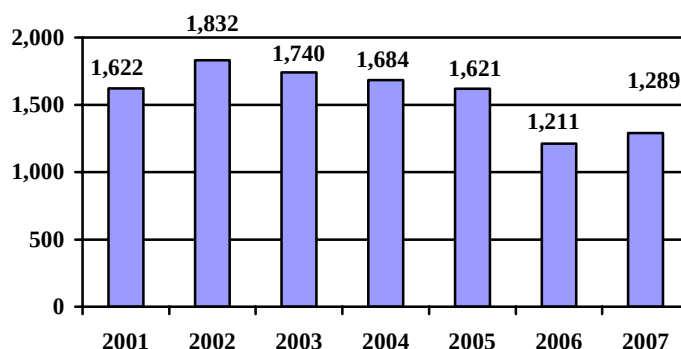
Some field purcesers have no respect for the legislation, weather due to an inexperience or an extra benefit they may gain his way. Also, plant growers are not alwayss well informed on their obligations when they grow protected MAP species. They are supposed to register their plantations to the Institute for Nature Protection and that is checked up by the expert who visits the plantation and gives an opinion on possible yields from the plantation. This is the only way to obtaine permission to legaly put cultivated MAP species that is under low protection on sale.

MAP market in Serbia

MAP market in Serbia is supplied by collection from nature, by cultivation and importing. Wild collection and cultivation supply the greatest part of market demands. Our country imports only MAP species that do not naturally exist in our region, are in deficit in given period of time or their price is higher then on the foreign market. Market surplus are exported in EU and some other countries (USA, Canada). Intensification of MAP growing in our country started by the middle of previous century. Serbia is rated as an exporter even before the first World War and following the second World War MAP were one of the first goods exported. Already, in the seventies, greater quantities of some fifteen plant species were produced (Chamomile, Mint, Lemon balm, Fennel, Caraway, etc). Increased demand for MAP row materials all over the world lead to expansion of organized large-scale MAP production (Helberg, U. and Dajić Z. 2001b). Besides, scientific achievements enabled determination of numerous biologicaly active substances from MAP as well as their therapeutical implementations and imposed high standards for evaluation of the quality of MAP row materials. These standards may be achieved only in well organized, controlled and aim–leaded MAP cultivation. GAP is a legal good agricultural practice that was launched by the Organization for food and agriculture that belongs to UN-FAO (www.fao.org/prods/GAP). In Serbia, GAP is not distinguished as a separate document but it is incorporated in the low and in the book of regulations on agricultural production. Since 2005., application of GAP is a legal obligation and precondition to join market of EU and other world contries.

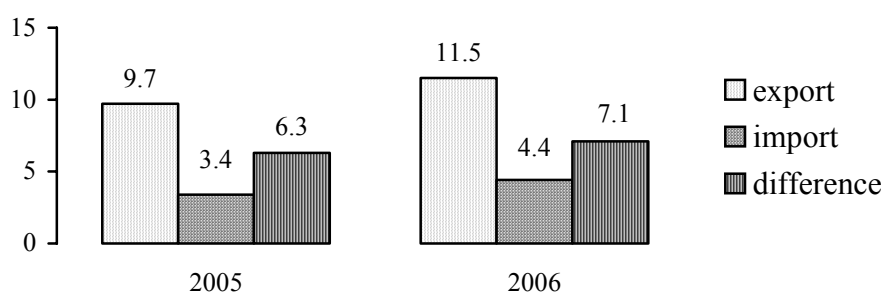
Chart 1. represents surfaces under MAP in Republic of Srpska. It may be observed tendentious decrease in surfaces despite all idices that there are demands for MAP row materials. One of the possible reasons is decrease in competition at foreign market since the export prices of the goods we are exporting are quite higher. Our market demands are satisfied with the quantities we produce. In order to increase export it is necessary to introduce stimulations for large-scale MAP cultivation.

Chart 1 Surfaces under MAP in ha



Association for Medicinal plants that belongs to Serbian Economy Chamber already works on this subject for several years. Unfortunately, these demands up to now did not meet with understanding in our the Ministry of Agriculture, Forestry and Water Management of the Serbian Government. It might be useful to persuade our Ministry for Environment and Spatial Planning to gather incomes from taxes for wild MAP collection and to invest them in subvention for large-scale MAP production. Countries that export MAP and are the main competition gain subvention for their MAP cultivation and their incomes do not depend on the market yields and prices.

Chart 2 Export-import in 2005-2006 (in million \$)



From the Chart 2., it can be observed export-import tendencies during the years 2005 and 2006. It can be concluded that the import was really great. It would be wise to re-examine list of imported MAP species and reconsider if some of them

might be introduced in our agro-ecological region. Also, wild collection or cultivation of market demanding MAP species should be stimulated. It is well known that MAP that derive from our country possess better quality.

Chart 3 Export of MAP for the period 1998-2008 (\$)

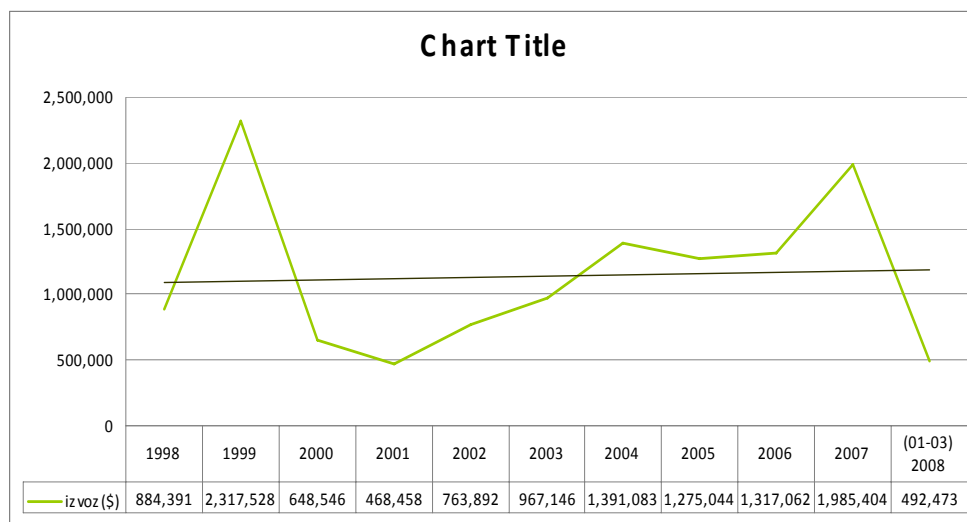


Chart 3. presents export in ten years period (2008, first quarter of the year, only). There are obvious oscillations in income realized in MAP sector but also a small increase in comparison to the years 2000 and 2001. Based on existing MAP field resources of Republic of Serbia it is quite expectable to keep and even increase MAP exporting level and this may be achieved primarily by widening exploitation surfaces from the nature and surfaces under cultivated MAPs in Serbia (Turudija Živanović, 2008a i 2008b).

Education as a way to improve MAP sector business

Out of all the facts outlined so far it can be concluded that MAP sector is limited by a numerous factors, started from the absence of proper legislation up to the louse knowledge on the rules to be followed during some procedures (wild collection, purchasing, processing and cultivation) in order to possess good quality MAP row material. Also, purchase is not well organized in all regions of Serbia, such a way obstructing possibility to increase the entire quantity of wild collected MAPs, to increase number of pickers so as their incomes from this kind of job.

There are communities in Serbia that have long tradition of MAP collection (Southeast region of Serbia: Sokobanja, Knjaževac, Svrljig, Pirot, Surdulica, Aleksinac). In order to solve some problems the education of all the participants in this sector is of great importance. The first level includes education of MAP pickers. Training should encompass few segments, such as: knowledge on MAP species that are of interest for purchasers, skills how to collect (exact part of the plant, exact phase of plant vegetation, precise timing for collection as well as a proper management of collected plant material – how to transport, dry and store collect it) and prerequisite quantities of plant material in a given season. MAP association “Dr Jovan Tucakov” from Sokobanja, gathers a great number of members. It has its own center for education of MAP pickers and producers and its activity has been carried out for a long period of time under financial support of some international organizations. In order to organize collection and purchase in other regions of Serbia it is very important to educate pickers and purchasers or to gather all local pickers and connect them with purchasers from the nearest region.

The next phase of education has to encompass purchasers as mediators in MAP turnover, since they are supposed to satisfy requirements of the MAP processors. They also have to be informed on legislation in purchasing of protected MAP species and on MAP raw material quality requirements. Education of MAP producers has for its aim to encourage producers to increase number of grown MAP species and surfaces under MAP species that are demanding on market and enable stable supply of market by the good quality MAP raw material. Counseling services that exist in many regions of Serbia should provide this kind of education, together with the agronomist from the Institute for Medicinal Plant Research „Dr Josif Pančić“ who were pioneers in introduction of the most MAP species into culture in our country. Following the education they will be mediators between purchasers and MAP processors, since they are very often on terrains in rural regions of Serbia. Also, it would be necessary to educate MAP processors that deal with packaging and disposal of MAP goods. They would need a help from pharmacists and technologist during process of production, from referent laboratories for quality control, and as well they would need a knowledge in marketing (which are the most demanding MAP products on market, how to produce, pack and distribute them, etc., Turudija Živanović, 2008a i 2008b)

Conclusion

Traditional use of medicinal plants is well preserved throughout the history and trend known as a “return to the nature” and an increased application of phytopreparations are recorded. MAP sector belongs to economic activities that have no great significance for economy of Republic of Serbia, regardless the

existence of great potentials (rich plant biodiversity, organized purchase, large-scale production, great number of MAP processing enterprises, an increase of consumption of phytopreparations) which are to better used. That would bring about an increase of MAP export, more efficient use of MAP processing equipment as well as rural development of the country. The limited factor is control of MAP collection from the nature. Possible as a best method for protect of MAP resources is orientation towards cultivation and introduction into culture of certain MAP species that are of great economic importance (eg. Yellow Gentian, Calamus, Yarrow, Plantain, Marsh Mallow, etc). Scientific achievements that enabled determination of numerous biologically active substances from MAP and their therapeutical values have imposed high standards for evaluation of the quality of MAP raw materials which can be achieved only in well organized, controlled and aim-leaded MAP cultivation, following GAP standards. MAP sector is limited no proper legislation as well as with a louse knowledge on the rules to be followed during wild collection, purchasing, processing and cultivation of MAP species that would provide good quality MAP raw material. Also, it is very important to educate all actors in the MAP sector (pickers, purchasers, processors and consumers). Education of MAP processors, apart from the processing methods have to encompass disposal, marketing and quality control.

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EFFICIENCY OF CAPITAL INVESTMENTS IN ECOLOGICAL AGRICULTURAL PRODUCTION AND POSSIBLE SOURCES OF FINANCING

Mihai Botezatu¹

Abstract

The capital investments have always directed towards the areas of activity where the capital increase has proven to be most efficient. From this point of view, the perception of various investors is many times very different. Thus, in today's world, which faces many problems, mainly economic ones, there is the possibility to use capital properly, by making some investments whose purpose is to obtain ecological products, the mankind is interested in today, more than ever.

In order to achieve this goal have to be used some technical but also some economical methods that are referred above. This paper wants to emphasize the particularities and efficiency of such investments in ecological agricultural production, concurrently with emphasizing the importance that the ecological products have for mankind, mainly in the actual stage, when very many of the agricultural products we consume are counterfeits, with unwanted implications on people's health and on their hope of life. This paper also presents briefly some possible financing sources of the mentioned investments, which an investor in this domain might take into account.

Key words: ecological agricultural product, certification, bonds, equity capital

Introduction

The economic crisis that has struck almost all the countries of the world is raising big problems which must be solved and find solutions to be compatible to

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the actual stage the world is crossing. Obviously, the economic crisis manifests at many levels, such as economic, political and social levels. In this context, it needs to be mentioned the fact that a domain that has been seriously affected by this crisis is the one of investments, both on the national and on the international plan.

It might be said that we are facing a recession period, which manifests in several plans, as we have mentioned before, the investment sector being seriously affected. Obviously, in front of such a situation, countries will react, but will try to find the best solutions to overpass such a state of things, as has always happened in history.

Any investor, owner of a certain capital, will search those areas of economic activity which might lead to profit. But there is a problem, the one of taking risks. In other words, an investor, today more than ever, will have to weigh very well the advantages and disadvantages of a possible capital placement and will have to know the risks this decision will bear.

Regarding the first aspect discussed, the one related to advantages and disadvantages of a capital placement, the investor must have minimum knowledge of evaluation of efficiency of the respective capital investment, based on some methodologies of evaluation, however, the evaluation of risk of the respective investment is a much delicate problem. That is why, today, more than ever, when the economic crisis is at its peak, an investment must be thoroughly analyzed in its early stage, before making the respective decision, and the advantages and disadvantages must be carefully weighed, next to the risks associated to the respective investment.

All these problems mentioned above, in the context of a capital investment in a productive corporal asset must start from the demand of the market for the respective product or, more exactly said, if that product sells or not after the investment is made. Though, in present, most of economic sectors which are hit by the crisis are not interesting for the investors, there is a domain where an investment made may prove to be efficient, to the expectations of the respective investor. This domain for the future capital investments, where the risks of the respective placement are minimum, is the domain of the ecological agricultural products.

Why Investments in Ecological Agricultural Products?

To speak of investments and their efficiency in the domain of ecological agricultural products means to speak of the interests of the two participants at this process. On one side, there are the interests of the investor, who, as owner of capital, is interested in the capital to turn into profit, more efficiently, or to lead to a

higher rate of gain. On the other side, we must take into account the population, which, in the end, will dimension the demand for the future ecological products which will be born after the investment made.

The moment has come to become aware of the negative effects caused by an irrational alimentation, based on a series of products which have in their composition improper raw materials, as mentioned above. In other words, there is more and more interest in buying natural, ecological agricultural products, which would have good effects on our health. On this plan, in order to obtain such ecological products and to find them in our shops, certain measures should be taken, such as:

1. to change radically the technologies used, both for vegetal production and for the animal one, in order to obtain natural, ecological agricultural products;
2. to identify the most convenient financing sources, possibly to obtain, in order to achieve such investments able to respond to the desiderate mentioned under point 1).

Though only two plans have been mentioned, these are not the only ones. Synthetically formulated, these two plans, if achieved, open the road towards obtaining a natural, ecological agricultural production.

For the first plan mentioned above, we consider that one of the basic factors that must be taken into account in the future is the intensification of the activity of research in the agricultural domain, which should lead to new technologies of obtaining ecological agricultural products. The reminded measures also must be taken very soon, as much as the soil must be cleaned, purified from a series of chemicals used for so many years; and this cannot be done instantaneously, but in a certain period of time, sometimes in years.

Obtaining agricultural products in ecological regime requires other higher production costs, but there must also be taken into account the fact that, once obtained, these products will be sold at higher prices, which – how interesting – the population will want to accept and pay, because of the superior quality of these products. A higher price must also be seen in another aspect, from the position of the investor, as sole manufacturer. Otherwise said, a higher price means, among the others, a higher profit for the manufacturer, which can be found in the price.

Starting from the idea that profit is one of the mobilizing factors or even the most mobilizing factor in making some investments, we may affirm, without the fear of being wrong, that the investments in obtaining ecological products, mainly in the actual stage, are efficient capital placements, on long term having a huge rate of gain. In order to emphasize the continuously increasing preoccupations in

achieving efficient investments in this domain, I would like to discuss an example, even from Romania, which is significant and which I have also discussed about in other similar papers. In the eastern side of the country, there is a locality called ZEBIL.

About 4 years ago, a farmer from this area, started practicing ecological agriculture. He started growing tomatoes, cucumbers, peppers and onions using ecological technologies. After 3 years of severe monitoring, the 240 ha of the farmer from ZEBIL were certified ecologically. In this moment, I consider it is useful to stop for a while on the economic consequences coming from this certification. Certainly, the economic consequences are numerous and very various, but, from among them, we shall try to extract a very direct and important consequence.

Subsequent to the ecological certification mentioned above, the respective agricultural products could be exported at a double price than the price that would have been obtained if sold on the internal market. It is obvious that, without putting the ecological labels on those products, which had as starting point the ecological certification specified before, this would have not been possible.

It is obvious that obtaining a double price when exporting these products, in comparison to their sale on the internal market, in the conditions of certain production costs, means also a bigger profit, which, at its turn, attracts a series of other favorable economic consequences on various levels, inclusively on the plan of making some investments for the development of activities in this ecological regime.

Subsequent to this experiment, we must mention that in present, the experience mentioned above has been taken over by other farmers, so that, today, the whole land from the ZEBIL area has been certified and registered for ecological cultures; various landlords have associated to practice ecological agriculture, so that, soon, other farmers will receive the ecological certification from the Romanian agricultural authorities. It is interesting to observe one other fact: in present, about 85% from the agriculture of the county of TULCEA (a very nice and fertile area from the eastern side of the country) has been included in the European network of ecological sites NATURE 2000.

Therefore, one of the urgent measures that should be taken not only in Romania, but also in all the countries of the world, refers to adopting a package of very severe laws, which should aim at the protection of bio-diversity. More than that, complying with these laws could be accompanied by the State granting some facilities in form of incentives. There is a greater and greater interest in consuming products that would make us come closer to their natural taste, which would have a major impact on our health. We want to eat fresh vegetables and fruits and also tin

cans prepared ecologically. It is important to keep in mind, from those presented above, that there are two basic aspects, as follows:

- the investments in ecological agricultural production are efficient for the owner of the capital, who makes such capital placement;
- the investments in ecological agricultural production are also efficient for the population, for the consumers, eager, as mentioned before, to pay a higher price, which is very well justified by the superior quality of the respective products;

According to some calculations, the period for recovering the capital invested by such an investor is of about 2-3 years, period calculated with the formula:

$$T = \frac{KI}{PRn}$$

Where:

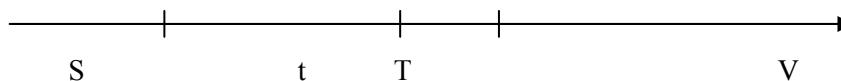
T = payback period of the invested capital

KI = volume of the invested capital

PRn = yearly profit

The relation defined above, though easily to calculate, is not relevant enough to specify the period of time when the invested capital may be paid back. The limited degree of relevance comes from the fact that this formula approaches statically the calculation of the payback period, or, otherwise said, this relation does not take into account the influence of the time factor. In this regard, in order for the reminded indicator to reflect the reality best, it is necessary for this calculation of the payback period to be made in other form, using a dynamic calculation, which should take into consideration, beside the efforts and investment effects, the influence of time value of money..

The dynamic calculation of the payback period of the invested capital is based on the fact that in T moment $\rightarrow$ the respective payback time, the cumulated profits obtained are equal to the efforts of capital invested; the only problem that must be understood in this context is that the respective values appear discounted, meaning corrected, with the influence of the time factor. Thus, we put it on an axis:



Where:

s = moment of beginning the investment

t = moment of putting the investment into function

T = payback period of the investment

V = moment of ending the investment

Putting the sign of equality between the invested capitals and the profits earned until the respective moment, the values calculated in their updated form, we shall obtain:

$$\sum_{h=1}^d Ih(1+a)^h = PRn \frac{(1+a)^{T'} - 1}{a(1+a)^{T'}}$$

Where:

d = period of making the investment

Ih = investment from the “h” year of the achievement period

PRn = yearly profit (constantly estimated)

T' = discounted payback period

a = updating coefficient

In the above relation, all the elements are known, except for T' , meaning the dynamic period or discounted payback period. Otherwise said, solving this exponential equation, by using logarithms in the end, we shall obtain the discounted period term. It is obviously very important, at the end of the calculations, to compare the static payback period of the invested capital to the dynamic one, the difference between them representing in fact the influence of the time factor.

Possible financing sources of the investments in the ecological agricultural production

Certainly, one of the most delicate problems, mainly in the actual stage the mankind is crossing, the one related to an economical crisis, which seems to last longer, is related to money, to the existence of a volume of capital, able to move the economic processes in the direction specified above.

In other words, to pass to an ecological agriculture is a problem that cannot be solved without money. That is why I shall try below to present a few possible financing sources, which, in my opinion, should be taken into consideration.

Certainly, a first financing source would be the equity capital, which would solve the problem without other interventions; but, if this source does not exist, or it exists, but it is not enough, the problem will not be solved. In such a context, it is necessary to call for other possible financing variants which I shall try to present below.

The capital market offers a few possibilities of attracting some available capitals, based on which the proposed purpose may be reached. The share issue is also a concrete and possible opportunity of attracting some capitals, and, if the respective issue is successful and the shares are sold, the respective capitals attracted in this way will be later on found in the company's equity capital or in the issuing company's capital.

In another context, if the company considers such a way of attracting capitals as not being successful, it may change its direction, to bond issue. The difference between attracting capitals from share issue and bond issue consists in the fact that, whereas, in the former variant, the capital attracted can be found in the own capital, in the latter variant, the capital attracted can be found in the loan capital.

It is very clear the fact that these two variants of attracting capital have different costs, reason for which the issuing company shall consider very carefully the decision to be made in this regard. There also must be taken into account the variant of attracting capitals based on some bank credits, variant which should be taken into account by the respective company only as a last call; the costs of attracting capital in this situation are the highest, in comparison to other possible variants presented above.

Beside all these presented before, I should also mention a series of structural funds granted by the European Community for this destination, such as SAPARD funds.

Some Economic Considerations and Conclusions Regarding the Increase of the Efficiency of Capital Investments in Ecological Agricultural Production

Passing from a classic agriculture to an ecological one is not a very simple problem, but, we may say, it can be solved. There are difficulties in present and there will appear also other difficulties in the future, the basic problem being the one of finding the ways and means to overcome them. At the same time, time factor must also be taken into account, which is very present in this system.

For example, only the period of soil conversion to an ecological agriculture is of minimum 2-3 years, period in which the soil must be cleaned from all the chemical substances used for treating the soil until that moment. Despite all these, I

declare myself as being the adept of a decision to invest in this domain of activity, considering that this investment will be efficient. Among the basic arguments of such an adventure, there are also a few basic ones, as follows:

- once started and put into function, such an investment will have sales, mankind being more and more interested in consuming natural products;
- without such an investment, thoroughly thought, the road towards the “certification of products” obtained ecologically is blocked; in other words, the price of these products will depend on their quality; however, the quality must be real, certified by competent bodies. Therefore, the whole road to this certification cannot be possible without making some capital investments.
- a legislative framework is necessary, containing the conditions that must be accomplished by those who will choose such an activity;
- the minimum necessary conditions for applying the ecological labels on the agricultural products must be clearly agreed and communicated;

There also must be taken into account the collateral effects such an investment will have. For example, some economic effects of the respective investments will be felt in tourism; very many tourists, mainly foreigners, may be attracted in the country, by presenting them the possibility to consume, during their stay, only agricultural products obtained in ecological regime.

Such an investment in ecological products may have a special efficiency, by prospecting external market by certain agricultural companies, which are monitored in order to be granted the ecological certificate. By prospecting the market, the companies will also take into account the conclusion of export agreements for the future agricultural products which will be obtained ecologically.

Another way of increasing the efficiency of investments is to find solutions for changing some technologies of maintaining crops and of fighting against pests, by using substances and materials which should respond to the ecological requirements of obtaining ecological products. As mentioned in a different context, despite the higher prices of such products, they are still sold, thus leading to obtaining profit; this aspect, together with the element of volume of sale of these products, leads to economic efficiency; therefore, this investment may be paid back in 2-3 years and, later on, the final profit is obtained, which means that final profit is obtained after the period of investment recovery.

These are only a few ideas pleading about the decision to make some capital investments in this domain of maximum importance both for present and for the future, the domain of ecological agricultural products. For such an investor, the

financial effort made will be fully justified in the efficiency of the investment made, as shown above.

I do not claim that I have exhausted the whole topic of efficiency of investments in this domain, still, through this paper, I have wanted to draw attention of some directions where investments may go, so that the respective results, the efficiency of capital attracted, to meet the expectations. I also want to emphasize the fact that these investments may be efficient, even in this period of crisis, when very many investors become skeptical.

As a conclusion, such investments will be efficient in obtaining ecological products, not only now, but also in the future, therefore, any investor should analyze such an opportunity of investments, starting from the particularities and specificity of such kind of investments.

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STRUCTURAL CHANGES OF THE ROMANIAN AGRICULTURE IN THE PROCESS OF EUROPEAN INTEGRATION

Anca Dachin¹, Letiția Zahiu¹

Abstract

The Romanian agriculture has experienced different stages in the process of European integration, while quantitative and qualitative changes in land use structures, provision of inputs, financing sources and production structures have taken place, which needed suitable agricultural policies. The effects of these changes are reflected in the economic performance measured by structural and general indicators, which show a significant gap to the majority of the Member States of the European Union. The paper focuses on the specific problems of holding structures and labor in agriculture and on the necessity to improve the quality of employment in this field, in accordance to the requirements of the modernization process. The capacity of agriculture to use the EU structural funds depends highly on the improvement of human capital and on the development strategies of farmers.

Key words: agricultural structures, productivity, size classes of holdings, employment structures

Introduction

The European Community had nearly 23% of the labor force in agriculture in 1958, down from 30% in late 1940s. The exit from agriculture was specific to industrial development, accompanied by stronger urbanization and the development of modern agricultural production systems. A failure to absorb this labor into other sectors would cause agricultural income to fall steadily and destabilize the society and the whole rural area (Pelkman, 2006). Romania is following the same path, but the gap to the EU countries is significant. The

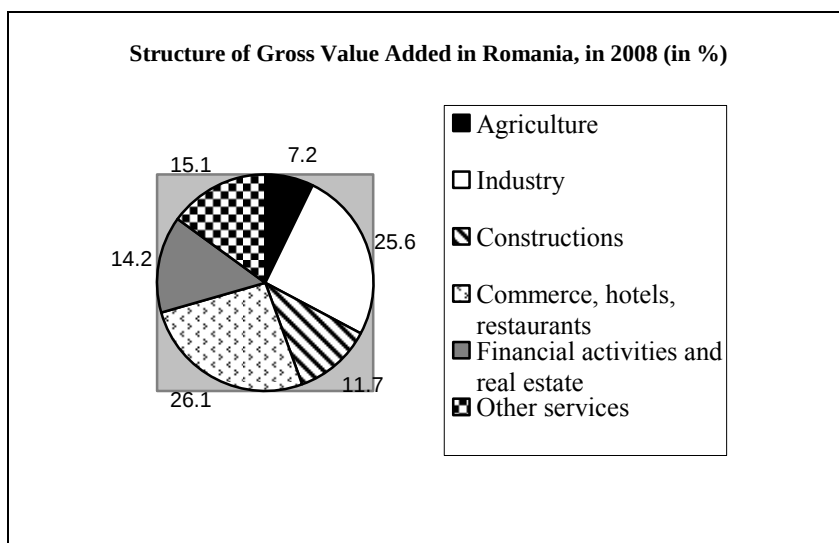
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internationalization of agricultural markets leads to the convergence of the labor and production structures in different countries (Zahiu, 2003). The paper focuses on the structural changes in the Romanian agriculture, which were slow in the pre-accession, but should accelerate under the impact of the Common Agricultural Policy.

Contribution of agriculture to the GDP

During the decade of transition to the market economy in Romania (1990-2000), the share of agriculture in the total value added decreased from 23% in 1990 to 13% in 2000. This trend is due to unfavorable weather conditions, as well as to the recovering of industrial production and enhanced development of services.

In the period of sustained economic growth (2000-2008), the Romanian agriculture reaches a maximum of 14% in the total value added in 2004, which is considered an exceptionally good agricultural year, but in the next years the percent declines gradually, reaching 7.7% in 2008 (figure 1). Even if this share is still much higher than the EU average (about 4%), this trend is important because of diminishing the GDP fluctuations induced by agricultural supply shocks which occur under unstable climate conditions.



Source: data from the National Institute of Statistics (NIS)

The contrast between the contribution of agriculture to GDP and the rather low level of investment in this sector is expressed by labor productivity. In 2004

the general level of GDP per labor force unit in Romania was 36.4% of the EU25 average, while the productivity in agriculture was only 17.2%, even if the agricultural output in 2004 had a record of the latest years.

The delay in implementing a real reform of the production system in agriculture keeps a high level of labor force, of which only about 5.2% are employees in 2007. This is the reason why the labor productivity is at the lowest level compared to all other economic activities of the economy. Moreover, in all other activities the productivity has increased, while in agriculture it is keeping the same level.

Changes of agricultural structures in Romania in the period 2002-2007

The Romanian agriculture has radically changed the property structures. The private property became dominant and created the conditions for market competition. But the agricultural structures which can give an impulse to economic expansion by an efficient use of human, natural and financial resources still do not allow the normal functioning of the market. Because of incoherent agricultural policies and lack of coordination of actions meant to reform all agricultural structures, there occurred large gaps between the property and the production system, between the agricultural production and marketing of the products. This was accompanied by waste of resources, destruction of production and unsatisfactory economic results.

The preparation of Romania's integration to the European Union has been done with difficulties, the unbalances of the agricultural markets became larger and the agro-food self-sufficiency decreased gradually. The food safety of population in the urban areas is highly sustained by imports of food products from the common market and by own consumption in the rural areas. The commerce with agro-food products on local markets is limited and creates disadvantages for farmers compared to food processing units and trade units. Therefore the farmers' income level remains low.

The Romanian agriculture has not homogenous holding structures, since there is an excessive number of small and very small individual holdings, as well a low number of large and very large production units (table 1). This dual character of the holding structures is more visible than in most EU Member States. Even if there is some progress, the individual holdings are still keeping dominant. The very large holdings are difficult to be restructured in order to become compatible with the requirements of the common market and to benefit from the financial support, considering that the application of the CAP mechanism means a reduction of support for large farms. *The sector of medium-sized holdings is missing.*

The types of medium sized family holdings and associative forms of holdings are specific to the “European agricultural model”, which evolved in the long run under the impact of the Common Agricultural Policy, respectively of the structural policy measures and of the Community and the national financial support.

Table 1 Changes in the structure of agricultural holdings in Romania,
by size and legal status in the period 2002-2007

(in %)

Size classes (ha)	Total number of holdings	Of which		Total area	Of which:	
		Individual agricultural holdings	Legal units		Individual agricultural holdings	Legal units
2002						
< 1	50.46	50.64	14.75	5.45	9.83	0.02
1-2	20.88	20.96	5.84	9.14	16.49	0.03
2-5	22.15	22.2	13.04	20.87	37.6	0.15
5-10	5.09	5.04	14.36	10.34	18.44	0.32
10-50	1.09	1.04	10.89	5.4	9.14	0.77
50-100	0.09	0.06	4.95	1.85	2.35	1.24
Over 100	0.24	0.06	36.17	46.95	6.15	97.47
Total	100.00	100.00	100.00	100.00	100.00	100.00
2005						
< 1	44.93	45.08	11.61	4.99	7.62	0.02
1-2	21.11	21.18	5.38	8.97	13.69	0.03
2-5	24.61	24.66	12.81	22.73	34.64	0.16
5-10	7.03	6.99	14.5	13.85	20.98	0.34
10-50	1.99	1.94	12.57	9.49	14.01	0.93
50-100	0.12	0.1	5.72	2.42	2.88	1.55
Over 100	0.21	0.05	37.41	37.55	6.18	96.97
Total	100.00	100.00	100.00	100.00	100.00	100.00
2007						
< 1	43.76	43.92	8.18	4.72	7.24	0.01
1-2	20.77	20.84	5.31	8.42	12.9	0.03
2-5	25.07	25.13	12.32	21.97	33.62	0.15
5-10	7.79	7.76	13.56	14.67	22.33	0.31

Size classes (ha)	Total number of holdings	Of which		Total area	Of which:	
		Individual agricultural holdings	Legal units		Individual agricultural holdings	Legal units
10-50	2.24	2.19	12.62	10.22	15.15	0.99
50-100	0.12	0.09	6.93	2.42	2.72	1.86
Over 100	0.25	0.07	41.08	37.58	6.04	96.65
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: calculated on base of 2002 General Agricultural Census, Vol 1/2004; 2005 Farm Structure Survey; 2007 Farm Structure Survey; National Institute of Statistics, Romania

The old CAP measures are not suitable any more today. New solutions had to be identified, which are adapted to the new realities of the European agriculture. The structural and efficiency gaps between the Romanian agriculture and the old Member States (UE15), as well as the lagging behind the New Member States (UE10) are difficult to reduce. In 2007 the share of holdings up to 5 hectares represent 89.6% of the total number and 35.1% of the total utilized agricultural area, compared to 93.5% and respectively 35.5% in 2002.

In five years the number of holdings under 5 hectares decreased by 568.4 thousand, but this reduction is not sufficient and it occurred mainly because of the decrease of the land owners and not due to the concentration of areas by the creation of associative organization forms. Part of the agricultural area of these holdings was taken on lease or bought by agricultural commercial companies or it was used in the real estate business.

Changes also took place within the size class 5-10 hectares (an increase by 81.12 thou holdings) and 10-50 hectares (an increase by 39.35 thou holdings). The share of these holdings in the total utilized agricultural area (UAA) also increased from 15.74% to 24.89%. Within the size class 50-100 hectares, the number of holdings increased only by 941. In 2007 the size class over 100 hectares included 9608 holdings covering 37.57% of the UAA. The number of holding decreased by 595 in the period 2002-2007. This size category is also including very large holdings (over 5000 hectares).

The average size of the individual holdings is 2.34 hectares and of the legal units 275.37 hectares. In the group of legal units is included a low number of private commercial companies using agricultural areas of thousands of hectares, which were taken on lease from state agricultural companies or from small farmers who became land owners as a result of the application of the land property law.

The number of legal units decreased especially as a result of the liquidation of some agricultural companies created as association based on the old agricultural cooperatives. There were 1630 such companies in 2005 and 1475 in 2007. On the other hand, the number of private companies increased from 4574 to 5019, as a result of leasing, concession or buying land (their average area is about 400 hectares but there are production units holding over 20000 hectares). The number of cooperative units decreased. The association forms of the small farmers for the execution of agricultural operations in common were not encouraged and they developed only by chance in some areas.

The total number of agricultural holdings at the end of the year 2007 was 3.93 million, compared to 4.26 million in 2005 and 4.48 million in 2002. In 1941 Romania had 1.25 million holdings and in 1949 about 2 million holdings. After the reform in 1991 combined with the lack of an efficient structural policy, the process of excessive division of land into lots extended the subsistence agriculture in Romania beyond the economically acceptable limits. This type of agriculture means small production units with no connection to the market and increase of own consumption in the rural area.

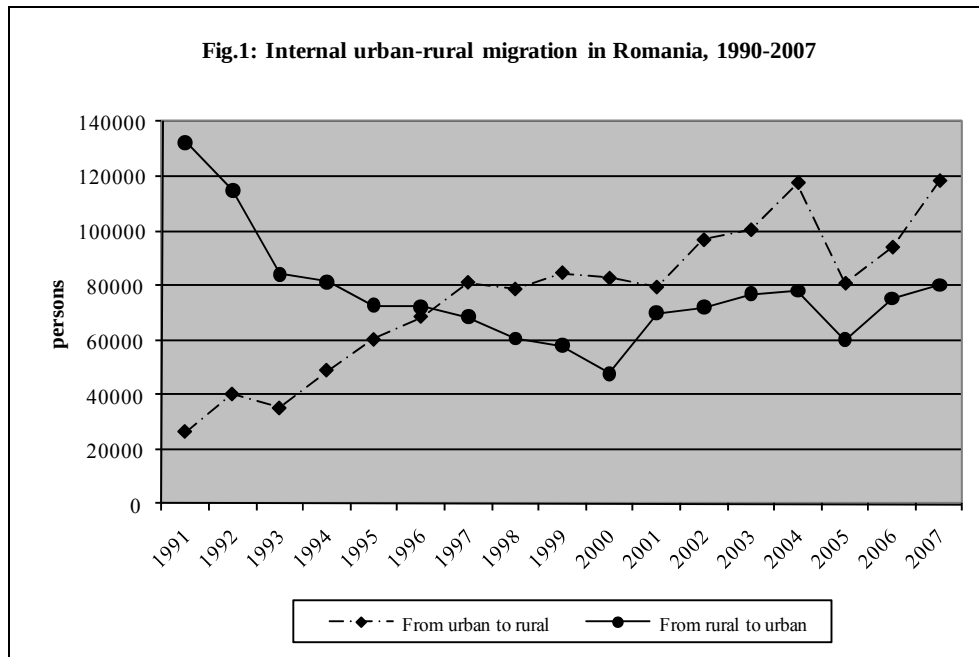
In Romania the sector of small family subsistence production units in agriculture is very resistant and it survived after 1990, on base of the structure of the old rural households. The structural changes should lead to a multifunctional development of these households, to their association for the marketing of products, to provisioning with industrial inputs, common investments, agricultural activities, storage of agricultural products, processing of raw materials, environment protection etc. As a consequence, the number of subsistence units should decrease in favour of the development of a viable commercial sector.

Changes in labour force structures

After 1990, during the transition to market economy, the restructuration of employment was accompanied by poverty increase and also by a certain inverse trend, migration of urban population to the rural area (fig.2). The economic decline of many small and medium-sized urban centers generated negative social effects. Many people who lost their jobs used the alternative to move to the informal sector of the economy. The main survival strategy of people moving to villages was to produce food on their own land. The urban-rural population net flows in the last decade have not significantly changed the share of rural population, because migration is in both directions, but elderly domestic migrants replace progressively the younger population. There is also a migration flow of people from the rural areas to foreign countries, especially EU countries.

The high number of workers released from industry after 1990 and the net migration to the rural area resulted in the increase of labour force employed in agriculture, hunting and fishery, which reached the peak of 42.7% of the total employment in 2000 in Romania. This process extended the subsistence economy. After 2000, the sustained economic growth created favourable conditions for the development of non-agricultural activities and determined the reduction of employment in agriculture to 30.5% in 2006 and 29.5% in 2007. But this share is still much higher than the average of 6.4% in EU27, while the highest values in some Member States do not exceed 20% (in 2006, Bulgaria 20.6%, Poland 19.2%, Lithuania 12.4% and in 2005, Greece 14.4%) (European Commission, 2007).

In the period 2002-2008 there was a significant reduction of employment in the rural area, while in the urban area the trend shows the opposite situation (table 2). This demonstrates the unsustainable economic development in the rural area.



Source: Romanian Statistical Yearbooks 1992- 2008, National Institute for Statistics

Table 2 Employment by area of residence, 2002-2008, (Thousand persons)

Year	Romania	Urban	Rural
2002	9234	4607	4627
2003	9223	4662	4561
2004	9158	4906	4252
2005	9147	4889	4258
2006	9313	5115	4198
2007	9353	5072	4281

Source: *Romanian Statistical Yearbooks Time Series 1990-2007 and 2008*, National Institute for Statistics

Agriculture has gradually lost its status of employment buffer specific to the period 1990-2000 (Toma, 2009). However it is expected that a prolonged period of the economic crisis that started in 2009 could result into higher net migration flows from urban to rural areas. Ageing of the labour force is another phenomenon in the rural area, due to the age of people working in agriculture, which is the dominant economic activity. In 2003 about 17.7% of the farmers and skilled workers in agriculture, forestry and fishery were of age 65 and over, compared to total employment in Romania, where this age group had only a share of 6%. In the period 2003-2007 the number of farmers and skilled workers in agriculture decreased by 661 thou persons (by 22%), while the share of old employed people increased to 18.6%. This change shows that most people who found an alternative employment in the rural area or migrated from the rural area belong to the younger age groups.

Table 3 Employment structures, by age group in Romania in 2003 and 2007

	Year	Total (000 persons)	of which, at age (in %):	
			15-64 years	65 years and over
Total employment, of which:	2003	9223	94.0	6.0
	2007	9353	94.5	5.5
Farmers and skilled workers in agriculture, forestry and fishery	2003	3004	82.3	17.7
	2007	2343	81.4	18.6

Source: *Romanian Statistical Yearbook 2008*, National Institute for Statistics

Taking into consideration that in 2007 the total employment in agriculture, hunting, forestry and fishery was 2757 thou persons, it is obvious that beside the farmers and skilled workers in this field (2343 thou persons, see table 3), there still

are about 400 thou persons who are unskilled workers employed in this activity, which are not expected to change the occupation. Even if the overall reduction of employment in agriculture is a good sign because it improves the employment level in agriculture compared to the EU countries, this kind of change alone does not make agriculture more competitive.

The young generations in the rural area go through a complex transition after they exit the educational system (Pârciog, 2008). They are not attracted to agriculture because of the low income and negative expectations in the short run. They prefer non-agricultural activities paid with salary or the temporary work in western EU countries. The present structure of employment in agriculture, respectively the structure by age group and by education and qualification level and the ageing trend of the last years are not positive premises for the efficient and rapid restructuring process in agriculture. The application of the Common Agricultural Policy depends highly on the capacity of farmers to understand and use the new mechanisms of the CAP.

The expected impact of the new CAP

In the period 2002-2007 the average area per holding increased only slightly, from 3.37 hectares to 3.57 hectares. In order to reach the average level of 10 hectares per holding, the subsistence holdings should decrease by 2.4 million until 2013. After this time limit the new reform of the CAP will bring disadvantages for the Member States having subsistence agricultural structures. Under these circumstances, the application of economic and social mechanisms in Romania should lead to the extension and consolidation of the commercial holdings, family holdings and associations.

In Romania the number of family holdings will be high also in the future, due to the historical traditions and to the consequences of the land property law. The consolidation of these holdings is important in the context of the worldwide economic crisis and the climate changes, since they ensure the food for the rural families and are able to produce diversified products for the market. The risk for bankruptcy is lower than in the case of large agricultural companies.

The basic option for Romania is the formation of diversified agricultural production structures linked by various forms of cooperation and agro-industrial integration, which are competitive on the single market. The restructuring of the large agricultural companies must be done because of economic reasons. They have difficulties in adapting to the market requirements. However some of these large holdings could reach high performance and they play an important role on the internal market and for the development of exports.

The present SAPS mechanism which distributes the direct payments per hectare in the new Member States does not stimulate the merging of land and the increase of the holding size in Romania. However the the process of merging lots must be highly accelerated since, according to the new CAP after 2013, the funds allocated will be reduced or eliminated, even if they are a very important source for the financing of agricultural activities. On the other hand, starting with 2009, the large companies will receive decreasing direct payments per hectare, according to the CAP principle of „modulation”. There will be a percentage reduction of payments for holdings over 50 hectares, considering they manage to function with lower support (the reduction is up to 35% from the total sum per hectare for holdings having over 300 hectares).

Conclusions

In Romania the share of agriculture in the total value added decreased from 23% in 1990 to 13% in 2000 and 7.7% in 2008. The delay in implementing a real reform of the production system in agriculture and modest alternative job opportunities in the rural area still keep a high level of employment in agriculture. The sector of medium-sized holdings is missing. The present structure of employment in agriculture, respectively the structure by age group and by education and qualification level and the ageing trend of the last years are not positive premises for the efficient and rapid restructuring process in agriculture. The structural changes depend highly on the capacity of farmers to understand and use the new mechanisms of the CAP. In order to reach the average level of 10 hectares per holding, the subsistence holdings should decrease by 2.4 million until 2013. After this time limit the new reform of the CAP will bring disadvantages for the Member States with subsistence agricultural structures.

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THE DEVELOPMENT OF AGRICULTURAL ACTIVITIES IN THE HILL AREA OF DROBOTFOR VALLEY FROM BACĂU DISTRICT, ROMANIA

Mariana Bran¹, Iuliana Dobre, Radu Voicu

Abstract

Because of risk hereupon are insecure the natural resources and other environmental elements, must to act in the sustainable development sense. Permanently, are decisive to assure the healthy life conditions (pure water, fresh air, health food). Thus, in studied zone, are imperative field work of an affected areas from natural disaster (inundations, deforestations, and landfall) and friendly technologies based agricultural activities (in crops and animal husbandry).

Key words: agricultural activities, risk, natural resources, strategy.

Introduction

Since 2008, many localities from Bacău County were declared disadvantaged areas, with specific natural conditions. They are also located in the basin Drobotfor / Pojorata and Motoșeni and Stănișești. Here are the necessary rehabilitation works (areas affected by natural disasters) and reconstruction of natural capital (damaged areas).

The relation between regional development and environment has than fundamental aims to creating on long-term harmony between it and the socio-economic processes. Thus, the decision makers of economic field must take responsibility for the consequences on the environment. The future of area study is bound to preserve soil fertility, and interests present and future generations should be oriented towards the adoption of technologies needed to achieve a healthy food.

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Material and method of working

In the perimeter of Basin Drobotfor - Pojorata were analyzed demographic and natural aspects, production, management (based on statistical data of the territory, using questionnaires) and were quantified influences with the help of specific indicators of this field. In terms of number of inhabitants, settlements in the area of analysis have between 4000 and 5000 persons are considered, the sociological perspective, medium-sized. It was found that the population, compared to 1989, decreased a little. The person employed in the active economy is approx. 65% (of which 13.5% working in out of locality) and agricultural activity in 85% of working population (can do manual work hoeing, weeding, mowing and harvesting, but the shepherd). Among those active persons, in the last period, went to work abroad approx. 50%.

In inside of locality are 3328 households (430 new homes), the share of young families representing about 60%. The labor market is poorly developed, the populations of hilly areas are farmers and beekeepers, and the degree of organization is in its early stages.

The studied area is characterized by increased degradation, particularly by torrential erosion, favored by dominance of sandy rocks, features of relief, but also by anthropogenic activities. The process has intensified and as a result of the use of land: fragmentation (Low18/1991), the orientation of the parcels and works on the direction of slopes on direction of slopes.

The exposure slopes have significant implications on the structure of crops and the establishment of associative exploitations. The anti-erosion agro-technical measures on these sloping lands, considered imminent, are: the territory organization, selection of plants, the specific production system, specific technological actions and actions for land improvements.

Results and discussions

1. Current situation of agriculture. Analysis of use of land in the hydrographic basin Drobotfor shows a different distribution such as vegetal formations and the area occupied by these formations. Lack and / or fragmentation of forests reveals anthropogenic activities predominantly agricultural, with vegetal crops applied, especially in the bottom of the slopes and in the meadows rivers Drobotfor Pojorata - subject to management and technology used to achieve them. Across sub basin Pojorata prevail areas occupied by pastures, meadow, vineyards and orchards (land occupied by vineyards and orchards - cherry, pear etc. - are present in the vicinity of localities).

The legal position of agricultural land governed by Law 18/1991. The land (6831.89 ha) -in perimeter Drobotfor / Pojorata - is fragmented on the 3036 exploitations. Thus, there are 1066 exploitations with areas less than 1 ha, 986 with areas of 1.1 - 2 ha, 588 with areas of 2.1 - 5 hectares, 222 with areas of 5.1 - 10 ha, 127 with areas 10.1 - 25 ha, 46 with areas of 25.1 - 100 ha, 1 exploitation with area of more than 100 ha. As a result, the average area on exploitation is less than 2 ha – critical situation regarding efficient and sustainable exploitation. *Ownership and the mode of operation are the first conditions that may elucidate the role of viable exploitations to solve problems of agriculture, from the rationalization and organization of activity and of their territory.*

In vegetal production and animal production prevailing tradition, empiricism, the trend is toward diversification; considerations relate to the provision of family food needs and achieve revenue. Of course, in sole commercial exploitation, things are different, the purpose of the activity to obtain a profit. Therefore, the production structure is oriented towards specialization.

The main cultures practiced on agricultural exploitations (60% of exploitation have as their object the cultivation of plants) are cereals, fodder plants and technical. Their yields obtained in 2007 were low: wheat 1.7 t / ha, barley 1.2 t / ha; grain maize 1.4 t / ha, sunflower 0.9 t / ha, fodder plants 3 t / ha. In a small proportion are included vegetables, potatoes, alfalfa. Because these cultures are obtained in the, individual households, the small size of them not facilitated the creation of a rigorous statistical basis on their share in the area held on the exploitation. Besides the show, mention that the plant products are not sold. Also, the territory includes a fruit-growing exploitation of 100 hectares, the sole exploitation with legal personality.

With a greater openness to market are the products of animal nature. In locality, there is an exploitation specializing in raising sheep, the size is 100 head, and destination marketing products is integral to the local fair. In individual households, along with crop production is a growing number and variety of animals and birds, but also families of bees (187), bred milk cows (785), sheep (2465), goats (105) pigs (77 actual source), horses (147), + hen turkeys (4515), ducks + geese (1005). For them, there are 60 ha of pasture, managed by the local council, growers alfalfa (50 ha) and corn silage (50 ha).

In Drobotfor basin, production system practiced in the culture of plants is traditional with insertion of elements to increase, based on poly culture and practiced in the open. In animal husbandry, production systems are traditional - sheep transhumance.

2. Perspective on issues of agriculture development. The area Drobotfor / Pojorata can be exploited by exploitations (field crops, vegetable, forage, mixed,

and vines and pomicole, zoo technical) and modern forestry, after the preliminary works to improve the conservation and proper slopes and erosion. Thus, the agricultural favorability, respectively the structure crops recommended for different tilt is on slopes below 10% → vegetables, wheat, mash, corn, peas, sunflower, rapeseed, sugar beet, perennial grasses (*Bromus*), on slopes of 10 - 15% → 60% annual crops (of which 1 / 2 fall), 40% perennial crops, on slopes of 15 - 20% → 40% of annual grasses and perennial autumn, wider 20%, 10% forage herbs, 30 % forage legumes, over 20% → destination forestry.

The most rational use of land and directions of development of the agricultural exploitations are defined by determining the number and types rotation to be organized. The crops suitable for protection against soil erosion in the basin Drobotfor are perennial legumes and gramineae which protects from year of vegetation, grain cereal, legumes and perennial gramineae in the growing season of year, annual forage plants, and legumes annual grain are poorly protective.

The favorability is even better the texture culture and the period of exploitation is higher. So, in rotation, the structure should fall weeding crops rate and annual plants. To achieve rotations for 4-6 years with these cultures, the association of owners is required. Specified for that should be taken into account and meet the owners of certain products, staggered crops need to be more technical, labor, available opportunities for producers and mechanization of the work.

The situation in the exploitations impose measures in the future: re-production technologies, the meaning of optimal allocation of production factors determining the level of production, depending on the effort required, given the costs, projected production environments must ensure that the necessary balance between income and expenses, while enabling and producing a profit, resizing fleet of cars and tractors, which allow execution of the entire volume of agricultural best periods, filling gaps in existing plantations and the establishment of young plantations, establishment of own funds to support production technologies and realization of investments, development of recovery programs plantations reached the limit of economic exploitation.

In Drobotfor, use of advanced technologies or improving existing ones could have positive impact on revenue growth, in the case of family exploitations, or profit, in the case of commercial exploitations. In this sense, first, should be respected rotation crops. Needs for food, and primarily for profit, in conjunction with "good agricultural practices", the rotation crops must contain the autumn cereal, rape seed (bio diesel) and / or forage, maize (grain and silage), sunflower, alfalfa (with field rotation jumper). To wheat, for example, that may be obtained on the effect of stabilizing the soil, and analyzed the variations in profits, more, if they

use organic crops, the profit is more than double compared to conventional technologies.

From the analysis of the structure of expenditure production is found high share of expenditure with the seed, generated by the high quantity to hectare and its price, as a resource for organic production. Culture of maize for grain, the variable costs have 94% of total expenditure, which has strong impact on the training cost of production.

In the structure of this indicator are relevant (as a share) the mechanical works spending, as is culture weeding, not give herbicides, is required multiple mechanical weeding. Also, following the division of culture on small areas (a phenomenon specific land slope) occurring return repeated at short intervals of time, with increasing influence on fuel consumption and therefore on growth of expenditure.

For alfalfa, the biggest variable expense is recorded for the period of exploitation with the mechanical work, in the II-IV years of exploitation, these costs increased by approximately 1,7 times compared to the year of establishment. The explanation lies in the increased number of work and maintenance work related to culture. Given the influence of size and of other factors on the production and economic results, and the changes about the operating system and the management practice, is necessary to use changes in areas planted, with increase the land.

The structure of categories of land in the area examined was determined according to the insurance needs of consumption and formation rotation. Thus, the following calculations, based on variables - number of inhabitants, consumption per capita and the average production obtained in 2007 - were obtained as:

- for cereals (wheat + maize), the required annual sowing = 711.7 ha, representing 15.76% of total arable;
- for sunflower (for vegetable fats), the required annual sowing = 293.93 ha, representing 6.52% of total arable.

Mention: words needed in main agricultural crops suitable in terms of protection against soil erosion shall ensure an area of 1005.63 hectares (is 11.2% of the perimeter basin analysis). If the high culture with its reserve the arable with slope to max 10% (although it may get up to 20% if that vine plantings and trees are not investors), 6.3% of the perimeter basin back of the alfalfa (for animal feeding) and rapeseed (for sale).

The lands with slopes of 10-15% will be for life and plantations of trees (16.9% of the area studied) in order to avoid the offset, which is costly for small

businesses. The vine can put on land less favorable for the cultivation of field plants. The conditions of slope in the area Drobotfor / Pojorata are favorable for obtaining grapes and aromatic white wines, as well as table grapes. Currently, the vines are the hybrid direct producers, to be replaced with new plantings vine fruitful they must be located on land which does not require expensive solutions for interior and anti arrangements with broad possibilities of mechanization and lifting continuous indices of economy. The economic conditions (the existence of financial availability) refers to the offer of setting up a wine-growing plantations. Thus, if there is placed a short distance of a good service for winemaking products and close to a good and cheap way of communication, the price that the seller and the loss or reduction of quality is lower.

An important technical factor is the land form and size of parcels determined the level of exploitation expenditure. Uneconomic use of energy has raised costs, thus small exploitations must circumscribe in conceptual organized areas, underpinning the establishment of use in the agricultural perimeter.

The technical criteria are determined by: anti arrangement, construction of roads network, etc. If land is slope is uniform and depth of erosion was not, anti arrangement can run with ordinary mechanical means, and traces the paths are easy to build. For land with sloping uniform, with frequent changes of exposition and frequent places with pronounced erosion of depth, will call the various solutions and specific interventions. Where are slopes of 10-12%, should use anti agro technical works (works of deep soil, administration of chemical fertilizers or green), grass etc. On slopes less than 12%, targeting rows of vineyards and orchards was on the bend. It designs permanent buffer strips (4-5m wide) along water courses and strip grass the bend between the rows of vines or trees.

On the land with low fertility and slope greater than 12%, protection against erosion requires the offset arrangement of land. Planting distance should be 2.0-2.2 m between rows, to ensure work mechanization and 1.0-1.2 m between vines per row. So, stop or reduce loss of water and soil, due to leakage on versants requires practicing anti curtains, grass bends, channels terraces, and coastal. The main shortcoming of tree plantations is age, leading to a potential decline (excluding exploitations with 100 ha). The alternative is the establishment the new plantations.

The organization of land for this purpose, pursuing and achieving the best conditions for preventing and combating soil degradation, creating optimum conditions for the execution of the work of tree care and recovery of production must include works of land improvement, fragmentation, trace roads etc. On slopes of 12% - 18%, are required the grass bands between rows of trees (ratio 1:2:3 or 4, depending on the slope and distance between rows. For establish a hectare of orchard with apples, for example, the land preparation it means an investment of at least 10-15 thousand euros (semi intensive and extensive

exploitations, which they recommend the area studied). Annual maintenance costs, to enter the rod, also are high, and fructification starts at 4-6 years. It follows that the recovery of investment is high and is preferably a combination of such owners for the business, which involves the cost of storage.

As a feature of the area Droboțor / Pojorata, as was specified, the assurance of agricultural products is essential. Thus, to the requirements of annually livestock products, respectively 63.5 kg meat, 240 kg milk and 280 pieces of eggs, the production per capita are achieved 30.78 kilograms of meat, milk and 466.72 l 652 eggs. The deficit is found in meat product. Therefore, can use the mix of industries and growth of sheep for meat and rational exploitation pasture and meadow. By using the rational and full of pasture and meadow land with slope between 15 and 20%, annual to increase over 6,000 head fattened sheep (approximately 141,435 kg meat) that far exceeds the needs of consumption and therefore production can be marketed fresh or processed (if the Association to access funds for IMM).

Also, can to increase the herd of cows, and, milk production, whereas the maintenance of the meadows and pastures, their yields (3 t/year) may be double. Therefore, in the livestock can be organized associative exploitations in the production and processing, which will increase value added.

Conclusion

In the area Droboțor, are predominant agricultural activities, as a means of ensuring the needs of food and income for family. The exploitations are, in generally, small, and least connected to market and poorly capitalized. The solutions obtained after completion of diagnostic analysis regarding capacity the use of the land, knowing the area potentialities, as premise for development of basin Droboțor.

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CONSIDERATIONS ON DIMINUATION OF THE ECONOMIC-FINANCIAL CRISES IN AGRICULTURE OF MOLDOVA

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Abstract

The functionality of the new system based on market relations and open for the people is often marked by dynamism, uncertainty, risk, even by hostility and undoubtedly will be affected by the current economic and financial crisis.

Negative effects within this segment of national economy could be reduced through land plots consolidation, development of agricultural market on the Best Practices base. It's considered economic mechanisms for the increase of land plots production through irrigation, landscaping, soil protection, etc.

The specific of small agricultural exploitations is that entrepreneur is owner, manager, investor, worker at the same time, and must have a wide range of knowledge to achieve the success and to do all rolls mentioned above in a proper way.

Key words: Agriculture, crisis, inflation, taxes, credits, property, legal forms, instruments and economic mechanisms, managers, training, consultancy.

Contemporary agriculture- an important branch of the national economy

For the Republic of Moldova the agriculture was, is and in the nearest future will remain the most important segment of the national economy. Today the agriculture of the Republic of Moldova contributes substantially to the formation of the Gross Domestic Product, even if as it is shown in table 1, the contribution of agriculture to the formation of GDP in our country is reducing from 22.4% in 2001 to 9.9% in 2007. In 2006 the value of agriculture in our national GDP exceeded the industry sector as it is shown in table 2, it has been reduced from 50.6% in 2000 to

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33.6% in 2006. It is necessary to mention that the figure of the population in our country decreased from 3644.1 thousand in 2000 to 3581.1 in 2007. The active economic population has decreased from 1655 in 2000 to 1357 thousand people in 2006. If the population from the rural sector in 2000 was 58.5% then in 2006 it was 59.1% from the total number of people in our country.

Table 1 The evolution of GDP structure per branch of formation, %,

Economic branch/Year	2001	2002	2003	2004	2005	2006
Agriculture	22,4	21	18,3	18,2	18,4	15.1
Industry	18,7	17,3	17,6	16,4	15,9	14.3
Services	46,9	49	49,3	50,9	51,4	54.0
Net taxes on products and import	12	12,7	14,8	14,5	14,3	16.6
Nominal GDP	100	100	100	100	100	100

Source: Statistics annual book of the Republic of Moldova

Table 2 The active economic population of the Republic of Moldova, thousand of people

Year	2001	2002	2003	2004	2005	2006	2007
Total	1499	1505	1356	1316	1319	1257	1247
Including: agriculture	764	747	583	533	537	422	409
Industry	165	171	164	162	159	161	158
Wholesale and retailing, hotels and restaurants	164	175	176	179	183	196	198
Public administration, education, health and social assistance	241	243	246	246	247	247	250
Other types of activities	165	169	187	196	193	231	232

Source: Statistics annual book of the Republic of Moldova

The diversification of agricultural products-is an important factor in over coming the crisis

In all countries and obviously in our country as well, the agricultural products are produced mainly for the internal market. The internal market of the Republic of Moldova is limited by 3.6 million of consumers and conditioned by the purchasing power of the latter. As from Table 3 monthly medium income per person from 2001 to 2007 had increased by 4.2 times, but even in 2007 it covers

only 93% from the monthly medium value. In the structure of the consumption costs of economic entities in 2007, the agricultural products constituted 44%. Without doubts, our country is obliged to export agricultural products.

Table 3 Incomes and costs

Year	2001	2002	2003	2004	2005	2006	2007
Average monthly income per person, MDL	241.0	321.6	422.4	491.4	568.6	839.6	1022.6
Average minimum monthly value for the existence per person, MDL	468.7	538.4	628.1	679.9	766.1	935.1	1099.4
The income reported to the existence minimum, %	51.4	59.7	67.2	72.3	74.2	89.8	93.0

Source: Statistics annual book of the Republic of Moldova

Table 4 External trade per sections according to the Harmonized System (HS),
(mil. USD)

Year	2001	2002	2003	2004	2005	2006	2007
Total export	565.5	643.8	790.0	985.2	1091.2	1051.6	1341.8
Including: Animals and animal products	18.3	15.3	28.6	20.2	17.2	16.2	13.6
Vegetable products	78.8	106.1	91.2	120.0	131.9	136.5	162.9
Fats and animal or vegetable oils	8.2	16.8	28.9	41.2	37.8	34.9	55.3
Food products, alcoholic and nonalcoholic drinks	251.6	267.4	314.3	345.9	396.0	276.4	276.0
Total import	892.2	1038.0	1402.3	1768.5	2292.3	2696.2	3689.9
Including: Animals and animal products	23.8	23.9	24.8	38.8	57.2	51.9	61.7
Vegetal products	37.6	43.5	82.3	73.5	65.0	72.8	150.4
Fats and animal or vegetable oils	3.0	7.1	5.5	7.4	9.9	11.1	16.0
Food products, alcoholic and nonalcoholic drinks	78.9	72.6	92.0	105.3	147.5	179.8	237.9

Source: Statistics annual book of the Republic of Moldova

Both, the import and export in our country, as from table 4 are increasing. If the total export increased by 2.37 in 2007 compared to 2001, then the total import in the same period increased by 4.12 times. Consequently, the loss from the external trade increased by 7.19 times or from 326.7 million USD in 2001 to 2348.1 mil USD in 2007. This should concern us a lot.

Table 5 External trade with main partner countries, millions of USD

Year	2001	2002	2003	2004	2005	2006	2007
Total Export	565.5	643.8	790.0	985.2	1091.2	1051.6	1341.8
CIS countries, total	344.4	350.4	423.6	502.4	551.4	424.1	550.3
Inclusive: Russia	247.0	238.9	308.4	353.3	347.5	182.0	232.7
Ukraine	57.2	61.4	56.1	64.8	99.9	128.8	167.9
EU countries, total	140.9*	171.2*	211.0*	400.7	443.4	537.7	679.3
Inclusive: Romania	37.9**	56.7**	90.2**	98.9	111.7	155.6	211.2
Other countries: USA	25.0	34.9	33.6	42.7	37.5	16.2	15.2
Turkey	2.3	4.1	7.2	12.3	24.7	28.5	32.1
Total import	892.2	1038.0	1402.3	1768.5	2292.3	2696.2	3689.9
CIS countries, total	340.2	408.9	593.4	764.8	905.2	1020.8	1333.7
Inclusive: Russia	143.9	153.4	182.9	212.3	267.8	417.0	498.6
Ukraine	152.6	203.6	309.3	436.3	479.7	516.5	687.0
EU countries, total	317.5*	356.8*	505.4*	774.8	1038.8	1218.5	1681.3
Inclusive: Romania	93.4**	90.4**	97.9**	164.1	257.3	346.0	449.1
Other countries : USA	28.1	48.0	34.5	29.4	40.8	35.9	46.8
Turkey	19.7	32.7	48.2	69.1	93.0	113.8	166.8

Source: Statistics annual book of the Republic of Moldova

* European Union countries to corresponding years:

** In corresponding years Romania was part of Central-Eastern Europe

In 2001 the export of agricultural products represented 63.1%, alcoholic and nonalcoholic drinks 44.5%, then in 2007 this represented 37.8% including agricultural products, alcoholic and nonalcoholic drinks-20.6%. In 2007, the import

of animal products increased by 2.6 times, vegetables by 4.0, fats and vegetable oils by 3 times.

If in 2001 the rapport between the export and import of food products, alcoholic and nonalcoholic drinks was 3.1:1, then in 2007 this rapport is 1.6:1. In this way our country known as an exporter of food products becomes an importer of them. The external trade geography has changed categorically. As it is indicated in table 5 the export has increased in all countries.

In this way the export of CIS increased from 344.4 mil of USD in 2001 to 550.3 mil USD in 2007 or by 1.6 times. The export in EU countries has increased more from 140.9 million to 679.3 USD or by 4.8 times. In 2007 the export to EU countries overcame the one to CIS by 1.24 times. The situation with the export is almost similar. If the import from CIS in 2007 increased in comparison with 2004 by 1.74 times, then in EU countries by 2.17 times. Thus, starting from the situation created on the food and agricultural market, we consider that the economic and financial crisis is quickly approaching to Moldova can be diminished by the evaluation of the offers from the side of European market.

Property and organizational forms in food and agricultural sector and the crisis

The land fund represents the main natural resources of the country and offers opportunities to diminish the crisis. The main orientation of the national agricultural policy was and remains to be the de monopolization of the state property, the change of the property type of the land. 1st of January 2007, as it is seen from table 6, the surface under private property was 1844.5 thousand hectares or about 73% from the agricultural lots. The surface of gardens was 83.6% and the vine yards -94.7%.

Table 6 Agricultural fields as to the property type, 1st of January 2007

Indexes	All types of property		From which			
	thousand ha	%	Public		Private	
	thousand ha	%	thousand ha	%	thousand ha	%
Agricultural fields, total	2511.8	100	667.3	100	1844.5	100
From which: arable land	1820.1	72.5	264.8	39.7	1555.3	84.3
Multi annual plantations	301.8	12.0	37.8	5.7	264.0	14.3
inclusive: gardens	131.5	5.2	21.6	3.2	109.9	5.9
vine-yards	158.6	6.3	8.4	1.2	150.2	8.1

Source: Statistics annual book of the Republic of Moldova, 2007

Such a policy is opportune as the private sector efficiency is very much significant. In 1995 the global agricultural goods obtained from the private sector overcame those from the public sector by 9 times and in 2006 by 11.4 times correspondingly. Comparing the prices in 2005 the global agricultural production increased by 0.7% in the public sector and by 4.2 in the private one. No comments.

The juridical and organizational forms practiced in the national economy will have a great impact on the development of economic and financial crisis. Nowadays, the micro enterprises are dominating. This represents 75.9% from the total, followed by the small ones of 18% and medium-size that make 4.4%. The agricultural fields that belong to small enterprises, represented by farms, have decreased from 1048.7 thousand ha in 2003 to 987.4 thousand ha in 2007 that is shown in table 7.

Table 7 Agricultural fields according to the land owner category,
at the beginning of the year,
(thousand ha)

Indexes	2003	2004	2005	2006	2007
Total	2269.6	2264.0	2257.4	2254.0	2245.8
From which: enterprises and organizations	798.5	835.2	841.2	848.0	839.0
Farms	743.5	706.7	692.9	685.6	678.9
Surface less than 50 ha	607.1	611.7	604.1	620.0	605.8
From which a surface less than 10 ha	600.4	586.5	601.9	611.6	591.3
Plots near the house	305.2	298.6	299.1	306.9	308.5
Other land owners	422.4	423.5	424.2	413.5	419.4

Source: Agricultural activity of small producers in Moldova Republic in 2007, Ed. Statistica Chişinău, 2008.

Today people are oriented to develop small and medium-size businesses. In statistical researches it is stated that “in 2007 the average size of the near house plots was of 0.4 ha. The medium size of the individual farmer fields was 1.62 ha.

First of all we consider that this size of 1.62 ha represent a near house plot of 0.4 ha together with the land share attributed to one person which in 2006 was 1.3 ha. Indirectly, the current idea is confirmed by the same statistical investigation which shows that “those from the total number of the farms, 80% possessed both near house plots and land share given to people. Consequently, if one person is

subject to 1.3 ha of land share and in the majority of families there are about 3 share holders, then the size of the farm should be of about 4-5 ha.

Secondly, the comparative study of the experts of countries with a highly developed agriculture shows that in 2004, in Great Britain the exploited land was of 67.9, in Denmark – 34.7, in Sweden-33.7, Luxemburg-32.4, France-28.4, Ireland-26.1, Germany-17.9, Holand-16.2, Belgium-15.9, Spain-15.8, Finland-12.8, Austria-12.2, Portugal-6.9, Italy-5.6, and Greece-4.2 ha.

Thirdly, according to the annual statistical bulletin of Moldova, the households and the farms provide for the consumer's disposal over 70 % of the total volume of agricultural products they produce. According to the results of statistical studies, the personal subsistence farms of citizens and farmer's units with areas under 10 ha in the year 2007 occupied only 40% of agricultural lands and have provided 70% of the total volume of agricultural products in the country, including 58% of crops and over 87% of livestock. Labor productivity is higher in small and middle-sized enterprises. The average income per one employee in the middle-size and small business is 176.7 thousand lei compared to the enterprises of the same size in agriculture – only 39.9 thousand lei. In small enterprises – respectively 270.6 and 74.6 thousand lei, while at micro enterprises - 128.3 and 61.4 thousand lei respectively. This is an incontestable demonstration of higher efficiency of small producers.

However, one has to mention that the agricultural lands are highly fragmented, even within the same agricultural enterprise. Obviously, we consider it advantageous to consolidate the agricultural lands by following the western model granted that this process would take place in accordance with the provisions of the EU-Moldova Action Plan for the year **2007 that urges us to „Continue the processes of voluntary re-parceling and consolidation of agricultural lands through the land market mechanism”**.

In the conditions of the Republic of Moldova, as well as in the countries of European Union the growth of average area of farming units takes place by: donation and successors; *lease; sale-acquisition; association and cooperation*. ***For the consolidation of small agricultural producers it is extremely important for the state not to impose any of the above-mentioned modalities but to mediate impartially and to encourage them by fiscal facilities and financial support, simultaneously providing adequate legal framework.***

The extension of private property on land and formation of farmer's enterprises have contributed substantially to the growth of the number of persons capable of making decisions in agriculture.

Economic tools and mechanisms to be implemented in agriculture for the attenuation of crisis

The economic and financial crisis in the sector of agriculture and foodstuffs may be attenuated by economic tools and mechanisms. Another important aspect is the *price* that generally expresses the "society's power" over its members. In agriculture it may have both positive and negative effects. According to the Table 8 below, the consumer price index for foodstuffs is growing from year to year practically at the same rates, oscillating from 104.3% in 2002 to 113.7% in 2005. The difference between the price indexes of products sold by the agricultural enterprises and the compared to the previous years is more pronounced and varies from 93.7% in 2004 to 139.2% in 2007.

Table 8 Evolution of consumer price index

Year	2001	2002	2003	2004	2005	2006	2007
Consumer price index for foodstuffs, annual average, previous year =100	110.8	104.3	113.6	112.8	113.7	109.1	111.0
Price index of products sold by agricultural enterprises, annual average, previous year =100	99.5	100.2	120.3	93.7	105.5	102.9	139.2

Source: Annual Statistical Bulletins of the Republic of Moldova

Most of them want to buy as much as possible. In the conditions of economic and financial crisis direct and indirect intervention of legislative, executive and legal powers is necessary in order to regulate the price policies and in such situation one should consider the experience of EU in the application of *indicative prices, or suggested prices, equitable for both producers and consumers; intervention prices* are aimed at triggering the community mechanism of *maintaining the incomes of the farmers and the threshold prices* – minimum prices at which the imported products may enter the internal market.

Taxes and duties are efficient intervention tools that the public authorities may use for the regulation of agricultural sector. Indirect taxes, such as VAT, equivalent land unit fee, etc. are the dominating elements in the structure of taxes levied from agricultural producers. The direct collections, such as income tax are insignificant. Non-fiscal collections in the form of duties, including the customs duties also have a significant impact on the situation in agriculture. Besides fiscal scopes they also may pursue:

- increase of prices for the respective products on the international market (given that the state in case is an important exporter of these products);
- limitation of certain exports (as a rule, of non-processed products in order to have them processed in the country in bigger quantities and exported as manufactured products) to stimulate certain industries.

In the conditions of economic and financial crisis one may find useful to apply selective temporary interdictions on the imports of agricultural products in order to maintain the necessary equilibrium between the supply and demand for the national agricultural products and cancellation of all interdictions on the exports of foodstuffs in order to encourage the domestic producers.

Credits. The specifics of agriculture imply a need to borrow resources both for long and short terms. Pursuant to the results of a selective statistical study, the cash income from agricultural activity generated per hectare of agricultural parcels located adjacent to the farmers' houses in the year 2007 have attained a value of 10364 lei while the income per hectare obtained by the farmers having both adjacent parcels and farming lands was only 5033 lei. Hence, such income opportunities are rather limited to enable adequate investments. This situation requires us to elaborate and implement measures to encourage borrowing.

In the conditions of economic and financial crisis *subventions* meant to stimulate the development of certain segments of agricultural sector are extremely important. They may take the form of specialized assistance for biological agriculture in order to encourage the alternative use of agricultural lands, for the maintenance of agriculture in less attractive zones and communes, for the professional training, etc. The EU-Republic of Moldova Action Plan for the year 2007 in the agricultural compartment requires „Optimization of agricultural subventions (allocation of funds in the form of investments). For this purpose we consider relevant the following measures:

- cancellation of the existing system of compensations for agricultural-climatic conditions even if they do affect the agricultural sector and encouragement of creation and implementation of private insurance systems;
- removal of limits on existing funds, creation of budgetary and extra-budgetary funds using the income from agricultural activities for the strictly targeted financial assistance of certain agricultural activities and processing of primary agricultural products;
- stimulation of exports of agricultural products and foodstuffs by implementation of preferential exchange rates. Every euro obtained from

exports would be exchanged at a rate increased by 1-2 lei compared to the prevalent one;

- assurance of transparency of costs incurred by the state for the agricultural sector;
- abandonment of support *ex ante* / before obtaining the products / that as a rule is inefficient and the state intervention *ex post* /after the products are obtained /. In order to stimulate the farmers to produce highly demanded products, especially for the external market, we must analyze the spectrum of sold products. The *ex post* support may be provided via two mechanisms:
 - a) the state provides subventions for a part of the market price, covering the production costs;
 - b) the state procures the products at a negotiable price not less than the production cost. The products are then sold, including to the processing industry at a price smaller than the one paid to the farmers in order not to affect the purchasing power of the population.

In the conditions of crisis the public authorities could support agriculture by taking the surplus of products from the farmers at a price sufficient for covering the costs, for their subsequent storage and sale when the demand on the market becomes high. Considering all consumers together, i.e. the total demand in the society, one may make a conclusion that the possibility of buying more products would increase when the prices become smaller. Nowadays the country's agricultural sector requires elaboration and implementation of a new system of tools and economic mechanisms aimed to reduce the effects of economic and financial crisis.

Entrepreneurs and managers may contribute to the attenuation of crisis in agriculture

Assuming risks and incertitude, the entrepreneur and/or the manager of an agricultural enterprise has to find new sources of certitude to limit the instability and reduce the effects of economic and financial crisis, providing for the profitability of his business. The "perfect" ones are practically impossible to be found or are insufficient to satisfy all needs. Rather limited is the number of personnel with higher education.

As seen in the Table 9, the share of staff with higher education in the total number of employed persons is around 19 percent. In agriculture the share of personnel with higher education is only 3 percent of the total number of workers

employed in this branch. Clearly, "perfect" entrepreneurs and/or managers have to be educated. Making people more productive by education,- in the vision of Peter Drucker [7, 76], is the „top challenge of our era”.

Table 9 Structure of personnel education by occupations 2007, thousand persons

	Total occupied labor force	Education					
		Higher	Special secondary	Professional secondary	Lyc-eum	Gym-nasia	Primary or no education
TOTAL	1247,2	247,4	211,3	308,6	253,6	205,4	20,9
Agriculture, hunting, forestry and fishery	408,6	12,8	36,9	102,5	106,0	131,7	18,8
Industry	158,1	27,0	28,7	53,5	31,3	16,9	0,7
Construction	75,7	9,4	10,5	25,9	16,4	12,6	0,8
Commerce, hotels and restaurants	197,9	42,5	43,0	52,9	41,5	17,6	0,2
Transport and communication	68,7	13,4	13,7	25,3	12,7	3,6	0,0
Public administration, education, health and social assistance	250,5	104,2	63,1	33,8	31,4	17,8	0,3
Other branches	87,8	38,0	15,4	14,8	14,2	5,1	0,1

Source: Annual Statistical Bulletin of the Republic of Moldova

Here one should mention at least two stages of knowledge accumulation by the entrepreneurs and/or managers:

- Before starting the business
- While performing entrepreneurial activity

Before starting his business any entrepreneur would need to have the competence that by Boettinger is acquired by the „methods transmitted from teacher to pupil ...” Already in 1911 Frederic Taylor wrote about the „optimum method”, while Henry Fayol pointed that „managerial ability may and should be acquired in the same way as technical ability – at school and then in the workshop”.

The entrepreneurs of agricultural enterprises consider that the best knowledge comes from experience – both their own experience and the experience of others. As a consequence the entrepreneurs often learn things after they „hit the problems with their heads” as they appear in the course of the business they have started. „Learning by doing” is a recipe recommended by Peter Drucker in his „Landmarks of Tomorrow” [7,76]. In the conditions of competitive economy and highly dynamic changes, as well as of the need for innovation one would want to have better training in the testing of ideas and elaboration of concepts to be applied for the reduction of effects of economic and financial crisis. Qualification upgrade courses for entrepreneurs and/or managers of agricultural entrepreneurs should include 60-90 hours of contact with the professor and around 360-450 hours of individual activity during a period of three to six months, four hours a week. It would be good for such trainings to include the following three components:

One third of the activities shall be organized based on the program elaborated by didactical staff and include the most actual problems of developing business in agriculture in the conditions of crisis; One third of the activities shall be organized based on the problems and situations faced by the entrepreneurs and/or managers following the qualification upgrade program; One third of the activities shall be dedicated to the elaboration of a development strategy for the agricultural enterprise by the entrepreneurs and/or managers with the help of a coordinating professor.

The entrepreneur and/or manager as any other human being is capable of effectively using only one or two of the competencies he has. Being unable to perform all of his managerial functions he is forced to employ permanent staff or apply for assistance to the respective specialists. As for the small agricultural producers it is not rational to hire specialized staff, the need to organize and develop consultancy services becomes absolutely clear. Obviously, consultancy services must be provided by specialized companies. The consultancy services would be the „business incubators”.

In conclusion we should stress that only by supporting private property, gradual consolidation of agricultural lands based on the principles of market relations, development of efficient organizational and legal forms, use of tools and mechanisms adequate for the competitive economy, training of persons working in the agricultural sector and foodstuffs production and widening of consultancy system the state may reduce the negative effects of the economic and financial crisis.

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