UDC 338.43:63

ISSN 0352-3462

ЕКОНОМИКА ПОЉОПРИВРЕДЕ
ECONOMICS OF AGRICULTURE

60.

"Сагласно одлуци из члана 27. став 1. тачка 4), Закона о научноистраживачкој делатности („Службени гласник РС", бр. 110/05, 50/06-испр. и 18/10), утврђена је категоризација домаћих научних часописа

Листа часописа за друштвене науке

5. Економика пољопривреде М24"
(Часопис међународног значаја)
http://www.nauka.gov.rs (28. Jun 2010)

Београд, јануар-март, 2013. године
Belgrade, January-March, 2013

Часопис / Journal

◊ ЕКОНОМИКА ПОЉОПРИВРЕДЕ ◊
◊ Economics of Agriculture ◊

Основан 1954. године / Established 1954

ИЗДАВАЧИ / PUBLISHERS

Научно друштво аграрних економиста Балкана, Београд
The Balkan Scientific Association of Agrarian Economists

Институт за економику пољопривреде, Београд (Србија)
Institute of Agricultural Economics, Belgrade

Академија економских наука, Букурешт (Румунија)
Academy of Economic Studies, Bucharest (Romania)

Адреса уредништва / Editorial office

Београд, Волгина 15; тел/факс (+381)11/6972-848; E-mail: epoljoprivrede@gmail.com
Belgrade, Volgina 15; phone/fax (+381)11/6972-858; E-mail: epoljoprivrede@gmail.com

TECHNICAL SECRETARIAT

UDC 338.43:63 **ISSN 0352-3462**

ECONOMICS OF AGRICULTURE

CONTENT

Original scientific paper

Economics of Agriculture 1/2013
UDC: 663.2:339.13(450.82)

ORIGIN DESIGNATION AND PROFITABILITY FOR SMALL WINE GRAPE GROWERS: EVIDENCE FROM A COMPARATIVE STUDY

Giuseppe Di Vita[1], Mario D'Amico[2]

Summary

The concept of profitability has been widely debated in the international scientific economic community but there are few studies which contribute to connecting the profitability of micro and small agro-food holdings in PDO or PGI areas with their ability to stay afloat in a competitive market.

This study compares the economic results of quality wine grape producers in Sicily providing an analysis of the impact and consequences of raised economic performance in local vine-grower economies. Economic indicators were employed to compare the profitability in two PDO areas, verifying if micro and small size farm quite remain competitive in an increasingly concentrated wine market.

Detailed survey data was collected in 2 of the most important Sicilian PDO wine areas, showing the first results of some economic indicators which compare the vine-growing processes in each geographic area and evaluate the profitability of a sample of small grape producers. To evaluate the remuneration of capital and the ability of smallholder to compete in a global market, average farm profitability expressed as farm net value for each homogeneous area was calculated taking into account production costs and total output.

Despite several studies demonstrating that PDO certification increases costs and profits our study reveals how DO does not always ensure adequate profitability for micro and small vine growers.

The production and sale of unprocessed grapes does not provide any value-added products and local producers do not gain additional remuneration for the intangible components of their PDO grapes. Further analysis has required exploring to what extent these results are caused by increasing costs or by an inefficient market structure.

1 Research fellow, University of Catania, Department of Agri-food and Environmental Management , via Santa Sofia 98, 95123 Catania, Italia.

2 Assistant Professor, University of Catania, Department of Agri-food and Environmental Management, via Santa Sofia 98, 95123 Catania, Italia.

Key words: *PDO wines, vine-growing economics, small size farms, Sicilian wine grape production, farm profitability.*

JEL: *Q12, Q13*

Introduction

Traditional wines are one of the most significant agro-food products of a rural territory and their point of strength derives from the historical, cultural and social expression of local tradition (Di Vita, 2004). Since Phoenician times, Sicily has retained a well-established reputation in wine production (Caniglia et al. 2008), nowadays being the third most productive region in Italy both for vine-growing surface area and wine production (D'Amico, 2005).

Between the '50^{s} and late '80^{s}, there was an increase in the surface area of vines and wine production in Sicily of which wine production was mainly oriented towards bulk wines, although bottled wine was produced in smaller quantities (Di Vita, 2003*a*).

From the early '90^{s}, Sicilian wine production entered a period of structural reforms, accompanied by significant economic growth in the whole wine sector. New enterprises started up, and wine producers affiliated into large groups so traditional companies started thriving again.

This trend, which occurred with varying intensity in different vine growing areas of the region, applied also to some counties which traditionally had less competitive levels of wine production (Caltanissetta, Agrigento and Ragusa). In fact, with few exceptions, wine producers had already started quality improvement some decades earlier (Di Vita, 2002). The wine industry in Sicily has multiple criteria (Crescimanno et al. 1998; Tudisca, 2007) due to different mountainous and pedological conditions (volcanic soils, Mediterranean red soils, clayey soils and soil with a high calcareous matrix) as well as from different characteristics of farming plantations (vine training, cultivars, irrigation practices, etc.).

Only in the last decade, have Sicilian wine producers understood the logical necessity of increasing production quality to compete with the market challenges of the global market (Di Vita, 2003*b*). For this reason, Sicilian grape producers invested in better quality vineyards (introducing new grape varieties, zonation, precision viticulture) and by introducing modern technologies in harvesting and better grape quality. Furthermore, there has been widespread growth in new PDO[3] designated areas all over the island,

3 According new EU regulation Protected designation of origin (PDO) express the name of a region, a specific place or, in exceptional cases, a country used to describe a wine that complies with the following requirements: (i) its quality and characteristics are essentially or exclusively due to a particular geographical environment with its inherent natural and human factors; (ii) the grapes from which it is produced come exclusively from this geographical area, (iii) its production takes place in this geographical area; (iv) it is obtained according production regulations (Reg. CE 491/2009).

but not always the spread of new origin designations has improved local winegrowing economies (D'Amico et al., 2011*a*).

In 2010, Sicilian quality wine production (PDO and PGI wines) reached over 220,000 hectolitres (ISMEA, 2010) representing 1.5% of all regional wine production in Italy.

Table 1 provide a short description of PDO wine sector in Italy by main region producers; the PDO wine areas are located in 13 different regions but three of them (Piedmont and Tuscany and Veneto) concentrate over 56% of PDO surfaces and 53% of total PDO wines.

Currently, Sicily has 29 certified wines, which represent about 6% of all Italian PDO wines, 21 of which are PDOs (76%) and 7 (24%) are PGIs (D'Amico et al. 2011*b*). Of all Sicilian PDO wine grapes growing, 37.7% is grown on less than 2 hectares and 28.0% is between 2 and 5 hectares (Chinnici et al. 2011).

Tab. 1- Wine grape surfaces, wine production and producers in main regions PDO areas

Region	Surface		Wine production *		Wine grape growers	
	hectares	%	000 hectolitres	%	number	%
Piedmont	**49,663**	**18.3**	**2,318**	**15.7**	**17,383**	**15.9**
Tuscany	**41,719**	**15.3**	**1,692**	**11.5**	**7,699**	**7.1**
Veneto	**36,620**	**13.3**	**2,402**	**16.3**	**14,561**	**13.4**
Emilia-Romagna	**23,857**	**8.7**	**1,544**	**10.5**	**11,110**	**10.2**
Lombardy	**21,628**	**7.9**	**681**	**4.6**	**6,206**	**5.7**
Abruzzo	**19,873**	**7.3**	**1,021**	**6.3**	**5,213**	**4.8**
Trentino AA	**14,595**	**5.4**	**959**	**6.5**	**10,369**	**9.5**
Sicily	**9,652**	**3.5**	**227**	**1.5**	**1,493**	**1.4**
Others	***55,226***	**20.3**	**3,882**	**26.4**	**34,774**	**32.0**
ITALY	**272,433**	**100.0**	**14,729**	**100.0**	**108,808**	**100.0**

Source: ISTAT, Italian National Institute of Statistics, 2010
*** Wine production is the mean of last 4 years (2007-2010)**

Detailed survey data was collected (Autumn 2010) in 2 of the most important Sicilian PDO wine areas, Alcamo and Menfi, showing the first results of some economic indicators which evaluate the profitability of wine growing processes in each PDO area.

This study, using detailed survey data collected (autumn 2010) in 2 of the most important Sicilian PDO wine areas, Alcamo and Menfi, shows the first results of some economic indicators which compare the winegrowing processes in each geographic area and evaluate profitability.

This survey analyses the economic results of quality wine grape producers in Sicily evaluating total output, total costs and the farm net value of sampled farms in 2 homogenous PDO areas. It aims at providing some analysis of the impact and consequences of raised economic performance in local vine-grower economies. This study also aims at identifying the main drawbacks for micro and small[4] PDO wine grape growers in competitive markets.

Theoretical background

Many studies have been directed to identify the key management skills for running a successful winery business (Charters et al. 2008; Grant et al. 2011; Pappalardo et al. 2013) and several of them have been carried out to represent actual trend of Italian PDO wine market (Vecchio, 2009; Stasi et al. 2011) but very few studies have estimated and compared the profitability of PDO wine for small vine grape growers, whose results not always seem to be profitable. Several complexities in the market for Italian wine-grapes may explain this dearth of studies.

Policy-makers have long recognized consumers' interest and the importance of Geographical Indications to impact product valuation (Herrmann et al., 2010). Geographical designations represent a useful differentiation tool for farms (Stasi et al., 2011) and it could provide farmers to avoid competition in commodity markets, representing a key option to raise farmers' incomes (Josling, 2006; Deselnicu et al. 2011a; Stasi et al. 2011). In this way, farmers and wine grape growers could have easier access to niche markets through the use of GIs labels, extracting premium prices (Bramley et al. 2009; Deselnicu et al. 2011b).

The concept of profitability has been widely debated in the international scientific economic community but there are few studies linking the profitability of micro and small agro-food holdings in PDO or PGI areas with their ability to compete in the market.

According to Harward & Upton (1961) "profitability is the ability of a given investment to earn a return from its use" which applied to the profitability of agricultural holdings, regional and traditional foods have been conceptualised as a form of cultural and social capital, providing rural areas with social and economic benefits (Tregear et al. 2007; Arfini et al. 2011).

4 *Small enterprises* are defined as enterprises which employ fewer than 50 persons and whose annual turnover or annual balance sheet total does not exceed 10 million euro. *Micro enterprises* are defined as enterprises which employ fewer than 10 persons and whose annual turnover or annual balance sheet total does not exceed 2 million euro. *Medium-sized enterprises* consists of enterprises which employ fewer than 250 persons and which have either an annual turnover not exceeding 50 million euro, or an annual balance sheet total not exceeding 43 million euro (European Commission, 2005).

Some empirical analyses have shown how the "PDO label seems to positively contribute to the sustainability of rural development (Belletti, Marescotti, 2011) and rural employment, mainly through the downstream market channel" (Bouamra-Mechemache, Chaaban, 2010c), as the origin-labelled products and territorial brand contribute to rural development (Lorenzini, 2010). On the other hand the "PDO label seems to have a negative direct economic influence on the number of farmers at the district level" (Bouamra-Mechemache, Chaaban, 2010c), first of all on small holdings, considering that this study showed that "given that the majority of grape growers in the industry are operating on less than 10 hectares, there is no guarantee that the endeavour will be profitable" (Bryant, 2010).

The demand for wine-grapes is often highly elastic and differentiated among qualities (Fuller, Alston, 2012) and the demand for Alcamo and Menfi winegrapes is effectively influenced by global supply and market conditions, making the demands very elastic. PDO producers could "benefit from a price premium on their product which offsets their higher production cost" (Bouamra-Mechemache, Chaaban, 2010a) but without a premium price, growing costs and low profits can reduce the market opportunities for small producers.

Generally "small farms are struggling to retain competitiveness via improved management and low-input systems" (Nehring R. et al. 2009) but at the same time Kirner and Bartel-Kratochvil (2007) show that larger holdings obtain higher incomes from agriculture and forestry but smaller holdings tend to provide greater environmental services per unit of agricultural land. Among these, vineyards are not only an essential component of the landscape in winegrowing regions, but also contribute to preserving them by preventing soil erosion and ensuring the presence of man in areas that are among the most fragile from an environmental point of view and often lacking any real economic alternative.

The survival of micro and small agricultural holdings and their "resistance to marginalization depends mainly on the reinforcement of endogenous resources of development, in combination with public and private initiatives from outside the region" (Bazin, Roux, 1995). Farm profits simply cannot be 'sustained' through continued industrialization of agriculture and "future profits of farmers must also be squeezed from the *farmer's penny*" (Ikerd, 1996).

Over the last five years, high levels of volatility in input costs (fertilisers, fuel and water) have lowered the profitability of Italian farms, leading to many difficulties in managing the negative returns from agricultural activity (Bracco et al. 2008) and only the best equipped farms with access to modern distribution channels as well as the technological ones can save on production costs (Arfini et al. 2010). With failing profits small farms are forced out of the market.

Given these conditions, first of all for Mediterranean countries (Sluiter, de Jong, 2006; Tatony et al. 2004), the risks of decreasing rural employment and increasing land abandonment are critically elevated (Pinto Correia, 2000) and the consequences have not been exhaustively analysed, either in terms of social or economic perspectives.

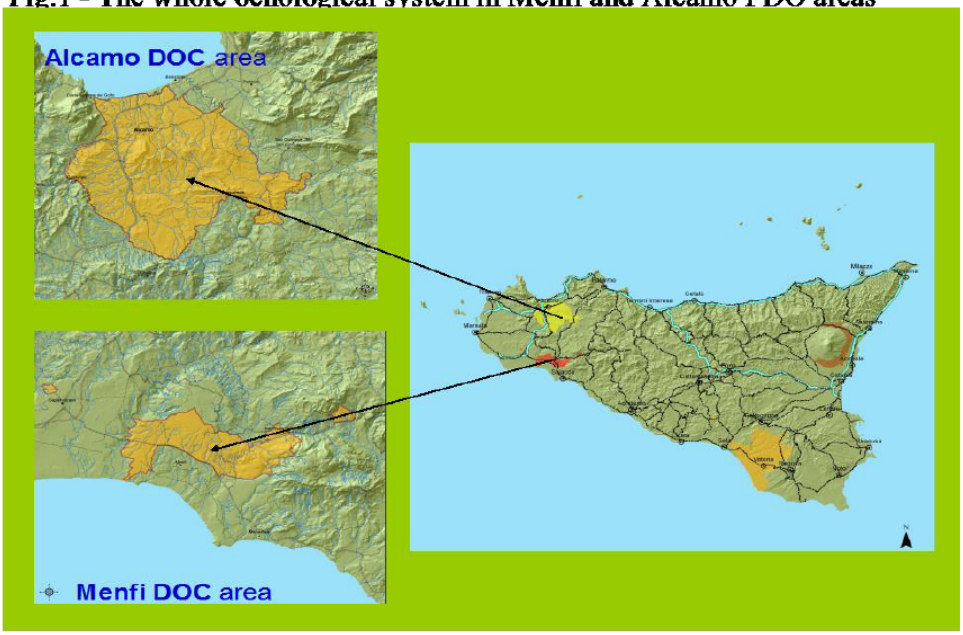
This study seems to confirm previous finding of a recent study that evidence how wine surplus and imperfect price transmission are the main causes determining low farm-gate prices in other Mediterranean wine sector areas (Costa-Font et al. 2009)

Data collection and methodology

The investigation covered the areas of *Menfi PDO* and *Alcamo PDO*. Figure 1 shows the geographic location of these areas and reports their main production breakdown.

The vine grower farms producing *Menfi PDO* wine are located in the municipalities of Santa Margherita di Belice, in the province of Agrigento, and Castelvetrano, in the province of Trapani. While the survey on the quality grape wine producers of *Alcamo PDO* wine was carried out in the municipalities of Alcamo, Castellammare del Golfo and Calatafimi, in the province of Trapani, and in Monreale and Camporeale, in the province of Palermo.

Fig.1 - The whole oenological system in Menfi and Alcamo PDO areas



Area	Certified surfaces (hectares)	Wine-grower holdings (n.)	Certified wine production (hl)
Menfi	393	142	2,745
Alcamo	695	172	20,633

Source: IRVV, 2010.

The structure of sample was mainly oriented to choice representative farms with respect to farm size of whole island as reported in Table 2.

Tab. 2 - Total wine grape growing farms by size in PDO areas in Sicily and structure of sampled farms

Size	Total Farms		Sample Farm	
	number	%	number	%
< 2 hectares	1.007	*67,4*	10	66,7
2-5 hectares	313	*21,0*	3	20,0
> 5 hectares	173	*11,6*	2	13,3
TOTAL	**1.493**	***100,0***	**15**	100,0

Source: ISTAT, Italian National Institute of Statistics, 2010

With specific regard to the technical and economical analysis of the companies involved in quality wine grape growing, 15 representative farms were identified in each area, taking into account the characteristics of the territories as well as some specific attributes of the production units.

Given that there is a great diversity of wine grape growers and to ensure that the sample of farms adequately reflects this heterogeneity, we stratified the universe of farms using four criteria for stratification: regional distribution of land size, PDO area of production, specialized grape wine growing farms and age of vineyard (constant production stage).

Tab. 3 - Characteristics of sampled farms

item	Surface (hectares)	Plants/ha (number)	Age (years)	Altimetry (metres)
Menfi DOC				
mean	**2.0**	**4,116**	**11**	**147**
MIN	0.9	3,800	8	50
MAX	5.1	4,660	16	210
Alcamo DOC				
average	**5.7**	**3,960**	**13**	**265**
MIN	1.4	3,500	9	150
MAX	17.1	4,625	20	550

Source: survey data 2010

The data was collected during 30 face-to-face interviews with vine growers using a survey questionnaire. The structure of the final questionnaire was developed using results and information derived from previous focus group that aimed at selecting the broad items through interviewed directed to producers, technical consultants (agronomists and

agricultural economists), public officers of the Agricultural Regional Department, and producers' association (PDO Committee of each geographic areas. Questionnaires were administered to wine grape producers in each of the two study areas. The questionnaire was divided into two sections. The first one covered technical information about the farms (name, location, setting up of business, distance from markets, etc.), the characteristics of the vineyard (physical environment, altitude, method of cultivation adopted, surfaces, type of grape, age, etc.) and the annual work units (family workers, wage earner workers, etc.).

The second one focused on economics, such as total crop output (mean grape production of last 4 years), sales prices and total costs referring to crop years 2009-2010.

With regard to production costs, the analysis identified three main classes: i. *materials*, ii. *labour and services* iii. *quotas and other duties*. In particular, *materials* includes the cost of all non-capital inputs used during the accounting years, such as fertilizers, pesticides, herbicides, fuel, water and other crop specifics.

Labor and services includes the cost of workers involved in farm production during the accounting year. Family labour is included in the whole labour cost. We calculated labour total cost, by multiplying the number of hours truly worked by the hourly labor costs

Non-farming services refers to incidental costs concerning 'activities carried out by external companies' which include: renting machinery and agricultural vehicles, insurance, mediation for the sale of products, and transport. *Quotas and other duties* includes machinery, equipment, land and building depreciation costs, circulating and current capital, taxes and fees. No direct subsidies were included, because in Italy wine grape growers do not receive direct government subsidies. EU support wine grape sector through indirect subsidies, whose measures are directed to promotion outside the EU, innovation, restructuring and modernisation of the production chain, support for green harvesting, crisis management, etc.

According to White (2008) and Bracco et al. (2008), any missing information was supported with an accurate integration of data provided by technical consultant of producer's management or by market official data (PDO Committee, etc.).

Similarly to other methodologies adopted to enable analysis of farm income (Blanks et al. 2009; European Commission, 2010; European Commission, 2011), the aims of study was to evaluate the remuneration of employed capital and the ability of smallholders to compete in the global market. The economic model used in the analysis essentially rewrites the methodological approach tested since the 70's by the Italian agricultural economists (Di Cocco, 1970). More specifically, to evaluate the profitability of examined sample the analysis used the counting scheme known as equation of profit (De Benedictis, Cosentino, 1979; Panattoni, Campus, 1983), a model widely experienced in the Italian agricultural economic literature. An alternative model could have been FADN methodology, but different approach of data collection did not allow using it.

The average farm net value for each homogeneous area was calculated by subtracting production costs, that include total intermediate consumption (specific costs + farming

overheads) plus depreciation, from total output that include total output crops and crop production (sales, farm use and farmhouse consumption), as follows:

Farm net value = Total output – total costs

$$\mathbf{FNV = [(TO) – (LC + O + I + Q + T)]}$$

FNV = Farm net value
TO = Total Output
LC = Labour and management Costs
O = Overhead
I = interests
Q = Quotas (land use, depreciation of capital, assurance, maintenance quotas)
T = taxes and fees

Results and discussion

Economic indicators - necessary for designing and assessing policies aimed at ensuring the success of a farm as well as for assessing and influencing agro-food markets - were employed to compare the production competitiveness in two PDO areas.

Cost of production - A preliminary analysis of the activity times for in-vineyard management was developed to determine the duration of time worked by growers in each cultivation activity (Pomarici et al. 2005). In the *Alcamo PDO* area, pruning requires more labour hours than other activities, representing 57.6% of all growing activities. The second most labour-intensive activity is grape harvesting (25.4%), and includes both mechanical and manual harvesting. Soil management comes third in labour intensity, with 11.4 %, while the rest can be broken down as follows: grape and soil treatments (3.6%), fertilization (0.9%) and other activities (1.1%), including the ordinary maintenance of trellis and irrigation systems.

As regards the labour intensity required in the *Menfi PDO* area, grape harvesting, mainly by hand, is the most labour-intensive (48.6%), while pruning is 36.0%. The remaining labour activities are distributed in a very similar manner to those in the *Alcamo PDO* area.

The main costing for vine-growing farms, were surveyed and aggregated in Tab. 4. According to a widely used methodology in previous economic analyses (Sturiale, 2006; Bracco et al. 2008), the costings were divided into three classes: i. materials, ii. labor and services and iii. quotas and other duties. The costs were related to surface areas and were expressed as euros per hectare (€/ha).

For the *Menfi PDO* vine growing farm sample, we calculated average total costs of 3,320 €/ha, ranging from 2,598 €/ha to 3,883 €/ha.

The *labor and service* costs are the most expensive (41.5%) averaging 1,370 €/ha and ranging from 1,027 €/ha to 2,200 €/ha. The costs attributable to 'quotas and other duties', represent 37.7% of total costs averaging just over 1,250 € /ha, with a minimum of 873.91 and a maximum of 1,451.20 €/ha.

The cost of purchasing 'materials' (fertilizers, pesticides, fuel, water, electricity, etc) are the least expensive (20.8%) averaging around € 690.00 per hectare, with extremes ranging from 454.00 to 875.50 €/ha.

Tab. 4 - Mean of total cost component of vine-growing sample (2009/10)

Item	Menfi		Alcamo	
	Euro/ha	*%*	*Euro/ha*	*%*
materials	668.74	*20.8*	381.95	*15.5*
labor and services	1,376.50	*41.5*	1,191.01	*48.4*
quotas and other duties	1,255.21	*37.7*	887.31	*36.1*
Total costs	**3,320.34**	*100.0*	**2,460.27**	*100.0*

Source: survey data 2010

The average total costs of *Alcamo PDO* vine growing amount to 2,460 €/ha, with a minimum of 1,983 and a maximum of 2,933 €/ha. *Labour and services* constitute the major cost (48.4%) averaging 1,190 €/ha. *Quotas and other duties* constitute a significant proportion of total costs (36.1%) and they average at 887.31 €/ha. The average cost of *materials* is the least significant (15.5%) at around 380 €/ha.

The difference in costs between the two DOCs are mainly due to different environmental conditions, wine growing techniques and different cultivar (white and red grapes), but in the authors' opinion no significant differential in costs emerges with respect to technical specification of each of two PDO's, that's because every PDO Council Regulation imposes production limits (maximum production per hectare) and very similar specific cultivation rules (soil management, pruning, grape and soil treatments).

Production and total output - The evaluations of grape production were based on average yield, expressed in grape kilograms per hectare (kg/ha) and in grape kilograms per plant (kg/plant). As reported in table 5, production was calculated as the average of the most recent years (2006-2010).

The corresponding market prices of grapes were calculated for weighted average prices. The prices refer to the most recent year (2009/10) and were expressed in euro per kilogram of grapes (Chinnici et al. 2011).

With reference to grape production, the *Menfi PDO* area produces an average of 10,754 kg per hectare, ranging from 9,800 kg/ha to 11,700 kg per hectare. The average plant produces from 2.3 to 3.0 Kg/plant, with an average around 2.6 kilograms per plant.

The weighted average price of grapes fluctuates from 0.27 to 0.39 €/kg averaging 0.32 €/kg, price fluctuations depending mainly on grape quality (sugar levels and grape soundness) and varieties. The most common varieties grown in *Menfi PDO* are Grecanico, Inzolia, Catarratto and Chardonnay for white wines and Nero d'Avola, Sangiovese, Syrah, Merlot

and Cabernet Sauvignon for red wines. As for the total output of the *Menfi PDO* sample, we estimated the average grape production over the last 4 years and the corresponding average price refers to last year (2009/10). The average total output is 3,448 €/ha, fluctuating from 2,954 to 3,846 €/ha. As regards total output per plant, gross production reached an average value of 0.84 Euros per plant, varying from 0.70 to 1.00 €/plant.

Tab. 5 - Production, prices and total output of sample (2009/10)

Area	Production (Grapes)		Average price of grapes	Total Output	
	kg/ha	kg/plant	euro/kg	euro/ha	euro/plant
Alcamo DOC	9,424	2.3	*0.24*	2,413.13	*0.61*
Menfi DOC	10,754	2.6	*0.32*	3,448.56	*0.84*

Source: survey data 2010

The variables related to production, prices and total output of the *Alcamo PDO* sample were evaluated with those previously assumed for *Menfi PDO*.

The production analysis was based on the average results of the sample of companies surveyed (Table 5 taking into account grape production per hectare (kg/ha) and per plant (kg/plant) in the last four years (2006/10) there was an average yield of around 9,400 kilograms, ranging between 9,137 and 10,012 kg/ha.

Taking into account planting density, we calculated average grape yield per plant at around 2.3 kg, ranging from 2.1 kg/plant to 2.8 kg per plant. Prices were expressed in Euros per kilogram of grapes, and calculated as a weighted average, on the basis of local market quotations, in the last 'growing season' examined.

The most common varieties grown in *Alcamo PDO* are Catarratto (80%), Damaschino, Grecanico and Trebbiano grapes, for white wines, and Nero d'Avola (min. 60%) and Frappato, Sangiovese, Perricone Syrah, Merlot and Cabernet Sauvignon for red wines.

The price quotations range between 0.22 €/kg and 0.30 €/Kg, with a weighted average value of 0.24 €/Kg. The lowest prices in this area are for the white grape varieties Catarratto and Trebbiano, while the highest are for the red grapes of Nero d'Avola, Cabernet Sauvignon and Sangiovese.

With respect to total output in the *Alcamo PDO* area, the average is about 2,413 €/ha, varying from 2,185 €/ha to 3,120 €/ha. Total output per plant varies from 0.55 to 0.84 €/ plant, with an average of 0.61 €/plant.

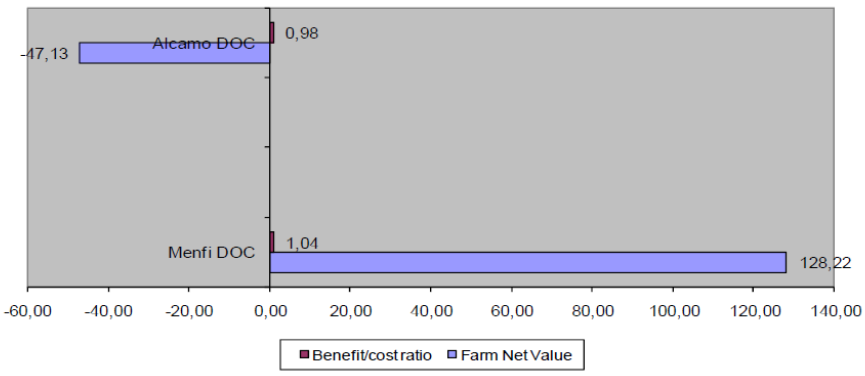
Economic performances - Analysis of the economic performance of quality grape wine production in *Menfi PDO* showed a positive average value of farm net value amounting to 128.22 €/ha by subtracting total production cost (3,320 €/ha) from total output (3,448 €/ha).

This data indicates how quality wine-making in the *Menfi PDO* area has poorly remunerated production factors, although smallholders can make a living with the support of the family work unit. Furthermore, competitive vine-grower associations and cooperatives ensure moderately acceptable price levels, whereas without family or smallholder labour, vine cultivation would be unprofitable.

In Alcamo, the cost of production is lower than in Menfi achieving 2,460 €/ha with a total output equal to 2,413 €/ha

Overall, the data doesn't show positive farm net values for 60 % of the sample, whose mean is -47 Euros per hectare. Even in this area family labour is still prevalent but smallholders, as stated by themselves, are progressively leaving vine-growing because it isn't profitable. Farm net value added and benefit cost ratios have been reported in Figure 2.

Fig. 2 - Farm net value and benefit/cost ratio



The reasons for such low profitability are due to: a low level of market prices and to small farm size. All together, the future development of smallholder viticulture of Alcamo does not look too bright.

Low market price of Alcamo PDO sample is mainly due to wine surplus production, but also different prices of cultivar grapes and low efficiency of supply chain. According to interviewers' declaration, market structure seems to influence this result but further analyses have required testing this hypothesis.

An additional matter of note is that prices that grape producers receive have gradually decreased. Despite it has been verified that the price of PDO product is not subject to the same fluctuations as on wholesale markets and on traditional market (Marescotti, 2003), price of our sample greatly varies according to the quantities year-production and type of grown cultivar.

A second important finding is that micro and small farm size of sample cause a weak bargaining power of producers. Despite organization over the supply chain and market/ bargaining power are not the main object of investigation, qualitative data and information

collected during interviews, confirm that the production and sale of unprocessed grapes does not provide any value-added products, which could be obtained for instance by better coordinating the whole supply chain (processing, bottling, distribution). As directly observed the mismatches between demand and supply for grapes are partly caused by a significant lag between grape prices and bottled wine prices, whose range are included between 5 and 10 Euros.

Another important issue, emerged during the interviews, predicts that small grape growers go out of business resulting occasionally in their farms being taken over by a larger conglomerate but the "gains from consolidation are small in comparison to the gains from growth in farm size, in this circumstance, consolidation serves only to exclude some small farmers from opportunities for income growth" (Monke et al. 1992).

The macroscopic effects of these results reflect the crisis in the family farm model and the progressive drop in rural employment; in both areas family labour is still prevalent and official statistics highlight (Unioncamere, 2009) how in any areas Sicilian smallholders are progressively leaving vine-growing because it is not profitable[5].

Given the lack of government intervention, especially when demand and price of the product do not allow producers to reach an adequate profitability, a differentiation of cultivar and a better organisation of supply chain, by facilitating the flow of information over the chain, could constitute an effective solution,

Concluding remarks

This study has looked into the vine-growing economy of Sicily by analysing a representative sample of two different wine producer areas. The survey was carried out in the *Menfi PDO* and *Alcamo PDO* areas with the aim of evaluating the profitability of wine grape production.

The analysis highlights differing economic results for two sample areas but the data shows how the performance indicators are both below the national average for the vine-growing sector (D'Amico et al. 2010; D'Amico et al. 2011*a*). This condition highlights the difficulties for small vine grape growers to compete with the market.

In both areas, small farms are scale-inefficient because of a historical lack of access to support services and infrastructure as well as the limited availability of capital and land compared with large farms, whose managerial ability seems to work better by using capital towards production methods more intensively. Moreover, poor production profitability in the sample areas is due to: the low sale prices of grapes and a lack of economies of scale. "The introduction of innovative technologies, as well as the increase in average farm size, have a positive effect" on decreasing the level of costs but profits remain low when the reduced "number of vines will only reduce the growers' market power, and hence profit margin" (Bryant, 2010).

5 The Italian wine sector, from 2005 to 2009, register a considerable reduction in the number of wine grape growers; a large part of producers is moving toward more complex business organization, outsourcing the bottling process to specialized companies. In the last 6 years the number of Sicilian wine grape growers decreased around 8% (Unioncamere, 2010).

Although limited, there I some profitability in the *Menfi PDO* area. By contrast, there are many difficulties in the *Alcamo PDO* area, where the lack of profitability in vine growing has a negative effect on farm net values, Results show that the current pricing system pays a very low price for a better-quality product and low prices and a surplus production (first of all in Alcamo area) are main components that seem to influence this result; further analysis have required to explore to what extent these results are caused by a increasing costs or by a an inefficient market structure.

Given that traditional cultivar of Alcamo actually seem not so appreciated in the market, to get a better remuneration of capital is necessary to increase the farm-gate prices of grapes and the differentiation of production seems to be the best solution for wine grape growers. As suggested by Golan and Shalit (1993) a quality-based pricing production could be useful to reduce the production of poor-quality wines by giving farmers a correct and powerful incentive to provide the most required grapes by market. Furthermore, given that the long-run food security of a community depends on the sustainability of its agriculture (Ikerd, 2002) organic and sustainable winegrowing could be a profitable alternative for wine producers. Recent studies suggest organic wine production allows small producers to maintain their income, precluding the abandonment of their agricultural activity (Brugarolas et al. 2010) offering a viable alternative to traditional production systems, constituting profitable opportunities in domestic and foreign markets (Vastola, Tanyeri-Abur, 2009).

Nevertheless, we observed that local producers do not gain additional remuneration for the intangible components of their PDO grapes Designation of origin (DO) is a significant quality attribute influencing consumer choice and it's also one of the most important intangible components of quality because regional foods incorporate and valorise many local assets with special or indigenous characteristics of the area (Brunori, Rossi, 2000; Treager et al. 2007). But, despite several studies demonstrating that PDO certification increases costs and profits (Arfini et al. 2010, Bouamra-Mechemache, Chaaban J., 2010*b*) our study reveals how DO by itself does not always ensure adequate profitability for small wine grape growers.

These findings might infer market failure or otherwise poor market efficiency, requiring stronger support from government policies to better regulate market mechanisms, for example through policies oriented towards adequate information. In a perfectly efficient market, stock prices would have to reflect all the available information on raw materials and origin.

All these factors suggest an unfavourable forecast for the future development of vine-growing in Alcamo and Menfi, giving rise to different hypotheses on the persistence of negative economic results due to low profitability, with negative future socio-economic scenarios for wine grape growing and agricultural land. In the near future, depending on societal values and political goals, we could see an implosion of vine-growing in Sicily, and possibly in many wine grape areas of the European Union, with a decrease in the number of vine-growing holdings and their going out of business, a progressive decrease in rural employment and a significant development in land conversion to non-agricultural sectors such as renewable energy and residential estates.

References

1. Arfini, F., Belletti, G., Marescotti, A. (2010): *Prodotti tipici e denominazioni geografiche, strumenti di tutela e valorizzazione*, Gruppo 2013, Quaderni, Edizioni Tellus, Roma.
2. Arfini, F., Albisu, L. M., Giacomini, C. (2011): *Current situation and potential development of geographical indications in Europe*, in Barham, E., Sylvander, B. (Eds), *Labels of origin for food: local development, global recognition,* CABI, Cambridge, pp. 29-44.
3. Bazin, G., Roux, B. (1995): *Resistance to marginalization in Mediterranean rural regions*, Sociologia Ruralis, Vol. 35, Issue 3-4, pp. 335–347.
4. Belletti, G., Marescotti, A. (2011): *Origin products GI special protection schemes and rural development*, in Barham, E., Sylvander, B. (Eds), Labels of origin for food: local development, global recognition, CABI, Cambridge, pp.75-91.
5. Blank, S. C., Erickson, K. W., Nehring, R., Hallahan, C. (2009): *Agricultural Profits and Farm Household Wealth: a Farm-level analysis using Repeated Cross Sections*, Journal of Agricultural and Applied Economics, vol. 41, no. 1, pp. 207–225.
6. Bouamra-Mechemache, Z., Chaaban, J. (2010a): *Determinants of Adoption of Protected Designation of Origin Label: Evidence from the French Brie Cheese Industry*, Journal of Agricultural Economics, Vol. 61, Issue 2, pp. 225–239.
7. Bouamra-Mechemache, Z., Chaaban, J. (2010b): *Protected Designation of Origin Revisited*, Journal of Agricultural and Food Industrial Organization, Vol. 8, no. 1, pp. 5.
8. Bouamra-Mechemache, Z., Chaaban, J. (2010c): *Is the Protected Designation of Origin (PDO) Policy Successful in Sustaining Rural Employment?*, Paper presented at International EAAE-SYAL Seminar – Spatial Dynamics in Agri-food Systems, Parma.
9. Bracco, S., D'Amico, M., Di Vita, G. (2008): *Analisi economiche dell'olivicoltura dell'area DOP Monti Iblei*, Tecnica Agricola, Olivicoltura e sviluppo rurale, no. 1-2, pp. 40-55.
10. Bramley, C., Biénabe, E., Kirsten, J. (2009): *The Economics of Geographical Indications: towards a conceptual framework for Geographical Indication research in developing Countries*, in WIPP (Ed.) The Economics of Intellectual Property. Suggestions for Further Research in Developing Countries and Countries with Economies in Transition, Geneva, pp. 1, pp. 09-141.
11. Brugarolas, M., Martinez-Carrasco, L., Bernabeu, R., Martinez-Poveda, A. (2010): *A contingent valuation analysis to determine profitability of establishing local organic wine markets in Spain***,** Renewable Agriculture and Food Systems, 25:35-44, Cambridge University Press.
12. Brunori, G., Rossi, A. (2000): *Synergy and coherence through collective action: some insights from wine routes in Tuscany*, Sociologia Ruralis, 40:4, pp. 409-423.
13. Bryant, R. (2010): *Wine sector in decline*, IBISWorld, available at http://www.smartcompany.com.au/food-and-beverages/20100407grapegrowing-sector.html (accessed 10 October, 2011).

14. Caniglia, E., D'Amico, M., Peri, I. (2008): *An analysis of consumer's perception of the quality of the Etna DOC wine,* New Medit, vol. VII, no.3, pp. 32-41.

15. Chinnici, G., Bracco, S., D'Amico, M., Di Vita, G., Pappalardo, G. (2011): *Economic evaluation of quality wine grapes (PDO) sector in Sicily*, Paper presented at the 5th Annual Conference of American Association of Wine Economists (AAWE), 22-25 June 2011, Free University of Bozen-Bolzano.

16. Charters, S., Clark-Murphy, M., Davis, N., Brown, A., Walker, E. (2008): *An exploration of managerial expertise in the Western Australian wine industry*, International Journal of Wine Business Research, vol. 20, no. 2, pp. 138 – 152.

17. Costa-Font, M., Serra, T., Gil, M., Gras, A. (2009): *Explaining low farm-gate prices in the Catalan wine sector*, International Journal of Wine Business Research, vol. 21, no. 2, pp. 169- 184.

18. Crescimanno, M., Fardella, G. G., Schifani, C., Tudisca, S. (1998): *I costi della produzione dell'uva da vino nella Sicilia occidentale,* Arti Grafiche Siciliane, Palermo.

19. D'Amico, M., Di Vita, G., Pappalardo, G., Vindigni, G., Zarbà, A. S. (2011a): *The profitability of wine grape growing in the European Union*, Paper presented at the 5th Annual Conference of American Association of Wine Economists (AAWE), 22-25 June 2011, Free University of Bozen-Bolzano.

20. D'Amico, M., Pappalardo, G., Vindigni, G. (2010): *Degree of development and competitiveness in the wine sector in EU member states*, Paper presented at International Conference Enometrics XVII, 09-12 June 2010, Palermo.

21. D'Amico, M. (2005): *Analisi della competitività del sistema vitivinicolo italiano nell'Unione Europea*, in Romeo del Castello, R., E. Schillaci, E. (eds.), La sfida del vino made in Sicily: strategie di crescita del settore e del territorio, Giappichelli Editore, Torino.

22. D'Amico, M., La Via, G., Di Vita, G., Peri, I. (2011b). Calitatea produselor agroalimentare din sicilia, *Calitatea-acces la succes*, vol. 12, p. 56-64

23. De Benedictis, M., Cosentino, V. (1979): *Economia dell'azienda agraria*, Il Mulino, Bologna.

24. Deselnicu, O., Costanigro, M., Souza-Monteiro, D. M, McFadden, D. T. (2011a): *A meta-analysis of geographical indication food valuation studies. What drives the premium for origin based labels?* Working paper no. 93, American Association of Wine Economists.

25. Deselnicu, O., Costanigro, M., Souza-Monteiro, D. M, McFadden, D. T. (2011b): *What Determines the success of a Geographical Indication? A price-based meta-analysis for GIs in food products*, Paper presented at the Agricultural & Applied Economics Association's 2011, AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011.

26. Di Cocco, E. (1970): *Elementi di economia agraria*, Edizioni agricole, Bologna.

27. Di Vita, G. (2003a): *Circolo della Qualità e certificazione di processo nel comparto vinicolo siciliano. Un caso studio*, Economia Agro-Alimentare, Vol. 1, pp. 87-110.

28. Di Vita, G. (2003b): *I certificati del vino*, Vignevini, Il sole 24 Ore/Edagricole, Vol. 3, pp. 29-33.

29. Di Vita, G. (2002): *La gestión de la calidad según las normas ISO 9000:1994 en el sector agro-alimentario europeo: el caso de una región mediterránea*, Información Técnica Económica Agraria (ITEA), Zaragoza (Espana), vol. 98, no. 1, pp. 54-70.

30. Di Vita, G. (2004), *Le politiche di qualità nel comparto vitivinicolo in Spagna, il mercato dei VQPRD,* Economia Agro-Alimentare, Vol. 9, pp. 139-160.

31. European Commission (2011): FADN-RICA: *Farm Accounting Data Network***,** retrieved from http://ec.europa.eu/agriculture/rica/methodology1_en.cfm

32. European Commission (2010): *Developments in the income situation of the EU agricultural sector*, Directorate-General For Agriculture and Rural Development, Brussels, December.

33. European Commission (2005): *The new SME definition. User guide and model declaration*, Enterprise and Industry Publications.

34. Fuller, K. B, Alston, J. M. (2012): *The demand for wine grapes in California*, Paper presented at Enometrics XIX, Coimbra & Viseu, Portugal, May 30 - June 2.

35. Golan, A., Shalit, H. (1993): *Wine quality differentials in hedonic grape pricing*, Journal of Agricultural Economics, vol. 44, pp. 311–321.

36. Grant, B., Dollery, B., Hearfield, C. (2011): *New England Australia: what follows from regional status*? *A comparative, political economy approach*, International Journal of Wine Business Research, Vol. 23, Issue 1, pp. 83 – 98.

37. Harward, Upto (1961): *Introduction to Business Finance*, Mc Graw Hill, New York.

38. Ikerd, J. (2002): *Small farms: the foundation for long-run food security*, University of Illinois, Nov. 13-14, 2002.

39. Ikerd, J. (1996): *Sustaining the Profitability of agricultural*, paper presented at the Extension Pre-conference: The Economist's Role in the Agricultural Sustainability Paradigm, San Antonio, TX, July 27, 1996.

40. ISMEA (2011): *Analisi della struttura e del mercato dei vini DOC, DOCG e IGT*, Roma.

41. Josling, T. (2006): *The war on terroir, Geographical Indications and Transatlantic trade conflict*, Journal of Agricultural Economics, vol. 57(3), pp. 337-363.

42. Kirner, V. L., Bartel-Kratochvil, R. (2007): *Effect of off farm income, farm size, natural disadvantage and farming system on the sustainability of dairy farming in Austria, an empirical approach on the basis of farm accountancy data*, BER LANDWIRT, vol. 85(2), pp. 195-213.

43. Lorenzini, E. (2010): *Origin labelled products, territorial marks and their contribution to rural development. Evidence from Italy and France*, Working paper no. 649, Società Italiana di Economia Pubblica, Dipartimento di Economia pubblica e territoriale, Università di Pavia.

44. Marescotti, A. (2003): *Typical products and rural development: who benefits from PDO/ PGI recognition*?, 83rd EAAE Seminar, Food Quality Products in the advent of the 21st Century: production, demand and public policy, September 2003, Chania, Greece.

45. Monke, E., Avillez, F., Ferro, M. (1992): *Consolidation policies and small-farm agriculture in northwest Portugal*, European Review of Agricultural Economics, vol. 19(1), pp. 67-83.

46. Nehring, R., Gillespie, J., Sandretto, C., Hallahan, C. (2009): *Small US dairy farms: can they compete?*, Agricultural Economics, vol. 40, pp. 817-825.

47. Panattoni, A., Campus, F. (1983): *Economia dell'azienda agraria,* UTET, Torino.

48. Pappalardo, G., Scienza, A., Vindigni, G., D'Amico, M. (2013): *Profitability of wine grape growing in the EU member states,* Journal of Wine Research, Vol. 24, no. 1, pp. 59-76.

49. Pinto Correia, T. (2000): *Future development in Portuguese rural areas: how to manage agricultural support for landscape conservation?*, Landscape and Urban Planning, vol. 50, pp. 95-106.

50. Pomarici, E., Rocco, L., Iannini, C. (2005): *Redditività e costi di produzione dell'uva in Campania, confronto tra differenti condizioni di coltivazione*, Working paper, no. 5/2005, Università degli Studi di Napoli Federico II.

51. Sluiter, R, De Jong, S. M. (2006): *Spatial patterns of Mediterranean land abandonment and related land cover transitions*, Landscape Ecology, vol. 22, pp. 559–576.

52. Stasi, A., Nardone, G., Viscecchia, R., Seccia, A. (2011): *Italian wine demand and differentiation effect of geographical indications*, International Journal of Wine Business Research, Vol. 23, Issue 1, pp. 49 - 61.

53. Sturiale, C. (eds.) (2006): *Analisi economiche dell'agrumicoltura biologica e convenzionale in Italia: valutazioni dei risultati delle indagini e prospettive*, Emme Erre Grafica, Catania.

54. Tatoni, T., Roche, P., Médail, F., Barbero, M. (2004): *The impact of changes in land use on ecological patterns in Provence (Mediterranean France)*, in Mazzoleni, S., Di Pascale, G., Di Martino, P., Rego, F., Mulligan, M. (eds.) Recent dynamics of Mediterranean vegetation and landscape, John Wiley & Sons, London, pp. 107-120.

55. Tregear, A., Arfini, F., Belletti, G., Marescotti, A. (2007): *Regional foods and rural development: The role of product qualification*, Journal of Rural Studies, vol. 23, no. 1, pp.12-22.

56. Tudisca, S. (eds.) (2007): *Analisi tecnico-economica della vitivinicoltura nell'area occidentale della Sicilia*, Ed. Fotograf, Palermo.

57. Unioncamere (2010): *Rapporto nazionale sul settore vitivinicolo*.

58. Vastola, A., Tanyeri-Abur, A. (2009): *Non-conventional viticulture as a viable system: a case study in Italy*, Working paper no. 43, American Association of Wine Economists.

59. Vecchio, R. (2009): *The e-mail responsiveness of Italian wineries*, working paper no. 47, American Association of Wine Economists.

60. White, G. B. (2008): *Cost of Establishment and Production of Vinifera Grapes in the Finger Lakes Region of New York*, Cornell University Publication E. B 2008-05, May, 2008.

Original scientific paper

Economics of Agriculture 1/2013
UDC: 551.5:631.559

THE IMPACT OF DROUGHT ON YIELD POSITION OF THE GROUP OF ENTERPRISES FROM AGRICULTURE SECTOR[1]

Sonja Đuričin[2], Duško Bodroža[3]

Summary

Starting from the fact that the amount and distribution of precipitations and the intensity of drought, considering the condition and extant of the use of irrigation systems, result in relatively low and unstable level of crop yields, the starting hypothesis of the research is that the agro meteorological trends in the period 2007-2010 influenced the yield position of the analyzed agricultural sector of Serbia. The aim of the paper is to determine the level of impact of agro meteorological trends on yield position of the group of business entities in the prevailing market conditions. The subject of the research refers to the analysis of the operation of the Serbian agricultural sector under the following activity code 011-cultivation of crops, plants and gardening. As the main source of data, the paper uses the summary financial statements of a group of business entities from agricultural sector under the activity code 011 and agro meteorological data for the period 2007-2010. By using the qualitative and quantitative methods of financial statement analysis and the synthesis of research results, the conclusion has been made that agro meteorological conditions in the observed period of time and under the existing market conditions had a significant impact on the worsening of yield position of the Serbian agricultural sector under survey.

Key words: *drought, agro meteorological conditions, irrigation, agricultural sector, yield position*

JEL: *Q12, Q14, M41, G33*

1 This paper is a part of research project 31005 (*Modern Biotechnological Approach to Solving Problem of Drought in Agriculture of Serbia*) financed by the Ministry of Science and Technological Development of the Republic of Serbia

2 M.Sc., Institute of Economic Sciences, Zmaj Jovina Street no. 12, Belgrade, Serbia, Phone: +381 11 2638 820, E-mail: sonja.djuricin@ien.bg.ac.rs

3 M.A., Institute of Economic Sciences, Zmaj Jovina Street no. 12, Belgrade, Serbia, Phone: +381 11 2635 823, E-mail: dusko.bodroza@ien.bg.ac

Introduction

Bearing in mind that for numerous reasons Serbian agriculture is now in very difficult position starting from weak technical and technological equipment, lack of favorable conditions in attracting sources of financing, prices disparity, lack of consistent development strategy and excessive import protection, in the paper are emphasized the influences of adverse weather conditions and insufficient irrigation system exploitation. Agro meteorological extremes and unequal precipitation distribution in Serbia, in combination with droughts of different intensity as well as the fact that draught is more and more common appearance as a consequence had need for analysis of influence of agro meteorological conditions on agricultural sector profitability.

For the purpose of analyzing the impact of agro meteorological trends on yield position of the agricultural sector, two main sources of data were used. The first data source refers to the summary financial statements (mainly balance sheet and income statement) of agricultural sector under the activity code 011-cultivation of crops, plants and gardening for the 2007-2010 period. The use of summary financial statements means that only performance indicators of enterprises that are legally required to prepare financial statements were taken into consideration in the analysis. However, it is necessary to point out that in Serbia there is a significant number of family farms and small agricultural entities whose operating results are not included in the analysis, but they contribute to a large extant to the level of development of the entire sector. The second source of data refers to the results of humidity analysis prepared by the Republic Hydro Meteorological Service of Serbia[4] based on the six-month standardized precipitation index (SPI-6).

In order to assess yield position of the agricultural sector under survey, the qualitative and quantitative methods of financial statement analysis were used[5], as well as classical data collection and analysis methods, description method and synthesis method. From the qualitative methods, the decomposition method by subject and time was used. The subject breakdown was applied in the analysis of the structure of synthetic accounts of financial statements, while the breakdown by time was used when financing sources were divided by maturity, i.e. when assets were divided by the period of time in which they are deemed to be used or owned.[6] The measurement method was used to determine the quantitative elements of the complex subject of analysis. After qualitative and quantitative characteristics of the subject of analysis had been determined, the method of comparison over time and with rule was used. The comparison over time was performed by monitoring the movement of the

4 Godišnja agrometeorološka analiza (više godina), Republic Hydro-meteorological Service of Serbia, available from: http://www.hidmet.gov.rs/ciril/meteorologija/agro.php, [Accessed 15/10/11]

5 Rodić, J., Vukelić, G., Andrić, M. (2007): *Teorija, politika i analiza bilansa*, Faculty of Agriculture, Belgrade, p. 131.

6 Đuričin, S. (2012): *Anliza poslovanja i mogućnosti izlaska preduzeća iz zone gubitka*, Institute of Economic Sciences, Belgrade, p. 60.

yield position indicators of the subject of analysis in the number of successive periods i.e. in the 2007-2010 period of time. The method of comparison with the rule was applied in the assessment of the research results which were compared with values and measurements ratios previously determined by the rule. Regarding the classical data collection methods, the content analysis method was used which based on the relevant literature provided the data necessary to verify the hypotheses. The description method was used mostly when explaining the results of the research and when arguing the current market conditions in the Republic of Serbia. By combining the facts that had been reached using above mentioned methods in single logical unit, the conclusions on the level of impact of agro meteorological trends on yield position of Serbian agricultural sector under survey were drawn.

In order to evaluate level of agro meteorological conditions impact on agricultural financial performances it is:[7] performed decomposed gross financial result analysis, given breakdown of structure and allocation of total and operating revenues, defined main profitability indicators, business risk drivers and elasticity in the sense of achieving neutral financial result from operating activities as well as total financial result. To achieve additional indicators it is also performed analysis of some financial position indicators such as liquidity analysis and business entities position on sale and procurement markets. Four year period analysis of climate conditions in Serbia indicate frequent occurrence of agro meteorological extremes with the absence of leading business in normal humidity conditions. Existing agro meteorological conditions resulted with the lower quality and quantity of yields for certain crop plants and had negative effects on financial results of the observed agricultural sector. It is noticed very low level of disposable irrigation system capacities exploitation and suggested necessity of its enlargement as well as more intensive exploitation.

Agricultural sector entities business position is additionally exacerbated by the effects of world economic crisis. Due to reduction of financial resources for developing programs, financial efficiency of agricultural producers deteriorated, which caused decrease in number of agricultural machines and employees.[8] Due to the crisis, capital raising terms and financing current production were less favorable. Lower yields as a result of current circumstances on the market, unrealistic low price parity, under the current climate conditions caused the absence of positive agricultural sector financial results. Consequently, in the paper are presented main courses of action needed in order to improve business performances of analyzed sector and agriculture sector in general, emphasizing the importance of Government support and providing the access to the alternative sources of financing.

7 Đuričin, S. (2009): *Mogućnosti izlaska preduzeća iz zone gubitka*, Accounting 11-12, Association of Accountants and Auditors of Serbia, Belgrade, p. 31.

8 Bubić, J., Hajnrih, J. (2012): *The analyses business performances of agricultural enterprises in Vojvodina during the current crisis*, Economics of Agriculture, Vol. 59, No. 2, Institute of Agricultural Economics, Belgrade, p. 185.

Agro meteorological conditions in Serbia in period 2007-2010

The unequal distribution, in space and time, of the rain- fall in Serbia causes frequent occurrence of agro meteorological extremes. Natural conditions in our country are such that there are large areas that are saturated with water, and surface water is lacking.[9] According to the Republic Hydro Meteorological Service data for period 2007-2008 was characterized by warmer weather than usual and very unbalanced precipitations. Analysis of humidity conditions prepared on the basis of six month standardized precipitation index (SPI-6) indicates the high temperatures and huge precipitation deficit in the summer months that had adverse impact on current crop yields. In the growing season from October 2006 to March 2007, major part of the country was characterized by normal humidity conditions. For the eastern part of Serbia, it was characteristic occurrence of drought, also noticed in the area of Loznica, Požega and on the far north. In growing season April-September 2007, northern part of the country was characterized by normal humidity conditions, while major part of the western, central and eastern Serbia were under the influence of drought. Moderate drought is also noticed in the area of Vršac and Veliko Gradište, while Niš and Negotin were affected by severe drought.

Changing agro meteorological conditions caused worse agricultural production in the period from October 2007 until September 2008. Growing season from October 2007 until March 2008 is characterized by widespread occurrence of precipitation from low to extreme increase of humidity while only the areas of Kikinda, Sjenica and Vranje had normal humidity. On the other hand, in growing season April-September 2008 moderately increased humidity kept in the small area of far north, while moderate droughts were present in broad areas of Zrenjanin, Veliko Gradište, Smederevska Palanka and Valjevo. Drought affected territory were located in the areas of Bečej, Beograd, Požega and Ćuprija, while Vršac was exposed to severe drought.

Unlike the period 2007-2008, for production year 2009-2010 lower quantity and quality of yields of certain agricultural crops were mainly the effect of increased humidity. Precipitation inflow was up to 40% higher comparing to the average and the thermal conditions were very low. The highest humidity degree was recorded in a broad part of Vojvodina and Western Serbia, while drought affected were southwest and eastern parts of the country. More precisely, in growing season from October 2008 to March 2009, normal humidity conditions were recorded in the north, parts of Central and Western Serbia, while slightly increased, moderately increased and severe humidity affected south and southeast regions of the country. In growing season from April to September 2009 normal humidity conditions were characteristic of the areas of Palić, Kikinda, Zrenjanin and parts of South and Southeast Serbia. Moderate drought affected the area of Loznica, Sombor and Bečej, while Central Serbia was affected by drought and Sremska Mitrovica by severe drought. For the growing season October 2009-March 2010, it was characteristic occurrence of extremely high humidity in Central and parts of

9 Rajic, Z., Novakovic, V., Gligoric, M., Lacnjevac, C., Grujic, R., Zivkovic, D. (2012): *Effects of aeration on groundwater quality for irrigation*, Economics of Agriculture, Vol. 59, No. 3, Institute of Agricultural Economics, Belgrade, p. 523.

Eastern Serbia, while the rest of the country was under the influence of strong or extreme humidity. In period April 2010-September 2010 extraordinary and extreme humidity affected northern part of the country while Belgrade, Smederevska Palanka and Loznica areas were under the influence of moderate or even a bit of increased humidity. Rest of the country was characterized by normal humidity conditions with the exception of Negotin and Sjenica where drought was recorded.

The analysis of agro meteorological conditions in the period from 2007 to 2010 indicates the fact that although the presence of extreme humidity conditions, drought was not absent any of the observed years. That is why its consequences and examination of irrigation system application require special attention.

Irrigation system in Serbia

Serbia lacks good results in the field of plant production under the natural climate conditions and irrigation system application is of the crucial importance for the yield growth. In drought years yields decrease comparing to favourable ones from 30% to 50%, and in extremely drought from 80% up to 100%[10]. Low exploitation level of existing irrigation systems is mainly consequence of adverse agriculture position and lack of financial assets for irrigation system machines maintenance. In a recent period only 0.5% of the total used agricultural land was irrigated that is significantly below the world average of 17% of total arable land. Insufficient use of existing systems and lack of investments in reconstruction and development of new irrigation systems significantly threatens competitiveness of Serbian agricultural sector, considering year drought losses, estimation is below cost of new system construction and the fact is that their more intensive exploitation is necessary.

Intensifying production through the irrigation as an influence has improving agricultural production structure, ways of farming and more intensive livestock production as well as competitiveness and agricultural export growth. In the conditions of intensive exploitation of plants and water potential productivity, irrigation is very important factor[11]. Drought intensity in the 2007 caused the largest amount of total water used for irrigation. In the following period, irrigation water usage significantly decreased while in total observed period water usage for irrigation is mostly used from watercourses.

10 *Strategija upravljanja vodama i ublažavanje suša u poljoprivredi zemalja zapadnog Balkana* (2004-2007), Institute for water management Jaroslav Černi, Belgrade, available from:http://www.jcerni.org/index.php?option=com_content&view=category&layout=blog&id=80&Itemid=280&lang=sr [Accessed 28/11/11]

11 Sredojević, Z., Gajić, B., Živković, D. (2006): *Ekonomski parametri optimalne strukture proizvodnje u uslovima navodnjavanja*, Ekonomika poljoprivrede, br. 3/2006, Društvo agrarnih ekonomista SCG, Savez poljoprivrednih inženjera i tehničara Jugoslavije, IEP, Beograd, p. 800

Constructed systems cover about 115 thousands hectares which represent 2-3% of total agricultural land suitable for irrigation[12]. In Serbia it is irrigated 27,000 hectares of total arable land, mainly by sprinkling process. Only 30% of the total land covered by irrigation systems is irrigated whereas number of buildings and irrigation equipment supply is insufficient, especially in areas where watercourses exist.

Table 1. Irrigation in the period 2007-2010

Explanation	2007.	2008.	2009.	2010.
Total water used for irrigation (in 000 m^3)	92,391	48,409	43,477	65,450
Groundwater	914	2,045	1,280	1,420
Watercourse	86,802	43,333	38,602	62,762
Lakes and accumulation	4,675	3,031	3,595	1,268
Total used agricultural land (in 000 ha)	-	5,055	5,058	5,051
Total irrigated land (in ha)	25,763	26,260	30,576	25,128
Surface method	3,067	1,571	1,507	1,261
Sprinkling	22,061	24,172	28,585	22,442
Dripping	635	517	484	1,425
Total exploited agricultural land covered by irrigation systems (in ha)	-	-	88,964	88,089
Refers to irrigated land (in ha)	-	-	30,576	25,128
Buildings and irrigation equipment				
Number of aggregates for sprinkling	498	449	480	375
River channels – total (in km)	460	1,258	2.297	658
Pipelines – total (in km)	919	1,110	1,739	930

Source: Statistical Office of the Republic of Serbia

Irrigated land in the total observed period is about at the same level although agro meteorological conditions differ. Therefore in the period of intensive drought in the last two observed years, which were characterized by the occurrence of extreme humidity, almost the same land area was irrigated mostly by artificial rain method which points out to the inconsistent exploitation of irrigation systems in Serbia.

Yield position analysis

Low accumulative capacity of the observed agricultural sector is a consequence of the lack of suitable financing system. Mentioned has negative impact both on the exploitation level of the production resources and already impoverished technical and technological system. Impossibility of maintaining basic reproduction level and productivity decline caused faster growth of expenditures comparing to the revenues and risk of capital decrease occurrence.

12 *Strategija razvoja poljoprivrede Srbije*, Governement of the Republic of Serbia, Official Gazette 78/05, p. 36.

Under the current market conditions financial result in agriculture sector is additionally threatened by adverse agro meteorological conditions and low exploitation not only new but also the old irrigation systems and methods.

In the analysis of yield position and evaluation of agro meteorological conditions impact on the business result it is used time analysis that provides possibility to identify the moment of genesis and reasons for the negative business result as well as its future trend.

Table 2. Structure of financial result

		Sum				Structure			
No	**Position**	**2007**	**2008**	**2009**	**2010**	**2007**	**2008**	**2009**	**2010**
1.	Operating result	141,072	3,215,644	-1,919,591	5,064,854	41.75	-190.70	13.97	-88.96
2.	Financial result from financing activities	-2,315,829	-4,563,700	-8,344,685	-7,489,049	-685.33	270.64	60.73	131.54
3.	Financial result from regular activities	-2,174,757	-1,348,056	-10,264,276	-2,424,195	-643.58	79.94	74.70	42.58
4.	Financial result from other activities	2,512,671	-338,219	-3,475,609	-3,269,272	743.58	20.06	25.30	57.42
5.	Total Gross financial result	337,914	-1,686,275	-13,739,885	-5,693,467	100.00	100.00	100.00	100.00

Source: Authors own calculation

Unsuccessful business of the agricultural sector entities that relate to Growing crops, plants and gardening is reflected in the negative result from the regular activities. Realized losses from the regular activities are with the exception of 2009 consequence of negative financial result from the financing activities. Operating result was growing but not enough since loss from the financing activities was still increasing.

Agro meteorological extremes had as a consequence in 2009 lower yield and a worse crop quality that with the impact of world economic crisis significantly threatened financial result of the analysed agricultural sector. The negative effects of the economic crisis resulted in a reduction in profits of agricultural enterprises, significant decline in the purchasing power of consumers of agricultural products and inflow of foreign direct investment in this sector.[13] Negative gross financial result is a consequence of the outstanding negative result from the regular activities threatened mainly by the growing loss in the part of financing but also by the realized operating result.

13 Bubić, J., Hajnrih, J. (2012): *The analyses business performances of agricultural enterprises in Vojvodina during the current crisis*, Economics of Agriculture, Vol. 59, No. 2, Institute of Agricultural Economics, Belgrade, p. 185.

Typical total revenue structure with the operating revenues share more than 90% is deteriorated by the relatively high proportion of the financing and other revenues. Also, bad allocation of the total revenues with the large share of the financial and other expenditures caused the occurrence of the negative gross and net financial result in the period 2008-2010. High costs of financing that in average affect operating revenues by 5% are the consequence of the currently high interest rates as well as existing ownership structure that moved in favour of greater leverage. Since there are no accumulation possibilities under the business with operating losses, share of the costs of financing in the total revenue structure, under the current adverse conditions on the capital market, can be considered as high. Moreover, other expenditures share in total revenues amounting to 6% in the average indicate possibility that high degree of assets could be disposed, poor management, debtor illiquidity, but also a damage caused by natural disasters and analysed agro meteorological extremes.

Table 3. Total revenue structure and allocation (in %)

No	Position	2007	2008	2009	2010
1.	Operating revenues	91.86	92.93	92.54	93.27
2.	Financial revenues	1.95	1.90	2.07	1.79
3.	Other revenues	6.19	5.18	5.38	4.93
4.	Total revenues	100.00	100.00	100.00	100.00
5.	Operating expenditures	91.75	90.82	93.55	90.50
6.	Financial expenditures	3.79	4.88	6.45	5.90
7.	Other expenditures	4.19	5.40	7.20	6.72
8.	Total expenditures	99.73	101.10	107.21	103.12
9.	Gross profit	0.27	0.00	0.00	0.00
10.	Gross loss	0.00	1.10	7.21	3.12
11.	Net income from the suspended operations	0.01	0.00	0.18	0.03
12.	Net income from the suspended operations	0.06	0.02	0.20	0.13
13.	Income before tax	0.22	0.00	0.00	0.00
14.	Loss before tax	0.00	1.12	7.23	3.22
15.	Tax expenditures- current period	0.10	0.11	0.08	0.10
16.	Deferred tax expenditures	0.06	0.43	0.05	0.04
17.	Deferred tax revenues	0.55	0.28	0.19	0.43
18.	Personal salary paid to the employer	0.04	0.00	0.01	0.00
19.	Net profit	0.58	0.00	0.00	0.00
20.	Net loss	0.00	1.39	7.17	2.93

Source: Authors own calculation

Sector has typical operating revenues structure with the more than 90% revenue from sales share. Decreasing share of other revenues in the total operating revenues is partly consequence of decrease of very important revenues that relate to premium incomes, subventions and regress. Above mentioned is an evidence for low level of investments and inadequate support for the development of agriculture sector. Structure of the operating revenues allocation indicates that huge share of operating revenues covers variable costs,

with the average amount about 75%, while the rest cover relatively high costs of salaries, that did not move in line with rise and decline of inflation and operating revenues, depreciation, accruals and other operating revenues.

High share of land in total fixed assets influences low costs of depreciation that are in the observed period slightly decreased as a result of other fixed assets number decline.

Table 4. Structure and allocation of operating revenues (in %)

No	Position	2007	2008	2009	2010
1.	Sales revenue	90.71	92.10	93.58	95.00
2.	Revenue from use of own products and merchandise	4.46	4.14	5.12	3.12
3.	Inventories value increase	5.28	5.26	4.05	3.84
4.	Inventories value decrease	2.31	3.20	4.38	3.46
5.	Other operating revenues	1.86	1.70	1.63	1.51
6.	Operating revenues	100.00	100.00	100.00	100.00
7.	Costs of goods sold	47.39	46.89	47.05	57.43
8.	Costs of material	27.40	28.76	30.65	21.72
9.	Costs of salaries, compensations and other personal expenditures	11.65	9.82	10.52	7.30
10.	Depreciation and accruals	3.72	3.38	3.89	2.84
11.	Other operating expenditures	9.72	8.89	8.98	7.79
12.	Operating expenditures	99.88	97.74	101.09	97.08
13.	Operating profit	0.12	2.26	0.00	2.92
14.	Operating loss	0.00	0.00	1.09	0.00

Source: Authors own calculation

Operating costs increase that was sharper comparing to the operating revenues in 2009 resulted with occurrence of negative operating result that is partly the effect of the world economic crisis.

Table 5. Business profitability and bankruptcy risk analysis (in %)

No	Position	2007	2008	2009	2010
1.	ROA	0.35	-0.90	-3.99	-1.94
2.	ROE	0.79	-2.07	-9.51	-5.14
3.	EBIT (operating revenues)	0.12	2.26	-1.09	2.98
4.	Z-score - Bankruptcy risk analysis	1.1293	1.2165	1.0397	1.2050

Source: Authors own calculation

Bad structure and allocation of operating revenues caused business to be barely profitable in 2007 and non-profitable in period 2008-2010. Return on Assets (ROA) decrease indicates lower efficiency in agriculture sector that could be the influence of inadequately performed planning process as well as control of business activities. Outstanding low and negative value of Return on Equity (ROE) shows weaker competitiveness of products, services and whole sector. Beside low calculated ROE, it can be noted that loss in assets that lowers

nominal equity value. For the optimistic prognosis it can be mentioned the fact that in the total analysed period it is achieved enough amount of non-distributed profit to cover the current loss resulting the equity to be in the safe zone.

Inefficient and not profitable business caused the need for the bankruptcy risk analysis whose results are in favour the fact that sector faced high bankruptcy risk in 2009 while in other years bankruptcy probability was about 50%. Business on the edge of existence indicates the need for more intensive planning and control activities as well as investments in building and use of irrigation systems for production characterized by agro meteorological extremes such as drought that was present in every analysed year.

Table 6. Risk of achieving financial result and break-even point

No	Position	2007	2008	2009	2010
1.	Operating revenues	115,296,597	142,188,439	176,443,660	170,192,710
2.	Variable costs	96,081,864	118,201,446	150,856,237	144,890,638
3.	Contribution margin (1-2)	19,214,733	23,986,993	25,587,423	25,302,072
4.	Fixed and dominantly fixed costs	19,073,661	20,771,349	27,507,014	20,237,218
5.	Net costs of financing	2,315,829	4,563,700	8,344,685	7,489,049
6.	Operating result (3-4)	141,072	3,215,644	-1,919,591	5,064,854
7.	Gross financial result from regular activities (6-5)	-2,174,757	-1,348,056	-10,264,276	-2,424,195
8.	Business risk factor (3/6)	136.21	7.46	-13.33	5.00
9.	Financial risk factor (6/7)	-0.06	-2.39	0.19	-2.09
10.	Total risk factor (8x9)	-8.84	-17.79	-2.49	-10.44
11.	Percentage of contribution margin in operating revenues (3/1)x100	16.67	16.87	14.50	14.87
12.	Operating revenues required for neutral financial result (4/11)x100	114,450,105	123,126,967	189,680,619	136,124,305
13.	Operating revenues required for gross financial result (4+5)/11)x100	128,346,067	150,179,352	247,223,217	186,498,897
14.	Percentage of operating revenues usage to achieve neutral operating result (12/1)x100	99.27	86.59	107.50	79.98
15.	Coefficient of elasticity for achieving neutral operating result ((1-12)/1x100	0.73	13.41	-7.50	20.02
16.	Percentage of operating revenues usage to achieve neutral gross financial result (13/1) x100	111.32	105.62	140.11	109.58
17.	Coefficient of elasticity to achieve neutral gross financial result (1-13)/1x100	-11.32	-5.62	-40.11	-9.58

Source: Authors own calculation

High leverage indicates enlarged risk that positive operating result will not be realized in 2007 and a result was actually low that year as an evidence for this statement. In the following year, business risk factor was significantly lower causing the operating result

to have strong rise. Negative business risk factor in 2009 is a consequence of operating loss and impossibility to cover fixed expenditures from the achieved operating revenues, while in 2010 lower business risk make the achieved operating result to be the highest in the observed period.

Negative financial risk indicator refers to the high level of uncertainty concerning gross financial result[14] and it is constant for the whole analysed period. Dramatically unfavourable financial risk is an evidence for high amount of operating profit to cover interest fixed expenditures.

Negative amount of combined (complex) leverage refer to high company exposure to the total risk where the net income is in direct interdependence with the volume of sales and revenues from sale achieved. These revenues were, in the relatively stable global parity of sale and purchase prices period, mostly dependent on production achieved in unstable agro meteorological conditions.

Table 7. Global parity of sale and purchase prices (purchase price = 1)

Year	2007	2008	2009	2010
Global parity	1.2385	1.2365	1.2014	1.2034

Source: Authors own calculation

Operating revenues percentage needed to realize neutral operating profit or gross financial result, is very high and in the most cases beyond 100% referring to operating loss or negative gross financial result respectively. Negative elasticity coefficient of the neutral operating profit in 2009 is a proof of the operating loss occurrence, while its negative value concerning gross financial result confirms the losses from the regular activities.

Unprofitable business is followed by the constant illiquidity. In the whole analysed period it is noted that exists illiquidity of first, second and third level.

Table 8. Liquidity assessment

No	Position	2007	2008	2009	2010
1.	Cash and cash equivalents	4,327,430	2,480,360	3,289,876	3,521,582
2.	Total liquid assets	52,003,371	65,701,683	100,979,503	84,208,009
3.	Total working capital	84,578,477	102,338,731	145,306,341	124,455,205
4.	Short term liabilities	95,003,837	106,645,810	155,102,894	142,156,639
5.	First liquidity level (1/4)	0.05	0.02	0.02	0.02
6.	Second liquidity level (2/4)	0.55	0.62	0.65	0.59
7.	Third liquidity level (3/4)	0.89	0.96	0.94	0.88

Source: Authors own calculation

14 In this case, result from regular activities since other revenues and expenditures were not the subject of the risk analysis of achieving financial result and profitability break even point.

Illiquid business is partly a consequence of the very low inventories turnover ratio and weak sector position in purchase and sale markets. Number of receivable days is less than the payable days referring to better position on the sales market. Although considering the fact that in the observed period it took 137 days for the receivables payment and 241 days to pay liabilities in the average, whole sector is characterized by poor position on both sales and purchases market.

Table 9. Purchase and sale market

No	Position	2007	2008	2009	2010
1.	Receivable days	128	131	159	131
2.	Payables days	264	227	238	235
3.	Inventory days	138	124	118	109

Source: Authors own calculation

Interconnection between profitability and financial position determined unsuccessful business of the sector considering all financial result and liquidity indicators. That is a starting solution in attempts to overcome the crisis and imposes the need for subsidizing companies in agriculture sector. Breaking the monopolies and establishment of the real prices parity with the adequate knowledge and experience primarily in the field of choosing the best varieties, ways of tillage and in building and exploitation of the irrigation systems would lead to yield rise, better financial result and accumulation.

Conclusion

By research results synthesis, it was concluded that agro meteorological trends in the 2007-2010 period of time, under prevailing market conditions, had a significant impact on the worsening of yield position of the agricultural sector in Serbia under the activity code 011-cultivation of crops, plants and gardening. Throughout the entire period under survey, the sector recorded negative operating result which is mainly due to high losses in the field of finance, as well as very low operating results. Since the relatively stable global sales and purchase parity price was determined, the achieved operating result was largely depended on the amount of yield which recorded low values due to frequent occurrence of agro meteorological extremes.

Agro meteorological extremes and inconsistent exploitation of irrigation systems have influenced the growth of risk of achieving a positive gross financial result. Investments in new and consistent exploitation of existing irrigation systems would contribute to the growth of yield, which would cause an increase in the value of sales, and through them, in operating result. An increase in the operating result would cause a reduction of risk of achieving a negative gross financial result thus minimizing or eliminating the probability of bankruptcy and improving the prospects of the development of agricultural sector.

In order to strengthen the agricultural sector, its competitiveness and exports it is necessary to adopt and implement the long-term plan in the field of combat drought and other agro

meteorological extremes followed by improvements in the breeding of varieties resistant to the ruling climate conditions in Serbia. The insolvent operations and high level of financial expenses are reducing an enterprise's possibility to re-borrow. For that reason, more intensive subsidizing of agricultural production is necessary, as well as improvements in the market operating chain which is of crucial importance for the reconstruction of existing and installation of new irrigation systems' capacities.

Literature

1. Bubić, J., Hajnrih, J. (2012): *The analyses business performances of agricultural enterprises in Vojvodina during the current crisis*, Economics of Agriculture, Vol. 59, No. 2, Institute of Agricultural Economics, Belgrade, p. 185.
2. Đuričin, S. (2009): *Mogućnosti izlaska preduzeća iz zone gubitka*, Accounting, no. 11-12, Association of Accountants and Auditors of Serbia, Belgrade, p. 30-39.
3. Đuričin, S. (2012): *Anliza poslovanja i mogućnosti izlaska preduzeća iz zone gubitka*, Institute of Economic Sciences, Belgrade.
4. *Godišnja agrometeorološka analiza*, Republic Hydrometeorological Service of Serbia, available from: http://www.hidmet.gov.rs/ciril/meteorologija/agro.php [Accessed 15.10.2011]
5. Rajic, Z., Novakovic, V., Gligoric, M., Lacnjevac, C., Grujic, R., Zivkovic, D. (2012): *Effects of aeration on groundwater quality for irrigation*, Economics of Agriculture, Vol. 59, No. 3, Institute of Agricultural Economics, Belgrade, p. 523.
6. Rodić, J., Vukelić, G., Andrić, M. (2007): *Teorija, politika i analiza bilansa*, Faculty of Agriculture, Belgrade.
7. Sredojević, Z., Gajić, B., Živković, D. (2006): *Ekonomski parametri optimalne strukture proizvodnje u uslovima navodnjavanja*, Ekonomika poljoprivrede, br. 3/2006, Društvo agrarnih ekonomista SCG, Savez poljoprivrednih inženjera i tehničara Jugoslavije, IEP, Beograd, p. 799-807.
8. *Strategija razvoja poljoprivrede Srbije*, Governement of the Republic of Serbia, Official Gazette no. 78/05, p. 36.
9. *Strategija upravljanja vodama i ublažavanje suša u poljoprivredi zemalja zapadnog Balkana* (2004-2007), Institute for water management Jaroslav Černi, Belgrade, available from: http://www.jcerni.org/index.php?option=com_content&view=category&layout=blog&id=80&Itemid=280&lang=sr [Accessed 28.11.2011]

UTICAJ SUŠE NA PRINOSNI POLOŽAJ GRUPE PREDUZEĆA IZ POLJOPRIVREDNOG SEKTORA

Sonja Đuričin[15], Duško Bodroža[16]

Rezime

Polazeći od činjenice da količina i raspodela padavina, odnosno intenzitet suše, s obzirom na stanje i obim upotrebe sistema za navodnjavanje, imaju za posledicu relativno nizak i nestabilan prinos useva, polazna hipoteza istraživanja je da su agrometeorološka kretanja u periodu 2007-2010. godine uticala na prinosni položaj analiziranog sektora poljoprivrede Srbije. Cilj rada je da se u vladajućim tržišnim uslovima utvrdi stepen uticja agrometeoroloških kretanja na prinosni položaj grupe privrednih subjekata. Predmet istraživanja je analiza poslovanja poljoprivrednog sektora Srbije pod šifrom delatnosti 011 – gajenje useva, zasada i baštovanstvo. Osnovni izvor podataka su zbirni finansijski izveštaji grupe privrednih subjekata poljoprivrednog sektora pod šifrom delatnosti 011 i agrometeorološki podaci za period 2007-2010. godine. Primenom metoda kvalitativne i kvantitativne analize finansijskih izveštaja i sintezom dobijenih rezultata istraživanja došlo se do zaključka da su u analiziranom periodu agrometeorološka kretanja, pri vladajućim tržišnim uslovima, značajno uticala na pogoršanje prinosnog položaja posmatranog poljoprivrednog sektora Srbije.

Ključne reči: *suša, agrometeorološki uslovi, navodnjavanje, poljoprivredni sektor, prinosni položaj*

15 M.Sc., Institut ekonomskih nauka, Zmaj Jovina 12, Beograd, Srbija, Telefon: +381 11 2638 820, E-mail: sonja.djuricin@ien.bg.ac.rs

16 M.A., Institut ekonomskih nauka, Zmaj Jovina 12, Beograd, Srbija, Telefon: +381 11 2635 823, E-mail: dusko.bodroza@ien.bg.ac

Original scientific paper

Economics of Agriculture 1/2013
UDC: 634.711(497.11)

TENDENCIES RELATED TO THE PRODUCTION OF RASPBERRIES IN THE REPUBLIC OF SERBIA

Nataša Kljajić[1], Predrag Vuković[2], Slavica Arsić[3]

Summary

Raspberry for its biological characteristics, economic importance, agro-ecological, technological, organizational and other requirements, the market value of the product, as well as very high interdependence and interdependence between the various phases of reproductive cycle, specific fruit species. He is one of the most important types of berries in the world, and is one of the most profitable crops in the overall crop production. By production volume, Serbia is among the leading producers of raspberries, and its economic significance is very high level of market sells and market competitiveness of the European Union.

Accordingly, the paper presents the production season in the Republic of Serbia for the period 2000-2010 its average, minimum and maximum of values in production, changes in rates and coefficients of variation.

Key words: *raspberry, production, economic importance.*

JEL: *Q13, Q11*

Introduction

The most significant production for the economy of our country within fruit production is the production of berrylike fruit (strawberries, raspberries, blackberries, blueberries, cranberries, gooseberries) since an annual turnover realized with the export of this fruit, and first of all the export of raspberries, is more than 120 million of euros *(Kljajic, 2012.)*.

Raspberry (*Rubus idaeus L.)* is the most important kind of berry-like fruit. Growing raspberries has a very long tradition in our country, longer than a century. Growing raspberries in Serbia dates from 1880 but it was used just as an ornamental plant at the

1 Nataša Kljajić, Ph.D., Research assistant, Institute of Agricultural Economics, Volgina 15, 11060 Beograd, E-mail: natasa_k@iep.bg.ac.rs

2 Predrag Vuković, M.Sc., Research assistant, Institute of Agricultural Economics, Volgina 15, 11060 Beograd, E-mail: predrag_v@iep.bg.ac.rs

3 Slavica Arsić, M.Sc., Research assistant, Institute of Agricultural Economics, Volgina 15, 11060 Beograd, E-mail: slavica_a@iep.bg.ac.rs

beginning. The production of goods dates from the period after WWI, more precisely in 1920 when raspberry was produced for the needs of the local market and mostly for preserves, treacle and pulp. After WWII demand for raspberries increased and the prices were high. Wide range of raspberry production in Serbia was realized at the end of the 20th century. Recently, raspberry has become the most important product in Serbian export. Serbia has become famous for its raspberries since they survived among competition on choosy western market *(Mišić, 2004)*.

Raspberry is one of the most important exported products, the framework of rural development in some circles, Serbian brand, an important branch in the economy and lot more. Raspberry fruit is very attractive, very tasty, with special aroma, juicy, it has high nutritional, dietetic and technological value and therefore extremely demanded and very appreciated. It is the most profitable exported product in Serbian agriculture. During the recent years in Serbia average annual production of raspberry was about 80.000 t which is 5,5% of total production of fruit. Over 90% of raspberry produced is being frozen and exported and the rest is being sold fresh or made into other products. About 25% of world raspberry production is from Serbia. In that way about 100 million of euros is insured in the Balance of Payment. Serbia mostly exports frozen and rarely cooled raspberry *(Vlahović et al., 2003, Dimitrijević, 2009).*

The production of raspberry in the world

In the world, raspberries are grown in relatively small areas, although for growing raspberries there is lot more space. According to the data of FAO Statistics FAO Statistics *(FAO Statistical Yearbook, 2009.)* the surface area of that space during the period 2007-2009 is in average 94.727 ha (Table 1.).

Table 1. Surface area planted with raspberries (by continents) for the period 2007-2009.

Area	Surface (ha)			Average 2007-2009 (ha)	Structure (world=100%)
	Year				
	2007	2008	2009		
World	102.441	90.482	91.257	94.727	100,00
Africa	66	66	66	66	0,07
North and South America	10.001	9.379	9.539	9.640	10,18
Asia	2.800	3.100	3.200	3.033	3,20
Europe	88.806	77.380	77.958	81.381	85,91
Pacific	768	557	487	604	0,64

Source: www.fao.org (http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#ancor)

Observed by continents, the largest areas planted with raspberries are in Europe (81.381 ha or 85,91%), then in North and South America (9.640 ha or 10,18%), in Asia (3.033 ha or 3,20%), in Africa (66 ha or 0,07%) and in Oceania (604 ha or 0,64%).

Raspberry production in the Republic of Serbia

Serbian share in total European raspberry production is 20%, and its share in domestic structure of fruit production is 6,5%. The largest areas planted with raspberries in Serbia are in Central Serbia – 98%. If Central Serbia is observed, the highest concentration of raspberry producers is in Western Serbia, which is logical because raspberries are growing best in hilly and mountainous regions *(Nikolić et al., 2008)*. Region of Vojvodina is insignificant regarding raspberry production. The raspberry production statistics regarding the Republic of Serbia and observed by regions and years is shown in Table 2.

The data sources were statistics publications (FAO, Statistics Division – FAOSTAT), as well as statistics publications taken from the official website of the Republic Bureau of Statistics and related to the observed period.

Table 2. Realized range of raspberry production in the Republic of Serbia for the period 2000–2010.

The observed period	The Republic of Serbia			Central Serbia			AP Vojvodina		
	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)	Area planted with raspberries (ha)	Total return (t)	Return per unit (kg)
2000.	13.519	55.999	4,14	13.238	55.530	4,20	281	469	1,67
2001.	14.753	77.781	5,27	14.385	77.068	5,36	368	713	1,94
2002.	15.293	93.982	6,15	14.943	93.572	6,26	350	410	1,17
2003.	16.354	78.974	4,83	15.987	78.664	4,92	367	310	0,85
2004.	15.995	91.725	5,73	15.589	90.861	5,83	406	864	2,13
2005.	15.413	84.331	5,47	15.063	83.777	5,56	350	554	1,58
2006.	15.024	79.680	5,30	14.672	78.929	5,38	352	751	2,13
2007.	14.496	76.991	5,31	14.116	76.185	5,40	380	806	2,12
2008.	14.680	84.299	5,74	14.174	83.335	5,88	506	964	1,91
2009.	14.957	86.961	5,81	14.441	85.302	5,91	516	1.659	3,21
2010.	15.174	83.870	5,53	14.709	81.240	5,52	462	2.630	5,70
Aver.	15.060	81.327	5,39	14.665	80.406	5,47	394	921	2,22

Source: The Republic Bureau of Statistics

The area covered with raspberries in the Republic of Serbia during the period from 2000-2010 in average was 15.060 ha with variations from year to year from 13.519 ha in the first observed year to 16.354 ha in 2003 (Table 3, Graph 1). The share of Central Serbia, an average surface area of 14.655 ha, in the total area planted with raspberries in Serbia was about 97,4% and the share of AR of Vojvodina was only 2,6%.

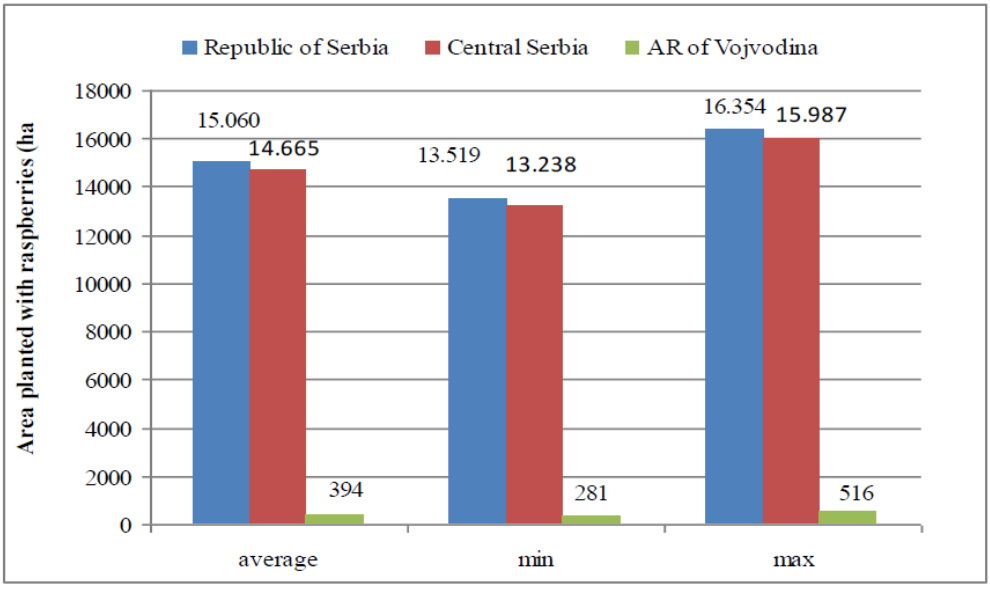
Table 3. Variations in surface area planted with raspberries in Serbia during the period 2000-2010.

Indexes	Surface area (ha)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010.	15.060	14.665	394
Minimum	13.519	13.238	281
Maximum	16.354	15.987	516
Rate variability (%)	0,19	0,07	4,53
Coefficient of variation (%)	5,01	5,08	18,32

Source: Calculation based on the data of the Republic Bureau of Statistics

Besides small exceptions in the observed period, the average surface areas covered with raspberries in Serbia had little tendency to grow (rate variability 0,19%) and in Central Serbia (rate variability 0,07%). However, the growth in the surface areas covered with raspberries in Vojvodina was a little bit more expressed (average annual rate variability 4,53%).

Graph 1. Variations in surface area planted with raspberries in the Republic of Serbia during the period 2000-2010.



Observing raspberry return expressed in kg/ha, during the period from 2000-2010 average raspberry return in the Republic of Serbia was 5,38 kg/ha (Table 4, Graph 2). The return per surface area unit in Central Serbia was significantly bigger – 5,47 kg/ha, while in AP Vojvodina it was 2,22 kg/ha.

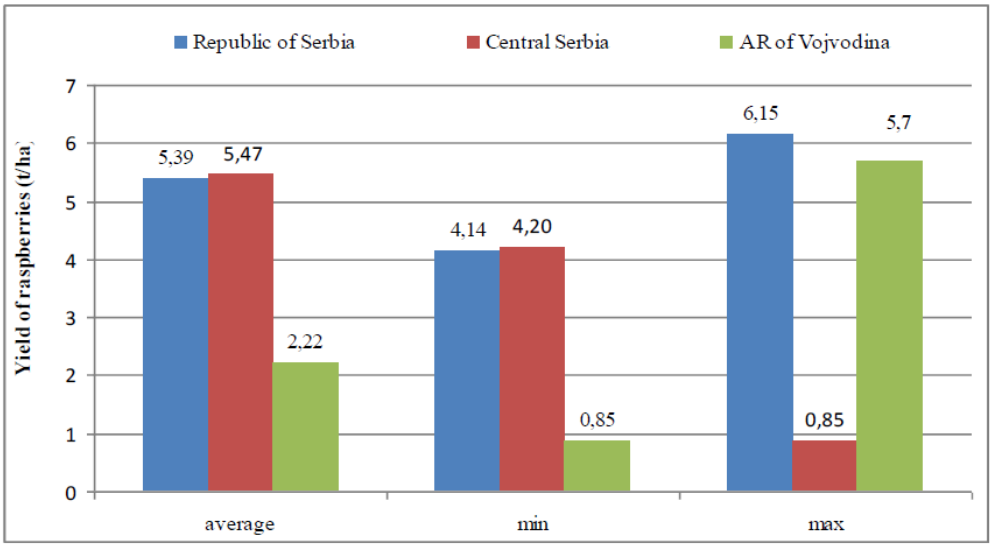
Table 4. Variations in raspberry return in Serbia during the period from 2000-2010

Indexes	Return (kg/ha)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010.	5,39	5,47	2,22
Minimum	4,14	4,20	0,85
Maximum	6,15	6,26	5,70
Rate variability (%)	1,60	1,53	10,97
Coefficient of variation (%)	10,03	10,11	58,73

Source: Calculation based on the data of the Republic Bureau of Statistics

The average raspberry return shows tendencies of growth in Serbia in general (rate variability 1,60%), as well as in regions. Raspberry return in Vojvodina was increased according to the average annual rate variability which is 10,97% and there was a significant variability during the observed period (coefficient of variation 58,73%).

Graph 2. Average raspberry return (kg/ha) in the Republic of Serbia for the period from 2000-2010.



Average raspberry production during the observed period from 2000-2010 in the Republic of Serbia was 81.327 t and the lowest production was realized during the first year observed (55.999 t), and the highest in 2002 (93.982 t). The share of Central Serbia, whose average production was 80.406 t, in the total raspberry production in Serbia was 98,9% (Table 5, Graph. 3). The remaining 1,1% represent the share of AP Vojvodina in the total raspberry production in Serbia.

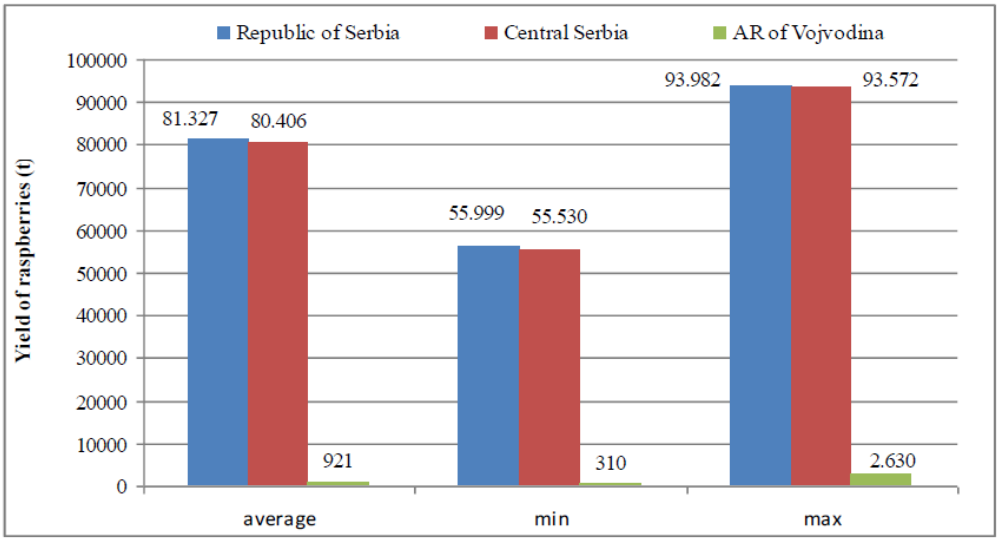
Table 5. Variations in raspberry production in the Republic of Serbia for the period 2000-2010.

Indexes	Production (t)		
	Republic of Serbia	Central Serbia	AP Vojvodina
Average for the period 2000-2010	81.327	80.406	921
Minimum	55.999	55.530	310
Maximum	93.982	93.572	2.630
Rate Variability (%)	1,79	1,61	16,01
Coefficient of Variation (%)	12,33	12,31	73,08

Source: Calculation based on the data of the Republic Bureau of Statistics

Total raspberry production in the Republic of Serbia was increased according to the average annual rate variability of 1,79%, with a remark that the intensity in production growth was significantly more expressed in Vojvodina (rate variability 16,01%) in relation to Central Serbia (rate variability 1,61%).

Graph 3. Total raspberry production (t) in the Republic of Serbia for the period 2000-2010



There are several regions in Serbia where raspberry production is widespread: 1) Region of the city of Valjevo (Podgorina and Pocerina), 2) Region of the city of Šabac (Krupanj, Loznica, Bajina Bašta), 3) Region of the city of Kosjerić (Povlen-Varda), 4) Region of the city of Arilje (Arilje), 5) Region of the city of Ivanjica (Ivanjica, Kaona, Kotraža, Guča), 6) Region of the city of Čačak (Čačak and Kablar), 7) Region of the mountain Kopaonik (Brus with the surroundings), 8) Region of the city of Kraljevo (Kraljevo, Dragačevo), 9) Region of the city of Leskovac (Leskovac). The biggest part of raspberry production is concentrated in the areas of the following municipalities: Kosjerić,Užice, Arilje, Požega, Ivanjica, Valjevo, Mionica, Osečina, Koceljeva, Krupanj, Ljubovija, Gornji Milanovac, Čačak, Lučani, Brus, Aleksandrovac (Table 6).

Table 6. Raspberry production in the Republic of Serbia (t) according to municipalities for the period 2001-2010

Municipality	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Kosjerić	4.752	5.611	4.624	6.416	5.230	3.700	2.950	3.321	3.483	3.853
Užice	3.403	3.987	3.499	3.997	3.426	2.590	2.435	2.539	3.074	2.863
Arilje	8.185	10.000	10.904	11.775	7.310	9.225	8.480	8.650	11.015	10.230
Požega	4.411	4.958	3.745	4.870	4.121	4.006	3.152	3.631	4.138	3.952
Valjevo	3.136	5.358	2.450	2.223	2.936	3.047	3.048	3.142	2.090	2.304
Ivanjica	7.421	7.398	7.009	11.075	9.120	8.513	8.495	9.720	9.236	9.637
Mionica	499	630	242	371	274	286	282	492	318	228
Osečina	3.640	5.862	3.479	4.232	3.894	3.524	3.210	3.992	3.468	3.710
Koceljeva	1.417	1.526	799	1.054	1.331	1.343	1.367	1.323	763	962
Krupanj	3.537	4.897	3.868	3.912	3.421	3.951	4.309	4.224	4.364	4.304
Ljubovija	3.542	4.138	3.937	1.751	3.452	3.578	3.537	4.575	4.516	3.889
Gornji Milanovac	1.400	1.374	1.518	1.885	1.888	1.470	1.726	1.912	2.168	2.217
Čačak	1.368	1.422	2.753	2.707	3.377	3.102	3.041	3.558	3.142	2.829
Lučani	6.046	7.967	5.638	5.815	7.223	5.704	4.402	5.181	5.712	4.671
Brus	5.178	6.322	5.232	5.207	6.349	5.469	5.384	6.538	6.434	5.834
Aleksandrovac	2.605	2.691	3.250	3.282	2.613	2.256	3.621	3.719	3.906	3.170

Source: The Republic Bureau of Statistics, Municipalities in Serbia, 2002-2011.

According to the data in Table 6 the biggest raspberry production during the observed period was realized in the following municipalities: Arilje (from 7.310 t to 11.775 t), Ivanjica (from 7.009 t to 11.075 t), Lučani (from 4.402 t to 7.967 t), Brus (from 5.178 t to 6.538 t) etc. Raspberry is being grown in other regions too, but on smaller areas. Other regions that have been started to develop significantly regarding raspberry production are: Region close to the river Drina, region of the mountain Kopaonik, region of the city of Šabac and region of the mountain Zlatar, but there are also regions where there are no optimal conditions for this kind of production, but because of profitability people started to grow raspberries there, as well *(Kljajić, 2012.)*.

Raspberry production depends on weather conditions. There are irrigation systems just on small areas and therefore every drought year significantly reduces return *(Cecić et al., 2006b)*. Droughts that are more often and last longer and which appear because of low rainfall, low water resource capacity and extended vegetative period, higher temperature and evapotranspiration, cause serious damages to raspberry production *(Milivojević et al., 2005)*. Therefore, in some areas, considerable fall in raspberry return was recorded with the tendency of further falling. On the other side, improper fertilization resulted in too much acid in soil, so it is necessary to check low pH value for a while in order to grow raspberries on that soil again.

Some of the problems in raspberry production in our country are related to the foreign investment. In an effort to enable foreign investments the problem appeared – poor infrastructure since we are talking about undeveloped hilly and mountainous areas. On the other side, genetic resources related to fruit growing in Serbia are significant and represent the base for improvement. It should emphasize the most modern and quality fruit types breeding and not rely on old fruit types that don't have potential. There is a long tradition in raspberry production on farms in Serbia, but specialization in households is necessary, as well as to form associations and unions in order to inform producers about the latest trends in production and to help producers directly. In particular, it is necessary to organize seminars to educate producers especially in order to transfer knowledge in production planning and realize the highest quality possible at the lowest possible production costs.

The problem related to raspberry production which is also important to mention is certainly the emigration of manpower from villages and an increased number of older people and therefore it is necessary to create conditions that will attract young people to return to villages. On the other side, there are lots of uneducated and unqualified seasonal workers, especially in the prime fruit-picking season, but because our workers are not interested to work, workers from Romania and Bulgaria are imported. In order to improve the situation it is necessary to ensure compliance with the EU Regulations, especially related to hygiene and human rights related to fruit picking jobs, as well as related to education and advanced training. In the EU countries rural development is considered to be an integral part of economic development. Therefore, rural development represents required standard for the development of our country. Besides, the question of dying villages and environmental protection are becoming more and more interesting topics in transitional societies and therefore, one of the most important tasks for the Ministry is to create more suitable conditions that would motivate young people to start with various activities related to those fields *(Cecić et al., 2008)*.

Conclusion

Raspberry production is an exceptional chance for the development of agriculture and Serbian Economy in general. It could be realized through increased economic efficiency in primary productivity, as well as in the improvement in product quality. Regarding competitors which have become more and more outstanding over the past several years, it is necessary to regain positions on the world market that our country used to have; it is important that state enables loans with favourable terms and that state protects raspberry as a product of national interest etc. *(Milić et al., 2011)*

Strategy of raspberry market development, since raspberry is an extremely important fruit type for our country, should be based on the following:

1. *To extend growing season* by introducing new fruit types suitable for long term storage, by modernization in pomotechnical measures and by introducing fruit growing in semi confined or confined space or sheltered space;

2. *Fruit picking and quality control* using new picking techniques, applying international quality standards and certification;
3. *Packaging and logistics* through the improvement in packaging plants and the improvements in transportation of products to foreign markets;
4. *Sales and marketing* through the improvement in regional and foreign fresh fruit market information, international promotion from Serbia using mass media and participation of fruit producers in international fairs;
5. *To coordinate standards with the EU requirements* and to create Serbian product according to European standards *(Cecić et al., 2006a, 2007).*

References

1. Vlahović, B., Tomić, D. (2003): *Izvoz maline iz Srbije i Crne Gore,* Ekonomika poljoprivrede, Specijalni broj - Ekonomika i tržište maline, vol. L, br. 3, IEP Beograd, str. 255-266.
2. Dimitrijević, B. (2009): *Organizacioni model kooperative proizvođača maline,* Magistarski rad, Poljoprivredni fakultet, Beograd.
3. Kljajić, N. (2012): *Ekonomska efikasnost investicija u različitim uslovima proizvodnje maline,* Doktorska disertacija, Univerzitet u Novom Sadu, Poljoprivredni fakultet.
4. Milivojević, J., Gajić, B., Bošnjaković, G., Cecić, N., Matović, G. (2005): *Optimizacija režima navodnjavanja zemljišta pod zasadima maline u različitim geomorfo-pedo-mikroklimatskim uslovima ariljsko-požeškog malinogorja,* Završni izveštaj projekta tehnološkog razvoja BTR 0547 A - u oblasti biotehnologije, str. 1-32.
5. Mišić, P., Tešović, Ž., Stanisavljević, M., Milutinović, M., Nikolić, M., Milenković, S. (2004): *Malina u Srbiji i Crnoj Gori-prošlost, sadašnjost i budućnost,* Jugoslovensko voćarstvo, Naučno voćarsko društvo Srbije, Vol. 38, br. 145-146, str. 5-22.
6. Milić, D., Galić, D., Vukoje, V. (2011): *Mogućnosti unapređenja voćarske proizvodnje u Srbiji,* Journal of Processing and Energy in Agriculture 2011, 15(1), pp. 27-30.
7. Nikolić, M., Ivanović, M., Milenković, S., Milivojević, J., Milutinović, M. (2008): *The State and Prospects of Raspberry Production in Serbia,* ISHS Acta Horticulturae 777: IX International Rubus and Ribes Symposium, Pucón, Chile, no. of article 83, Vol. 1.
8. Cecić, N., Jeločnik, M., Arsić, s. (2006): *Stimulating measures for improvement of rural areas of Serbia,* Conferința - Dezvoltarea complexă a spațiului rural, Vol. I, Diversificarea activităților economice din mediul rural şi creşterea competitivității agriculturii, Bucureşti, ASE Bucureşti, IEA Belgrad, IEA Bucuresti, pp. 312-321.
9. Cecić, N., Vuković, P., Jeločnik, M. (2006b): *Analiza klimatskih i zemljišnih uslova u funkciji gajenja maline na području opštine Mali Zvornik,* Međunarodni naučni skup - Multifunkcionalna poljoprivreda i ruralni razvoj I – razvoj lokalnih zajednica, Mali Zvornik, Ekonomika poljoprivrede, Vol. LIII, br./N º TB, IEP Beograd, str. 29-38.
10. Cecić, N., Subić J., Vuković, P. (2007): *Proizvodnja maline u funkciji ruralnog razvoja,* Međunarodni naučni skup - Multifunkcionalna poljoprivreda i ruralni razvoj

u Republici Srpskoj, Tematski zbornik, IEP Beograd, Jahorina, 13-14 decembar 2007, str. 379-386.

11. Cecić, N., Vuković, P., Arsić, S. (2008): *Basic Characteristics of the Alluvial Soil of the Experimental Field 'Kosovo' in the Productive Planted Raspberry,* International Scientific Meeting - State, Possibilities and Perspectives of Rural Development on Area of Huge Open-pit Minings, Tematic Proceedings, IEP Belgrade, Vrujci Spa, pp. 357-367.
12. http://webrzs.stat.gov.rs/WebSite/

TENDENCIJE PROIZVODNJE MALINE U REPUBLICI SRBIJI

Nataša Kljajić[4], Predrag Vuković[5], Slavica Arsić[6]

Rezime

Malina je po svojim biološkim osobinama, ekonomskom značaju, agro-ekološkim, tehnološko-organizacionim i drugim zahtevima, tržišnoj vrednosti proizvoda, kao i vrlo visokoj međuzavisnosti i uslovljenosti između pojedinih faza reprodukcionog ciklusa, specifična voćna vrsta. Spada među najznačajnije vrste jagodastog voća u svetu, i jedna je od najrentabilnijih kultura u celokupnoj biljnoj proizvodnji. Po obimu proizvodnje, Srbija se svrstava u vodeće proizvođače maline, a njen ekonomski značaj je u izrazito visokom stepenu robnosti i konkurentnosti na tržištu Evropske Unije.

Shodno tome, u radu je prikazana proizvodnja maline u Republici Srbiji za period 2000-2010. godine, njene prosečne, minimalne i maksimalne vredosti u proizvodnji, stope promene i koeficijenti varijacije.

Ključne reči: *malina, proizvodnja, ekonomski značaj.*

4 Dr Nataša Kljajić, istraživač saradnik, Institut za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, E-mail: natasa_k@iep.bg.ac.rs

5 Mr Predrag Vuković, istraživač saradnik, Institut za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, E-mail: predrag_v@iep.bg.ac.rs

6 Mr Slavica Arsić, istraživač saradnik, Institut za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, E-mail: slavica_a@iep.bg.ac.rs

Original scientific paper

Economics of Agriculture 1/2013
UDC: 658.8.011.1:338.439.62

MEASURING THE COMMUNICATION EFFECTS OF SALES PROMOTION IN A FOOD COMPANY

Ines Mesaroš[1], Nenad Đokić[2], Mirjana Penić[3]

Abstract

Consumer targeted sales promotion activities, especially discounts and complimentary products, are frequently pursued in food industry. Their fundamental goal is to boost sales over a given period, with short-term effects. However, studying literature dealing with effects of sales promotion, one will find controversies not only concerning expected economic effects of sales promotion, but also regarding unexpected economic impact of sales promotion on brand image, which is the communication goal of promotion itself. If some of the brand damage effects suggested in one part of literature were accepted as possible, this would result in adverse effect of sales promotion in comparison to other marketing communication tools. All of the above warns of the need to very carefully plan sales promotion activities undertaken by a food company, which requires the possibility of measuring communication effects of sales promotion. This article presents a method of measuring communication effects of sales promotion using the metric conjoint analysis technique on the example of a dairy product.

Key words: *sales promotion, metric conjoint analysis, food company.*

JEL: *M31*

Introduction

Ever since the 1990s, marketing communication has been dominated by the integrated marketing communication trend, but ideas about the need for such marketing communication appeared as early as in the 1960s (Salai & Grubor, 2011). The fundamental idea is to view the product the way it is viewed by consumers, i.e. as information flow from indistinguishable

1 M.A., Faculty of Economics, Segedinski put 9-11, 24000 Subotica, Phone: +381 63 822 01 73, E-mail: mines@ef.uns.ac.rs

2 M.A., Higher School of Professional Business Studies, Vladimira Perića-Valtera 4, 21000 Novi Sad, Phone: +381 63 849 33 15, E-mail: nenad.djokic.vpsns@gmail.com

3 M.Sc., Department of Geography, Tourism and Hotel Management, Faculty of Science, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Phone: +381 63 753 85 89, E-mail: penicns@yahoo.com

sources. This is done in an effort to achieve the company's economic goal, i.e. profit, as well as the communication goal– a positive and clear image, where accomplishing the communication goal contributes to accomplishing the company's economic goal.

One of the integrated marketing communication tools is sales promotion. Kotler and Keller (2006, p. 588, 589) identify consumer-targeted sales promotion tools (samples, coupons, cash return offers, low-priced packaging, premiums, repeat purchase programmes, prizes, raffles, contests, customer loyalty rewards, free trial periods, product warranties, tie-in promotion, cross-promotion, displays and point-of-sale presentations), then B2B sales promotion tools (price discounts, price allowances, free products), as well as tools for promoting business and sales force (fairs and conventions, sales contests, specialised advertising). Sales promotion activities, targeted predominantly at intermediaries and consumers, are mostly aimed at boosting sales over a certain time period, which means that their effects are short-term, although, when considering sales personnel education, one can also identify long-term effects of sales promotion. This is the fundamental difference between this integrated marketing communication tool on the one hand and advertising, which aims to inform and motivate consumers, and participate in image formation.

Nevertheless, the large volume of research into consumer-targeted sales promotion does not provide a unified conclusion regarding the effects of sales promotion. The first section of this article is devoted to this issue. Differences are present both in recognising the role of sales promotion in attaining the company's economic goals and in considering the impact of sales promotion on achieving the company's communication goal, despite the fact that the latter is not expected in view of the long-term period, so there should be no effect, when considering the impact of sales promotion of attaining the company's communication goal.

Contradicting views in literature concerning the impact of sales promotion activities on brand image as the goal of integrated market communication tend to result in a need to reconsider firmly established views of sales promotion. Actually, the most often quoted argument is that, as far as consumers are concerned, this integrated marketing communication instrument affects irresolute rather than loyal consumers, and the effects on the brand image are not likely to occur in either of the two mentioned segment. If some of the brand damage effects suggested in one part of literature were accepted as possible, this would result in adverse effect of sales promotion in comparison to other marketing communication tools. All of the above warns of the need to very carefully plan sales promotion activities undertaken by a company, notably measuring their communication effects.

Customer-targeted sales promotion activities, especially discounts and bonuses, are frequently used by food companies. In view of this, the goal set in this article is to present a technique that could be used for measuring potential effects of sales promotion activities on a food company's brand image, suitable for application in domestic economic conditions, i.e. deciding whether larger-scale sales promotion activities should be undertaken. The technique proposed is that of metric conjoint analysis, described in the second section of the article, while its application for measuring the communication effect of sales promotion is presented in the third section of the article.

Various views of sales promotion effects

Although literature provides a clear identification of sales promotion objectives, there is no agreement as to whether sales promotion makes a positive impact on some of them, and, more specifically, what is the interaction of various effects of sales promotion. In this sense, some authors introduce viewing sales promotion impact from the point of short, medium, or long term, or view the sales promotion effects depending on whether it is a new product, national brand, or a so-called no-name product.

De Pelsmacker, Geuens & Van den Bergh (2007, p. 371-373) cite the results of several studies pertaining to sales promotion effects. If sales promotion is viewed in the short term, the authors cite Allenby & Lenk's (1995), conclusions, arguing that a significant contribution of sales promotion to the increase in size and market share is noticeable even in such conditions. Some other studies (Dhar & Hoch, 1996) cited by the above mentioned authors, state that a growth in results from sales promotion, in other words (Gupta, 1998), that 80% sales increase can be credited to sales promotion when attracting the consumers of competing products. Moreover, sales promotions attract more consumers to retail outlets (Grover & Srinivasan, 1992). In the short run, these effects could be regarded as positive. Nevertheless, one should bear in mind the asymmetry relatable to sales promotion. More precisely, when sales promotion are applied to luxury products, it may result in increased purchases of these products by lower-income brackets consumers, or those prone to buying private labels, i.e. own brands. In the opposite case, however, symmetrical response cannot be identified.

From the mid- and long term perspective, the interpretations of sales promotion are different. On the one hand, some authors point out that promotion campaigns may result in increased sales volume during these activities, which in turn leads to piling up stocks and subsequent decreased sales, but on the other hand, it may lead to consumers reducing the purchases of given product before expected sales promotion activities (De Pelsmacker, Geuens & Van den Bergh, 2007, p. 372). This phenomenon is known as the sawtooth effect. The same authors cite a study into a long-term market share analysis conducted on 341 product, where the nine-year observation period showed that the market share of 60% of observed products remained stable, whereas 24% cases showed a significant impact of sales promotion on the products' market share (Lal & Pandmanabhan, 1995).

The effects of sales promotion on brand image are another significant factor. Some authors, cited in De Pelsmacker, Geuens & Van den Bergh, argue that frequent sales promotions get consumers used to buying discounted products instead of seeking value (Rotschild, 1987). On the other hand, there are authors claiming that possible brand damage caused by sales promotion will be more likely to be eliminated if the discount is not excessive, if the number of loyal customers is high, and in conditions where sales promotions are frequent. (Kahn & Louie, 1990). There are also studies arguing that sales promotions cannot affect brand image, as long-term consumer attitudes are not affected by short-term actions (Davis, Inman & McAlister, 1992). It should also be pointed out that buying products during sales promotions can develop the consumer's habit of using that product

(De Pelsmacker, Geuens & Van den Bergh, 2007, p. 371). Some of the studies even showed that sales promotions may lead to net positive increase in the likelihood of repeat purchases (Guadagni & Little, 1983).

Kotler & Keller also mention various research into the effects of sales promotion (2006, p. 585). They cite research predicting that sales promotion will not result in consumer loyalty, but rather additional and repeat purchases (Ailawadi, Gedenk & Neslin, 1999). The authors point out that where brands are similar, sales promotion will have short-term impact in the form of higher sales, but increased market share should not be expected in the long term. Also, referring to research by other authors, they argue that in situations with high diversity, consumers may switch to new brands, hoard or buy more (Mela, Jedidi & Bowman, 1998), but also warn that, after a while, sales may drop (Van Heerde, Leeflang & Wittink, 2000).

Metric conjoint analysis

Paul E. Green, the scholar most credited with the development of conjoint analysis writes (Green, Krieger & Wind, 2004), that the development of behavioural sciences, especially psychometrics and mathematical psychology in the 1970s, induced the development of new marketing analysis techniques such as cluster analysis, multidimensional analysis and conjoint analysis. In 1970, Luce & Tukey published an article in *Journal of Mathematical Psychology*, dealing with conjoint measurement, while Green & Rao were the first ones to write an article on conjoint analysis in 1971.

Conjoint analysis is a technique used in situations where the decision maker has to choose between options with two or more simultaneously varying attributes. The question that the decision maker has to answer is whether to choose option X or option Y, where X has a better attribute A, and Y has a better attribute B, which applies to the range of attributes. This analysis is applied to daily decisions made by consumers (such as which toothpaste brand to buy, car to lease, or photocopier to purchase or lease). The data can be gathered from hundreds, or even thousands of respondents.

Conjoint analysis measures consumer preferences and their purchase intention, shows how they would respond to changes on existing products, or launching new ones. Today, however, there is a whole range of areas where this analysis is applied. Gustafsson, Herrmann & Huber (2007, p. 3, 4.) state various possibilities of applying conjoint analysis and authors recording those applications in their work:

- when planning new products – for determining innovation effects' preferences (e.g. Bauer, Huber & Keller, 1997; DeSarbo, Huff, Rolandelli & Choi, 1994; Green & Krieger, 1987; Herrmann, Huber & Braunstein, 1997; Johnson, Herrmann & Huber, 1998; Kohli & Sukumar, 1990; Page & Rosenbaum, 1987; Sands & Warwick, 1981; Yoo & Otha, 1995; Zufryden, 1988);
- for enhancing existing solutions (e.g. Green & Wind, 1975; Green & Sriniwasan, 1978; Dellaert et al., 1995);
- for pricing policies (e.g. Bauer, Huber & Adam, 1998; Currim, Weinberg & Wittink, 1981; DeSarbo, Ramaswamy & Cohen, 1995; Goldberg, Green & Wind, 1984, Green

& Krieger, 1990; Kohli & Mahajan, 1991; Mahajan, Green & Goldberg, 1982; Moore, Gray-Lee & Louviere, 1994; Pinnell, 1994; Simon, 1992; Wuebker & Mahajan, 1998; Wyner, Benedetti & Trap, 1994);
- for advertising (e.g. Bekmeier, 1989; Levy, Webster & Kerin, 1983; Darmon, 1979; Louviere, 1984; Perreault & Russ, 1977; Stanton & Reese, 1983; Neale & Bath, 1997; Tscheulin & Helmig, 1998; Huber & Fischer, 1999);
- for distribution (e.g. Green & Savitz, 1994; Herrmann & Huber, 1997; Oppewal & Timmermans, 1991; Oppewal, 1995; Verhallen & DeNooij, 1982),
- for controlling (e.g. Green & Srinivasan, 1978; Herrmann et al., 1999);
- for market segmentation (e.g. Hagerty, 1985; Akaah, 1988; De Soete & Winsberg, 1994; DeSarbo, Olivier & Rangaswamy, 1989; DeSarbo, Ramaswamy & Chateriee, 1992; DeSarbo, Wedel, Vriens & Ramaswamy, 1992; Diamantopoulos, Schlegelmilch & DePreez, 1995; Gaul & Aust, 1994; Gaul, Lutz & Aust, 1994; Green & Helsen, 1989; Green & Krieger, 1991; Kamakura, 1988; Ogawa, 1987; Steenkamp, Wedel, 1991; Steenkamp & Wedel, 1993; Wedel & Kistemaker, 1989; Wedel & Steenkamp, 1989; Vriens, 1995; Vriens, Wedel & Wilms, 1996);
- for stimulating purchase decision with focus on competitors' responses (e.g. Mohn, 1991).

The conjoint analysis flow diagram, explaining the application procedure, includes: choosing preference function; choosing data gathering method; choosing the way to present attributes and their levels; choosing the gathering procedure, choosing the method for valuating attributes and their levels; value benefit assessment (Gustafsson, Herrmann & Huber, 2007, p. 5).

Nowadays, conjoint analysis includes a substantial number of techniques, sometimes mutually significantly different. The following section of the article will be devoted specifically to the application of metric conjoint analysis.[4] Particular attention is paid to its application method (www.ef.uns.ac.rs/Download/predvidjanje_i_prognostika).

Metric conjoint analysis is characterised by the fact that respondents' preferences are modelled directly when the analysis is applied. Once all attributes have been described, the analysis comes down to analysing the variance of main effects. In this, attributes are independent variables; the respondents' preferences are dependent variables, whereas evaluated parameters β from the main variance analysis model feature as partial preferences.

Let as assume that a product has M attributes, where m = 1,2,3, ... , M; while individual attributes have a precisely determined number of levels: the first attribute n_1 = 1,2,..., N_1; the second attribute n_2 = 1,2, ... , N_2; the m^{th} attribute n_m = 1,2, ... , N_m; and the

4 Metric conjoint analysis was chosen for application in this article due to comparative simplicity of its application. In an attempt to suggest an analysis applicable in domestic conditions, without purchasing costly software as technique for measuring the communication effects of sales promotion, it was metric conjoint analysis that arose as a technique of choice.

M^{th} attribute $n_M = 1,2, \ldots, N_M$. The dependent variableis, in fact, as it has already been pointed out, consumers' preference for a certain product, where this product is described by the listed set of attributes.

After this, a stochastic model is set for each combination of levels:

$$y_{n_1 n_2 \ldots n_m} = \mu + \beta_{1n_1} + \beta_{2n_2} + \ldots + \beta_{mn_m} + \ldots + \beta_{Mn_M} + u_{n_1 n_2 \ldots n_m}$$

where $u_{n_1 n_2 \ldots n_m}$ is the stochastic element.

In this, the set prerequisite is that the sum of values of parameters of all levels per individual attributes equals zero:

In the evaluated form, the model reads:

$$\hat{y}_{n_{11} n_2 \ldots n_m} = \hat{\mu} + \hat{\beta}_{1n_1} + \hat{\beta}_{2n_2} + \ldots + \hat{\beta}_{mn_m} + \ldots + \hat{\beta}_{Mn_M}$$

and features as the valuated product benefit with the given combination of attributes.

The relative values of evaluated parameters mark the order of partial benefits allocated by respondents to individual attribute levels. Entering the evaluated parameters values into a system of equations results in assessed values of the dependent variable $\hat{Y}_{n_1 n_2 \ldots n_M}$. The difference between the original value and assessed value is the residual. The sum of squared residuals equals 0.

The impartial assessment of the model error variance is

$$\sigma^2 = \frac{\sum e^2_{n_1 n_2 \ldots n_M}}{N - k}$$

Deviation or standard error of the regression is $\sigma = \sqrt{\sigma^2}$.

The sum of squared centred values of the dependent variable (deviation of original data from the average) is $\sum (Y_{n_1 n_2 \ldots n_M} - \bar{Y})^2$.

Coefficient of determination is obtained by means of equation:

$$R^2 = 1 - \frac{\sum e_{n_1 n_2 \ldots n_M}}{\sum (Y_{n_1 n_2 \ldots n_M} - \bar{Y})}$$

The scope of partial preference of a certain attribute is obtained by subtracting the lowest value of the partial preference of the given attribute from its highest value. The total scope is obtained by adding up the obtained scopes of partial preferences. Mutual relative relevance of individual attributes is determined by dividing the scope of partial preferences of individual attributes by the total scope.

Measuring the communication effects of sales promotion in a food company with metric conjoint analysis

All the research cited so far suggesting different levels impact of product promotion activities on brand image, or lack thereof, take brand loyalty as the starting point for inferences, where a loyal customer is defined as a person characterised by repeat purchases of the given brand within a certain period. However, in relation to this inference practice, the authors of the article emphasise two fundamental remarks. First of all, absence of repeat purchase does not necessarily mean brand damage brought about by sales promotion activities. It is a well-known fact that, if consumer satisfaction were rated on a scale from 1 to 5, only those whose satisfaction is at level 5 are actually loyal consumers (Salai & Kovač-Žnideršić, 2008, p. 9), whereas the consumers whose satisfaction takes level 2,3 or 4 can only be loyal until competition comes up with a better offer. Total absence of or reduction in consumer loyalty, therefore, does not imply that such state stems from sales promotion activities. In addition, it is well known that the basic construction of the image comprises perception, identity, and only then attitude as willingness to act (Salai & Grubor, p. 49). All of the above suggest that the authors are reserved towards the presented manner of measuring the communication effects of sales promotion.

This article opts to measure the communication effects of sales promotion through observing consumers' brand perception. What is observed is the expressed relevance of this product attribute in relation to a range of other attributes, as well as in comparison with competitors' offers. The absence of negative impact of sales promotion on brand preference (as the communication effects of sales promotion), the economic effects would be the only one to observe. In addition, the proposed experimental method enables isolating the measurement of communication effects of sales promotion from the impact of other marketing communication tools to a great extent.

The example in this article describes a dairy planning to begin sales promotion activities to boost the sales of their yoghurt.[5] What kind of sales promotion programme would most appeal to consumers is previously defined by appropriate pre-testing methods tailored for sales promotion programmes, where opinions on the tools of future actions, samples, packaging etc. (Salai & Grubor, 2011, p. 287) are gathered in test retail outlets.

Metric conjoint analysis, as a comparatively simple and cost-effective technique for consumer preference research, was chosen for measuring brand preference as the communication effect of sales promotion.

Before deciding whether to undertake sales promotion activities on the entire market, the dairy's marketing representatives have to select a single representative experimental retail outlet as the initial point of sales promotion activities. The chosen representative sales outlet

5 The significance of marketing for food industry is the topic of numerous papers (for example: Đokić, Kočić-Vugdelija & Berber, 2011; Vlahović, Radojević & Živanić, 2011). Sales promotion as part of integrated marketing communication belongs to important marketing activities for food industry companies.

should be relatively distant from other points of sale of the yoghurt under research. Another step is to choose another, representative, control sales outlet on the other side of the country, where the temporary sales promotion activities would not be initiated.

The authors of this article designed a survey comprising two parts, to research preferences of a yoghurt brand. In the first part of the survey, the consumers answer questions on how often they buy yoghurt, at what quantities, whether they buy a single brand, and if yes, which one it is, so as to separate the group of loyal customers from the others. The second part of the survey contains combinations of various levels of the yoghurt's attributes, and is intended for the application of the metric conjoint analysis.

Attributes can be defined by using focus groups, in-depth interviews with consumers, or internal corporate analysis (Green, Krieger & Wind, 2004, p. 118). The dairy employees were also consulted when defining he yoghurt's relevant attributes and their levels. The following attributes and levels were defined: *brands*: A – yogurt brand of the observed dairy; B and C – brands of competing yogurts; *types:* fermented cow's, sheep's or goat's milk; *milk fat percentage*: 0.5 or 2.8%; *packaging volumes:* 0.5 litre or 1.0 litre; *density*: thin or creamy; *taste*: sour or mild; *flavours*: none or fruit-flavoured.

When generating attribute levels, the attributes should be descriptive. It is also necessary for their levels to be: independent, focussed, realistic, and balanced (Kuzmanović, 2004). *Independent* attribute levels means that one attribute level does not exclude a level of another attribute; *focussed* means that attribute levels must be defined within a single dimension; *realistic* means that the interval or range defined by attribute levels has a direct impact on the attribute's relevance, whereas *balanced* levels imply that there is no great difference in the number of levels between individual attributes.

Given that the technique of metric conjoint analysis does not examine consumers' preferences directly, before beginning the application of the designed survey, the representatives of the dairy's marketing service should hand out questionnaires to a sample of 5 consumers who would fill in the questionnaire, which was, in this case, done by the article authors. Analysis was performed, their preferences were defined based on the application of the metric conjoint analysis technique, and then they were asked directly whether the results match their opinions. The outcome showed that results obtained by metric conjoint analysis matched the replies obtained by direct inquiry about reference.

What should also be mentioned here is that the listed 7 attributes were allocated the following number of levels: 3,3,2,2,2,2,2 respectively, so that the possible number of combinations, i.e. cards with yoghurt descriptions, containing all the possible attribute combination would be 3x3x2x2x2x2x2=288. However, handing out 288 cards with descriptions of 288 combinations of attribute levels of yoghurt is neither practical nor necessary. Kuzmanović (2008, p. 67) provides a formula determining the sufficient number of cards. Actually, it introduces the notion of saturated design, obtained by subtracting the number of attributes (here: 7) from the total number of levels of all attributes (here: 3+3+2+2+2+2+2=16), and adding number 1, i.e. 16-7+1=10. In addition, it also introduces the notion of recommended design, which is obtained by multiplying the previous result by 2 or 3, so that here it

amounts to 20-30 combinations. When creating this number of combinations, one should bear in mind that appropriate attribute levels should be equally represented.

However, between commencing sales promotion activities at the chosen experimental sales retail, the dairy's marketing service representatives should decide to survey 50 consumers in the experimental and 50 in the control outlet, about their preferences regarding the dairy's yoghurt brand. The surveyed consumers would fill in the questionnaire sections on purchasing habits, whereas the preferences of offered combinations would be expressed on a scale of 1 to 9, after which the results would be analysed.

Following this, sales promotion activities should be conducted in the experimental outlet for a week, whereas no sales promotion activities would be conducted in the control sales outlet. Consumer surveys would be repeated in both experimental and controlled on a sample of 50 consumers each. The results would be compared to those obtained a week earlier, to examine whether there has been a change in brand preference at the local where sales promotion activities were conducted.[6]

Starting from the defined yoghurt attributes and combinations of their levels, we have compiled a system of equations for valuating unknown parameters β, comprising 36 equations:

1. $\hat{y}_{111111} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$
2. $\hat{y}_{1211121} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{71}$
3. $\hat{y}_{1112222} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{72}$
4. $\hat{y}_{1211122} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
5. $\hat{y}_{3311221} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{71}$
6. $\hat{y}_{2211221} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{71}$
7. $\hat{y}_{2211112} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{72}$
8. $\hat{y}_{1112211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
9. $\hat{y}_{1212122} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
10. $\hat{y}_{3311211} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
11. $\hat{y}_{2212122} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
12. $\hat{y}_{3311212} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{72}$

6 The following section of the article will present one of the above mentioned required analyses (testing in the control retail outlet before commencing the sales promotion activities in the experimental retail outlet), to demonstrate the principle of applying the metric conjoint analysis techniques. This survey was conducted in Novi Sad, in the spring of 2011. The conclusion of the article will look into the impacts of possible results of other required analysis. Conducting these requires undertaking sales promotion activities by a well-chosen dairy. However, given that the authors have not managed to initiate such an experiment in any of the existing dairies, the functioning principle of such an analysis and the inferences drawn presented here are only hypothetical.

13. $\hat{y}_{2211222} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{72}$
14. $\hat{y}_{3312211} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
15. $\hat{y}_{2311211} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
16. $\hat{y}_{2311122} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{23} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
17. $\hat{y}_{1122211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
18. $\hat{y}_{1221112} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{72}$
19. $\hat{y}_{1222121} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{71}$
20. $\hat{y}_{1222212} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{72}$
21. $\hat{y}_{2121111} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$
22. $\hat{y}_{3212122} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
23. $\hat{y}_{1221211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
24. $\hat{y}_{2122121} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{71}$
25. $\hat{y}_{2322222} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{23} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{72}$
26. $\hat{y}_{1222111} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$
27. $\hat{y}_{2122122} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
28. $\hat{y}_{3211122} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
29. $\hat{y}_{3222211} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{71}$
30. $\hat{y}_{3222212} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{22} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{72}$
31. $\hat{y}_{2122212} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{72}$
32. $\hat{y}_{2321111} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{23} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$
33. $\hat{y}_{3122221} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{52} + \hat{\beta}_{62} + \hat{\beta}_{71}$
34. $\hat{y}_{3122122} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{42} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{72}$
35. $\hat{y}_{3121212} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{52} + \hat{\beta}_{61} + \hat{\beta}_{72}$
36. $\hat{y}_{3121121} = \hat{\mu} + \hat{\beta}_{13} + \hat{\beta}_{21} + \hat{\beta}_{32} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{62} + \hat{\beta}_{71}$

According to the condition defined in the description of the metric conjoint analysis, it follows that:

a) $\beta_{11} + \beta_{12} + \beta_{13} = 0 \Rightarrow \beta_{13} = -\beta_{11} - \beta_{12}$
b) $\beta_{21} + \beta_{22} + \beta_{23} = 0 \Rightarrow \beta_{23} = -\beta_{21} - \beta_{22}$
c) $\beta_{31} + \beta_{32} = 0 \Rightarrow \beta_{32} = -\beta_{31}$
d) $\beta_{41} + \beta_{42} = 0 \Rightarrow \beta_{42} = -\beta_{41}$
e) $\beta_{51} + \beta_{52} = 0 \Rightarrow \beta_{52} = -\beta_{51}$
f) $\beta_{61} + \beta_{62} = 0 \Rightarrow \beta_{62} = -\beta_{61}$
g) $\beta_{71} + \beta_{72} = 0 \Rightarrow \beta_{72} = -\beta_{71}$

Entering conditions a), b), c), d), e), f) and g) into equations 1 – 36 results in a modified system comprising k = 10 unknown parameters

($\hat{\mu}, \hat{\beta}_{11}, \hat{\beta}_{12}, \hat{\beta}_{21}, \hat{\beta}_{22}, \hat{\beta}_{31}, \hat{\beta}_{41}, \hat{\beta}_{51}, \hat{\beta}_{61}, \hat{\beta}_{71}$):

1a. $\hat{y}_{111111} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

2a. $\hat{y}_{1211121} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

3a. $\hat{y}_{1112222} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

4a. $\hat{y}_{1211122} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

5a. $\hat{y}_{3311221} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

6a. $\hat{y}_{2211221} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

7a. $\hat{y}_{2211112} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

8a. $\hat{y}_{1112211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} + \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

9a. $\hat{y}_{1212122} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} + \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

10a. $\hat{y}_{3311211} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

11a. $\hat{y}_{2212122} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

12a. $\hat{y}_{3311212} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

13a. $\hat{y}_{2211222} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

14a. $\hat{y}_{3312211} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

15a. $\hat{y}_{2311211} = \hat{\mu} + \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

16a. $\hat{y}_{2311122} = \hat{\mu} + \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

17a. $\hat{y}_{1122211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

18a. $\hat{y}_{1221112} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} - \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

19a. $\hat{y}_{1222121} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

20a. $\hat{y}_{1222212} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

21a. $\hat{y}_{2121111} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

22a. $\hat{y}_{3212122} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

23a. $\hat{y}_{1221211} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} - \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

24a. $\hat{y}_{2122121} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

25a. $\hat{y}_{2322222} = \hat{\mu} + \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

26a. $\hat{y}_{1222111} = \hat{\mu} + \hat{\beta}_{11} + \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

27a. $\hat{y}_{2122122} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

28a. $\hat{y}_{3211122} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{22} + \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

29a. $\hat{y}_{3222211} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

30a. $\hat{y}_{3222212} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{22} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

31a. $\hat{y}_{2122212} = \hat{\mu} + \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

32a. $\hat{y}_{2321111} = \hat{\mu} + \hat{\beta}_{12} - \hat{\beta}_{21} - \hat{\beta}_{22} - \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} + \hat{\beta}_{61} + \hat{\beta}_{71}$

33a. $\hat{y}_{3122221} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} - \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

34a. $\hat{y}_{3122122} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} - \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} - \hat{\beta}_{71}$

35a. $\hat{y}_{3121212} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} + \hat{\beta}_{41} - \hat{\beta}_{51} + \hat{\beta}_{61} - \hat{\beta}_{71}$

36a. $\hat{y}_{3121121} = \hat{\mu} - \hat{\beta}_{11} - \hat{\beta}_{12} + \hat{\beta}_{21} - \hat{\beta}_{31} + \hat{\beta}_{41} + \hat{\beta}_{51} - \hat{\beta}_{61} + \hat{\beta}_{71}$

Relative values of evaluated parameters denote the order of partial benefits awarded by respondents to individual attribute levels. In this example, relative values of evaluated parameters can be represented as follows:

$$\hat{\beta}_{11} > \hat{\beta}_{12} > \hat{\beta}_{13}\,,\ \hat{\beta}_{21} > \hat{\beta}_{23} > \hat{\beta}_{22}\,,\ \hat{\beta}_{32} > \hat{\beta}_{31}\,,\ \hat{\beta}_{41} > \hat{\beta}_{42}\,,\ \hat{\beta}_{52} > \hat{\beta}_{51}\,,\ \hat{\beta}_{62} > \hat{\beta}_{61}\,,$$
$$\hat{\beta}_{72} > \hat{\beta}_{71}$$

Further analysis produces the following results: entering the assessed parameter values into the system of equations 1-36 results in assessed values of the dependent variable $\hat{Y}_{abcdefg}$. The difference between the original value and assessed value is the residual: $e_{abcdefg} = Y_{abcdefg} - \hat{Y}_{abcdefg}$. The sum of residuals equals to 0.

The sum of squared residuals is $\sum e^2_{abcdefg} = 1{,}110745.$

The impartial assessment of the model error variance is $\sigma^2 = \dfrac{\sum e^2_{abcdefg}}{N-k} = \dfrac{1{,}110745}{36-10} = 0{,}042721.$

Deviation or standard error of the regression is $\sigma = 0{,}206691.\ \sigma = \sqrt{\sigma^2}$.

The sum of squared centred values of the dependent variable (deviation of original data from the average) is $\sum (Y_{abcdefg} - \bar{Y})^2 = 13{,}1624. \sum (Y_{n_1 n_2 \ldots n_M} - \bar{Y})^2$.

Coefficient of determination is obtained by means of equation:

$$R^2 = 1 - \frac{\sum e_{abcdefg}}{\sum (Y_{abcdefg} - \bar{Y})}$$

so that, in this case:

$$R^2 = 1 - \frac{1{,}110745}{13{,}1624} = 1 - 0{,}084388 = 0{,}915612$$

The scope of partial preference of a certain attribute is obtained by subtracting the lowest value of the partial preference of the given attribute from its highest value:

O_1 = 0.74676 - (-0.747486) = 1.494246

O_2 = 0.135864 - (-0.18945) = 0.325314

O_3 = 0.10858 - (-0.10858) = 0.21716

O_4 = 0.086086 - (-0.086086) = 0.172172

O_5 = 0.11478 - (-0.11478) = 0.22956

O_6 = 0.10488 - (-0.10488) = 0.20976

O_7 = 0.0141 - (-0.0141) = 0.0282

The total scope is obtained by adding up the obtained scopes of partial preferences: $O_1+O_2+O_3+O_4+O_5+O_6+O_7$ = 2,676412. Mutual relative relevance of individual attributed is determined by dividing the scope of partial preferences of individual attributes by the total scope.

First attribute relevance: V_1 = 55.8%,

Second attribute relevance: V_2 = 12.2%,

Third attribute relevance: V_3 = 8.1%,

Fourth attribute relevance: V_4 = 6.4%,

Fifth attribute relevance: V_5 = 8.6%,

Sixth attribute relevance: V_6 = 7.8%,

Seventh attribute relevance: V_7 = 1.1%.

The results above show that the first attribute relevance (yogurt brand) is the highest, on the second place is attribute describing yogurt type, while other attributes (milk fat percentage, packaging volumes, density and taste) have relatively similar level of mutual relevance. The least important attribute is flavours.

Given that the possible effects of sales promotion on brand preference needs to be viewed over a relatively long period, the above described trial sales promotions, and preference measurement should be repeated several times, for at least six months or a year. After that, in accordance with the obtained results, it can be decided whether to undertake sales promotion activities or not.

Conclusion

Based on the literature cited in the article, it can be clearly inferred that there is no unique viewpoint regarding the effect of sales promotions – not only primarily expected economic effects, but also communication effects, which should not even emerge. It is due to the latter effects, notably some authors' claims that sales promotion makes a negative impact on brand image, sales promotion activities must be planned carefully, to avoid backfire, i.e. opposite effect of promotion activities in relation to other integrated marketing communication tools. To this end, one needs to be able to measure the potential communication effects of sales promotion. The above mentioned also applies to food companies, which use sales promotion activities in the domestic conditions as well.

The article presented the application of the metric conjoint analysis techniques for measuring the communication effects of sales promotion. This technique enables measuring changes in a brand's consumer preference. An overview of this technique over a given period in an experimental design was presented after application in an experimental and a control retail outlet. In addition to measuring communication effects of sales promotion with consumer preferences rather than consumer loyalty as it was often applied, and is appropriately theoretically backed up the authors, it can also be inferred that applying the metric conjoint analysis technique in the given experimental design enables comparatively successful isolation of the effects of sales promotion on possible changes in brand preferences. The chosen technique is simple and cost-effective in domestic economic conditions.

The example given in the article presents analysis results at a control retail outlet before commencing sales promotion at the experimental sales outlet, which was the only thing the authors could have accomplished independently, without cooperation with the dairy in question. The results may lead to several conclusions. The most preferred yoghurt brand is A, the second place is taken up by B, and the third by C. The surveyed consumers most prefer cow's milk yogurt to other types, followed by goat's, and finally sheep's milk yoghurt. Moreover, they prefer the yoghurt with 2.8 milk fat to that with 0.5%. As for volume, they prefer 0.5-liter to 1-liter packaging. They will rather buy creamy than thinner, mild rather than sour, and fruit flavoured rather than plain. Thus, it can be concluded that the most preferred yoghurt would be brand A, produced from cow's milk, creamy, mild and fruit flavoured.

The whole analysis presented above, however, acquires its full sense only when considering the relative relevance of individual attributes. In the previous section, it was calculated that the relevance of the first attribute is 55.8%, the second 12.2%, the third 8.1%, the fourth 6.4%, the fifth 8.6%, the sixth 7.8%, and finally, the seventh 1.1%. For consumers, the

most important attribute for consumers is the brand. This shows that the market consists of consumers with express awareness; thus, the number of loyal consumers is significant. This goes to the credit of the dairy marked A by the authors, as their brand enjoys the highest degree of reference. Much less significant to consumers is whether the yoghurt is produced from cow's, sheep's or goat's milk, whereas the issues of milk fat percentage, volume, thickness and flavour are of comparatively low significance level, whereas the issue of additional flavours is by far the least significant.

For a definite answer to the question of the impact of sales promotion on brand preference in food industry, it is necessary to make further comparison, which would be possible by including a certain dairy intending to undertake sales promotion activities into the experimental design. First of all, it is about comparing research results from the control sales outlet (presented in this article) and the experimental sales outlet before commencing the sales promotion activities at the experimental sales outlet. If certain significant differences in consumers' preferences were noticed, one should first examine whether those differences are found at the level of loyal or occasional consumer, or depend on the region where the control and experimental sales outlets are located. However, what is of special significance is subsequent implication regarding the comparison of results in the experimental and control retail outlet, before and after completing sales promotion activities at the experimental sales outlet. In this procedure, it is necessary to compare the results at the two given moments at the control sales outlet. More notable differences that would not be ascribed to variations in the structure of the sample could be attributed to the effect of other integrated marketing communication tools of the above mentioned dairy, especially their advertising, or competitors' activities. On the other hand, one must also observe the differences in brand preferences at the experimental sales outlet as well. If the difference in brand preferences between the experimental and control sales outlet were significantly different, this difference could be attributed to sales promotion activities. It is the repetition of experiment over a longer period that could result in clearly noted possible impact of sales promotion activities. A particularly significant implication could be if differences in possible changes in brand preference between the experimental and control sales outlet did not exist, for then it could be inferred that sales promotion makes no impact on brand preferences. In that case, the decision whether to conduct sales promotion activities or not would be based exclusively on expected economic effects of such activities.

References

1. De Pelsmacker, P., Geuens, M., Van den Bergh, J. (2007): *Marketing Communications-A European Perspective,* 3rd ed. Prentice Hall, New York.
2. Đokić, N., Kočić Vugdelija, V., Berber, N. (2011): *Uticaj razvoja tržišta na promociju organskih poljoprivrenih proizvoda*, Ekonomika poljoprivrede, IEP Beograd, vol. 58, no. 3.
3. Green, P., Krieger, A., Wind, J. (2004): *Thirty Years of Conjoint Analysis: Reflection and Prospects.* In: Wind, Y. & Green, P. (eds.): Marketing Research and Modelling: Progress and Prospects, Springer Verlag, Berlin.
4. Gustafsson, A., Herrmann, A., Huber, F. (eds.) (2007): *Conjoint Measurement: Methods*

and Applications, Springer Verlag, Berlin.
5. Kotler, Ph., Keller, K-L. (2006): *Marketing menadžment,* Data Status, Beograd.
6. Kuzmanović, M. (2008): *The nonstandard algorithm for constructing efficient conjoint experimental designs*, Yugoslav Journal of Operations Research, no. 18 (1).
7. Kuzmanović, M. (2004): *Razvoj poslovnih rešenja pomoću conjoint analize,* SymOrg, Belgrade.
8. Salai, S., Grubor, A. (2011): *Marketing komunikacije,* Ekonomski fakultet Subotica, Subotica.
9. Salai, S., Kovač-Žnideršić, R. (2008): *Marketing,* Alfa Graf, Novi Sad.
10. Vlahović, B., Radojević, V., Živanić, I. (2011): *Istraživanje stavova potrošača o potrošnji organske hrane u Srbiji,* Ekonomika poljoprivrede, IEP Beograd, vol. 58, no. 3.
11. www.ef.uns.ac.rs/Download/predvidjanje_i_prognostika, accessed April 30, 2011.

MERENJE KOMUNIKACIJSKIH EFEKATA UNAPREĐENJA PRODAJE PREHRAMBENOG PREDUZEĆA

Ines Mesaroš[7], Nenad Đokić[8], Mirjana Penić[9]

Sažetak

Aktivnosti unapređenja prodaje usmerene na potrošače, posebno popusti i pokloni dodatnih proizvoda, često se preduzimaju od strane prehrambenih preduzeća. Osnovni njihov cilj je da se poveća prodaja u određenom vremenskom periodu dok su njihovi efekti kratkoročni. Međutim, u literaturi koja se bavi proučavanjem efekata unapređenja prodaje, postoji nesaglasje ne samo u vezi sa očekivanim ekonomskim efektima unapređenja prodaje, već i u vezi sa neočekivanim uticajem unapređenja prodaje na imidž marke proizvoda, što je komunikacijski cilj promocije. Ukoliko bi se određeni negativni efekti na imidž marke proizvoda sugerisani u delu literature prihvatili kao mogući, to bi dovelo do suprotnog dejstva unapređenja prodaje u odnosu na ostale instrumente marketing komunikacija. Sve to alarmira na potrebu vrlo promišljenog planiranja aktivnosti unapređenja prodaje od strane prehrambenog preduzeća, što zahteva mogućnost merenja komunikacijskih efekata unapređenja prodaje. U ovom radu prikazano je merenje komunikacijskih efekata unapređenja prodaje tehnikom metričke združene analize na primeru proizvoda jedne mlekare.

Ključne reči: *unapređenje prodaje, metrička združena analiza, prehrambeno preduzeće*

7 M.A., Ines Mesaroš, asistent, Ekonomski fakultet, Univerzitet u Novom Sadu, E-mail: mines@ef.uns.ac.rs

8 M.A., Nenad Đokić, asistent, Visoka poslovna škola strukovnih studija, Novi Sad, E-mail: nenad.djokic.vps.ns@gmail.com

9 M.Sc. Mirjana Penić, doktorant, Departman za geografiju, turizam i hotelijerstvo, Prirodno-matematički fakultet, Univerzitet u Novom Sadu, E-mail: penicns@yahoo.com

Original scientific paper

Economics of Agriculture 1/2013
UDC: 338.48-44(1-22)(497.11)

THE CHALLENGES OF RURAL AREAS IN SERBIA PROMISING TOURIST ACTIVITIES

Svetislav Milenković [1], Svetlana Utvić [2]

Summary

Challenges of rural areas in Serbia are complex categories, so the work set itself a goal to show how these challenges can help its people interested, which are still developing tourism within the region. In order to prove all, work have to use qualitative and quantitative social science methodology with emphasis on induction, conversion multiplier, surveys in the statistical models. With such methodology, work, has distinct hypotheses:

- *If the rural areas of each country carries a multi-purpose economic dependence, then the rural areas of Serbia must accept tourism as a positive economic challenge, and*
- *Tourism in rural areas, if there is a guaranteed capacity of tolerance, must provide rural area to be feedback of its successful economic development.*

Work, emphasizing challenges of rural areas in tourist activity, has to give results compatible with evidence of field research and indicate directions of tourism development in Serbia rural areas.

Key words: *rural, space, challenge, tourism, development*

JEL: *Q01, Q13, Q26*

Introduction

The global "construction" of economic and social trends, accidentally or intentionally, changed the physiognomy of tourism activities in all countries. In that race, tourism is becoming more and more, in the underdeveloped countries in transition, the specific factor "imperialism" and, so called, "pleasant colonialism". He was "pleasant colonialism" when forces neglected, often irresponsible and inactive community to your unproductive space left

1 Professor, Faculty of Economics, University of Kragujevac, Djure Pucara Starog 3, Kragujevac, Phone: +381 34 303 556, E-mail: svetakg@kg.a.rs

2 Student of Master Studies, Faculty of Economics, University of Kragujevac, Djure Pucara Starog 3, Phone: +381 64 241 421 7, E-mail: scutvic@yahoo.com

to develop responsible, i.e. sustainable tourism. On the other side, "honorary colonialism" in world tourism, is there where a strong desire for big profits, and it turns the spatial elements of the natural environment in a difficult apartmenisation, concreting, asphaltisation and totally uncontrolled tourism urbanization.

Recognizing that rural area in many countries is the stabilizer of environmental elements that are valuable tourist attraction, people began in the 19th century that it developed the facilities for guests through the summer houses, holiday homes of wealthy and sanatoria, which are mostly used goat's milk in the treatment of specific patients and motels (for example, "han") for rest and refreshment of passengers passer. For this reason, tourism in rural areas, particularly Europe, began to grow into an organized economic activity and benefit of tourists, local community and local residents 70 years of the last century. "In many countries, EU Rural tourism from the 1970s is considered a strategy of development of regions and rural areas, which has a very good chance, and that helps in keeping the population in the area, creating new jobs, and ultimately contributes to the socio-economic remaining areas of progress". (See /4/, p. 84) Since that time, and until 1986, rural tourism has matured and became more complex category of interest to all levels of socio-economic development. Therefore, the following item was born which became a legislative initiative for tourism development in rural areas of Europe. However, this year is designed to give more political definition, as a result of the Council of Europe. Already in 1994.year authors have begun to observe the development of tourism in rural areas, as a new challenge to the successful shaping of economic physiognomy of this range and, thus, laid the theoretical foundations of transforming attitudes in practical realization of rural tourism. "Rural tourism is multi-activity, not just tourism on farms". (See /9/, p. 451) As you can see, this indicates that the challenges of rural areas in Serbia are very attractive, but it still seems insufficiently understood tourism. With all the theory and practice of one of the most acceptable definition of tourism in rural areas gave the organization, which by its very name indicates its success: „Rural tourism was initially located in a rural area and is primarily a function of agriculture. It is primarily based on agriculture world and outdoors, in contact with nature, agricultural heritage and society. Rural tourism must be in agreement with the environment and the community in which it occurs". (See /5/, June, 2012)

Analysis and synthesis of the discussions, expert opinions, scientific papers and acceptable application challenges of tourism in rural areas in the early 21st century, becoming" assault" category, which carries both negative and positive parameters. '' So for the same term synonyms arise, such as farm tourism, ecotourism, rural tourism, nature tourism, green tourism and rural tourism. In all these analyse, there are variations, as follows:

- First, the basis for the distinction makes the distribution of income within the rural communities;
- Secondly, the basis for distinguishing the various factors makes deals (See /3/, p. 1-4)

Rural area of Serbia is naturally compact and anthropogenically highly heterogeneous environment. This gives it a great challenging opportunity for multipurpose utilization of the various subtypes of rural tourism. Provides well-designed tourism management through

the synchronization of the goals, vision, mission and development of appropriate strategies. Therefore, as the most competent definition of tourism in rural areas derive from WTO documents: „The term rural tourism is used in cases where rural culture is a key component of offered tourism product, the product of rural tourism characteristic effort to ensure the visitor personal contact, feeling the physical and human environment in rural areas and, as far as possible, to be given the opportunity to participate in the activities, traditions and lifestyles of local people." (See /11/, June, 2012)

Tourism, in rural area, is anywhere challenging categories, economic and social, cultural, political and post-modern. Therefore, the rural area of Serbia is challenging attractiveness and socio-economically possible in the development and acceptance of different forms of tourism.

Rural areas of Serbia and its challenging tourism functions

In discussions about the development of rural tourism in the area that suits his purpose, much is the story, a few shows. It seems that in our theory and practice, we are still looking "Aladdin's magic lamp", which would shed light on our path to the modern development of the rural area, which includes the activities of the modern multi-purpose structural, socio-economic activities and existence. Therefore, considering all that is emphasized in the previous activities of tourism and other workers in the development of rural tourism in Serbia, we can draw conclusions about the challenging features of rural areas to specifically determine the physiognomy of rural tourism in Serbia. These functions are:

1) Economic, which are divided into two active challenging groups: direct and indirect. Direct functions the challenging rural and tourist areas in Serbia related to the creation of income of rural tourism development, i.e. whether the tax incentive to accumulate in the form of development of investment activity in the rural area, or just maintain the existence of those involved in rural tourism in this area? In our conditions, is still active at the other, i.e. existential function, whereas investment is practically non-existent. All of this claims because rural tourism in Serbia, still, practically overflowing income results from urban to rural areas, while the international effects of the almost negligible.

The next significant, direct challenge lies in the impact of rural tourism on regional development of rural areas of Serbia. That his influence was more related to the natural features of the observed area (about 70% of highland type), and less valued anthropogenic tourist potential of rural areas in the regions of Serbia. It might be better if we consider the background of rural areas in Serbia individual clusters defined in the Strategy of Regional Development of Serbia (2007) and Tourism Development Strategy of Serbia (2005), as the clusters are increasingly attracted international interest, because they are already a real "tourist players" in many European countries (Austria, Slovakia, Hungary - Cluster Land), which reflect its impact on the development of rural tourism in Serbia. Also, the so-called, "border" rural area of Serbia (the one that was on the verge of economic viability and threatening him permanently depopulation) development of rural tourism can revive the economic activity that it generates income brackets, but which is constantly increasing. In those parts of the

rural areas of Serbia where the present dominance of ethnic identity, i.e. in six spatial units that cover the tourist clusters (Vojvodina, Eastern Serbia - Vlach identity, Southeast - Šopsko-torlački identity, Kosovo and Metohija, Central and Western Serbia) regional development, in economic terms, provides market valorisation of ethnographic characteristics of these areas. The most significant economic and tourism challenges of rural areas in Serbia we find in multiplicative effects of tourism on the area. This is especially true of multiplicative compensation and conversion of unproductive agricultural productivity in space travel. Also, additional employment multiplier in many villages, which develop rural tourism, became the primary employment, which is constantly increasing. In this way increases the quality of human labour, and multiplying further expanding the quality of life and quality of tourism products. Multiplier of tourism development in rural areas of Serbia, has a very stimulating and challenging role and typically as the constantly expanding production in other economic sectors, that their surpluses realized in the tourism market with favourable economic effects.

Another economic challenge is our indirect functional effects of rural tourism in other activities that constitute a secondary part of the tourism product. The impact in rural areas of Serbia is reflected through:

- Impact on the construction industry, mainly through the adaptation of existing old buildings This construction must meet this requirement for rural tourism in the long run to preserve ethno-style construction and use of local ecological materials It also has to pay attention to the rural area of Serbia all buildings for rural tourism should fit in the integrity of the original environment of the area However, it is acceptable and that the tourist value of certain buildings in rural areas cannot dominate, but it does not violate (for example, the monastery, monuments, etc.) and to all those objects which violate the ethnic-identity and the natural tranquillity of rural space should be removed from the premises All the more important that every tourist village in rural area supported by the colour, which is characterized by plants in the complex (e.g., sunflower yellow - colours of all buildings), and the integrity of the supply, i.e. that tourists can be stored in a village, and lunch and dinner in the fifth, which is in the same rural catchments area. Construction, in the end, it must engage primarily in the tourism development people from the local community;
- Indirectly challenges of agriculture in all rural areas are reflected through the exchange of goods in tourism and agriculture (food and drink), intangible impact on rural tourism (preserved natural environment), and the housing market surpluses materialized space and other resources, employment, redundancy and the raising of cultural tourism the local community;
- Traffic transport to and visitors from rural areas, and gives the best effect when modern transportation infrastructure, which is, unfortunately, in the tourist and rural areas of Serbia, a major drawback, and
- Wholesale and retail trade, the tourist supply variety of goods, homemade items and crafts products applied, subject to the most so "foreign" lobby, which means not encourage domestic consumption and production of items for tourists, but more than

80% is imported. This automatically means that it can be economic-stimulus challenge of tourism development in rural areas of Serbia.

2) Social challenges of tourism development in rural areas of Serbia are still not enough to become active in Serbia, and we will therefore only mention them. These are, first of all: raising living standards, and steady growth index of quality of life, permanent education of the rural population and its adjustment to permanent change of duties in the modern rural tourism, cultural tourism growth through the constant reduction of the so-called absolute abstainers and travel faster relative growth of tourism abstainers , which means the growth of real and potential tourism demand and supply, energisation level of culture, identity, ethnographic characteristics of the equalization of social milieu, i.e. slow disappearance of social differences in the local population, and constantly fit into active cooperation of tourists, tourism workers and local viewpoint;

3) The cultural challenges of rural areas receive their typical certificate in a development of tourism by completing additional tourism, a marketing presentation characteristics of the population of that area and activation of a growing number of people to deal with both amateur, professional and cultural activities; and

4) Environmental challenges of rural areas are larger and more typical of tourism development, particularly through the revival of eco-tourism activities. In order to become a rural area of Serbia challenging, the potential for rural tourism development on environmental grounds, it must in all parts, as the accommodation units, applied a typical eco-lodgings. Therefore, in our conditions, eco-lodging must presents, from the outside, build rural identity of Serbia, while the interior permits using the modern technical and technological. It must satisfy: protecting natural and cultural components of their environment, during construction performing minimal impact on the environment, fits into specific context of environment, using alternative, sustainable means of water consumption, ensure the proper handling of garbage and waste water; excellent cooperation with local population, applies programs of environmental education and education employees and tourists, and contribute to sustainable community development through research programs. (See /6/, June, 2012)

From everything the response that imposes is that a rural area of Serbia provides challenging activities in the following directions:

a. challenge of the independent tourism offer, with complete rural-tourist facilities;
b. challenge of the compatibility of rural-tourist area, with mountain centres, spas, urban and similar forms of tourism;
c. challenge of marketing mix of rural-tourist area, with the promotion of tourism products facilities in rural areas of Serbia;
d. challenges of transition rural-tourist area, through the valorisation of tourism next to tourist traffic corridors in the area;
e. challenges of excursion activities in rural areas, through the development of tourism in mainly hilly area of the space;

f. challenges of the specific integrity of tourist-rural areas of Serbia, through diffuse resorts, didactic farms, ethno-villages and bio-tourism garden, as well as through identified „the country" (e.g., The fifth country in Italy), etc.; and

g. all other challenges, which are a mix of forms and sub forms of tourist activities with „the central leader" rural tourism in rural areas of Serbia. (See /2/, p. 148)

Some of the driving challenges in a rural-tourist area of Serbia

Seeking the truth about how much rural areas of Serbia with their travel challenges can make people accepting development of tourism there, we came to the conclusion that people want such a challenge, but many factors in the socio-economic system practically preventing. However, that everything is not so unacceptable research tells us that we conducted with the students of final year of studies from the Economics Faculty in Kragujevac, in the scientific field of general economy and economic development. The study included 128 students, and processed was rural tourism as a significant form of selective tourism in rural areas of Serbia. According to performed survey, the main indicators on the structure of participants and their spatial and urban or rural background have given the following table:

Table 1. Basic characteristics of participants in the development of rural tourism in Serbia – Age structure

Age structure			
18-25	26-55	56 and over	Total
40	59	29	128

Source: Survey of Students of Economic Faculty in Kragujevac on rural tourism in Serbia, data processing, S. Milenković and S. Utvić, Kragujevac, May-June, 2012.

Table 2. Basic characteristics of participants in the development of rural tourism in Serbia – Gender structure

Gender structure		
Female	Male	Total
68	60	128

Source: Ibid, May-June, 2012.

Table 3. Basic characteristics of participants in the development of rural tourism in Serbia – Districts (See /8/, 2012) and Type of settlement

District	
Raški	31
Šumadijski	26
Moravički	22
Zlatiborski	17
Rasinski	8
Pomoravski	6

District		
Braničevski		5
Kolubarski		3
Podunavski		2
Nišavski		1
Kosovsko-mitrovački		1
Severno-baški		1
Zaječarski		1
Grad Beograd		1
Total		128
Type of settlement		
Cities	Villages	Total
77	51	128

Source: Ibid, May-June, 2012.

As we can see, is more interested in the urban population in these times of crisis for rural tourism (77 respondents), from a purely rural population (51 subjects). At the same time, rural areas that most want to develop tourism are from Raška District (31 interested in, from total number of respondents) and least interested in the rural areas (Nišavski, Kosovsko-mitrovački, Severno-bački, Zaječar District and City of Belgrade, one respondent from each district is interested). This picture is understood, because the Raška District, as part of the attractiveness of rural areas in Serbia, is the most relevant for the development of rural tourism. Consequently, we determined the most important resources, as well as basic and additional starters of rural tourism development in rural areas of Serbia. They are, in fact, well-known and recognized tourism challenges of that space.

Table 4. Device resources development of rural tourism in Serbia

The most important resources necessary for development of tourism	
The preserved nature	102
Clean and unpolluted water	72
Ethno content	71
Hospitable local population	63
Traditional gastronomy	61
Rich flora and fauna	50
Rural Councils	37
Developed agriculture	27
Excess of housing accommodation for tourists	21
Beer and Wine Trail	10
Other (roads, swimming pools, professional staff, healthy food, etc.)	7
Unproductive areas	2

Source: Ibid, May-June, 2012.

We are very pleased that our people understand that the basic resource for development of rural tourism in rural areas of Serbia, preserved natural environment (102 respondents gave a voice to this resource). This indicates that are challenges of rural areas in Serbia major, not only for rural tourism, but also for many other forms of selective tourism (primarily ecotourism). On the other side, all the respondents as potential participants in the creation of tourism products in rural areas of Serbia, the votes gave at least non-productive land (only 2 respondents), which means that everyone in Serbia is well understood that agriculture and tourism in rural areas make unique co-existential whole.

By further analysis, in a survey we came to the possible forms of rural tourism in rural areas of Serbia.

Table 5. Possible forms of tourism in rural areas of Serbia

In Serbia should develop the following forms of rural tourism	
Complex form of rural tourism	74
The traditional way of life	71
Exclusive stay in villages	52
Fishing in a rural area	38
Hunting in rural areas	35
Participation in agricultural work	32
Eco-rural tourism	27
Wine and gastronomic festivals	24
Tourism agribusiness	24
Diffuse hotel	19
Specific land	19
Activation of pub, pastures, farms, etc.	16
Rural phyto-pharmacology	8
Bird-watching in the rural area	7
Other (additional facilities, farm-sex tourism, etc.)	4

Source: Ibid, May-June, 2012.

Develop a global tourism itself causes increasing complexity of tourism demand and supply, which is why the respondents in our survey realized in rural areas of Serbia there is a major challenge for the tourism complex shape with several groups and subgroups, which all arise from the overall characteristics of the rural identity of our country . Even 74 respondents confirmed to have opted for a complex development of rural tourism in Serbia. Received the least votes sub-forms - bird watching, which is currently the most practiced in the U.S. and the UK, while in Serbia this advertising is not yet fully processed and accepted. So for this sub-form of rural tourism, in their development plans 7 respondents declared. The most interesting thing is that our citizens are ready to embrace the latest trends in tourism development in rural areas of Serbia through the so-called diffuse tourism (19 respondents) and the so-called „country specific“ (19 respondents), which is active, for now, only in Italy.

In order to challenges of rural tourism have been confirmed in developmental practice of rural areas of Serbia, the research shows how moves orientation of potential participants in the start-up tourism businesses in rural areas of Serbia:

Table 6. Orientation to start businesses in rural tourism of Serbia

When I would launch a rural tourism business, the funds would invest in the following activities	
The construction of ethno villages	79
Construction of ethno restaurants	51
Production of souvenirs and handmade products	49
Organize walking tours through the existing ethno village	42
The construction of ethno-house	38
The organization of gastronomic fairs	28
The formation of zoo with typical animal species	28
Raising plantations	25
The construction of wine cellars	19
Other (construction of roads and trails, additional facilities)	2

Source: Ibid, May-June, 2012.

The data shows that the most attractive challenge in our rural area is construction ethno village, which is considered a good indicator, because, thus, preserve the identity of the people who live in rural areas, with all its characteristics, and, in same time, satisfaction of tourists can be of the highest level. For this type of business voted 79 respondents. Unfavorably is that for construction of wine roads and cellars with wine tasting respondents chose the least, that is, only 19 respondents. This indicates that many viticulture areas must transform its traditions in the tourism challenge, i.e. "it is necessary to establish and develop the Wine Trail, which is a special form of selling wines, catering, tourism and agricultural products of one winemaking region". (See /1/, p. 470)

Since the development of tourism in rural areas is also a supplementary activity, this research was focused on the following indicators:

Table 7. Preferred additional business in the rural tourism of Serbia

From the additional business I would prefer one of the following	
Organic food production	82
Development of ethno-homemade	58
Harvesting and processing of medicinal herbs	57
Organizing excursions to rural areas	54
Harvesting and processing of wild fruits	44
Activate all water mills, rolling mills, etc.	38
Making rural tourism souvenirs	35
Construction and revival of old shed and similar accommodation facilities	26
Establishment of receiving agencies for rural tourism	6
Other (breeding bees and honey production)	1

Source: Ibid, May-June, 2012.

"The largest part of the world food production is based on the protection of plants and animals with various medications. The latest medical findings suggest on harmful effects of these medications on the human body. This is the reason why by conventional food manufacturing also organic (healthy) food production was organized." (See /7/, p. 338) Rural areas in Serbia even with 80% of its territory are suitable for the production of healthy food for of tourists. Therefore, our survey showed that most of those who would deal with the development of tourism in that area primarily provide healthy food, i.e. high-quality nutrition of tourists (82 respondents) and least respondents (only 6 of them) would set up their receptive tourism agencies. It is, in our opinion, a mistake, and the reason is in inadequate expertise and inadequate educational system for the agency business. Each rural tourist destinations, to well operated, must have at least one receptive travel agency in its area.

From all of said up to now impose the conclusion that there are challenges for tourism development in rural areas of Serbia, and study has shown what people can invest in order to achieve that:

Table 8. Forms of invested funds in development of rural-tourism businesses Serbia

From own investment in rural tourism business, I could and would like to invest	
Labor, knowledge	73
Space for accommodation and additional activities	59
Authentic agricultural products	55
Developed agricultural household	43
Financial assets	19
Other (experience, land)	2

Source: Ibid, May-June, 2012.

To achieve all this, 98 of them said they would invest their own material and financial resources, while 34 respondents - borrowed funds. So, rural area of Serbia is ready for future acceptance of tourism development with the unique active participation of all factors of socio-economic system of Serbia.

Conclusion

Rural areas of Serbia should, primarily, release of the steady opinion that it is residual part of the country, which population is lower level than the urban and it is the easiest to economize right on it. However, the development of many additional activities in this area in most developed countries shows that it is an attractive, economically challenging and socially stable. Therefore, the penetration of tourism in that area brings a new philosophy of relations between local residents, tourist and tourist workers, which initiates the interest in it in all documents of state economic policy.

The rural areas of Serbia, with its great variety of tourist resources, wants to become challenging for tourism development. That could achieve with the greatest inventiveness of their local communities, entrepreneurial initiatives, on clearly feasible target innovation in

rural tourism. Also, in future development, rural areas of Serbia, in order to satisfy multiple challenges, must realize cluster grouping and systematization of themed rural-tourist entities, so that all regions of rural areas in Serbia together become competitive in the tourism market without unfair competition tourist destinations within them.

The modern world imposes technical-technologically demand to rural areas of Serbia, to network all actors of agro-tourism development, from the smallest, at the local level, to those of the highest, on level of national territory. All the travel society, regional tourism organizations, associations, cooperatives, non-governmental agencies, church and others, must constitute a component network of tourism development interests in all parts of the rural areas of Serbia. It follows, that the challenges of rural areas in tourism activity are also associated activities, primarily through the cluster, tourism stakeholders and partner organizations, in order to ensure the smooth business circulation of labour, capital and other elements of successful tourism development in Serbia. Finally, in order to rural areas of Serbia could realize all the distinctive challenges of tourism development, must comply with accepted systems of standardization and product quality in rural tourism, as well as at each position, with ratified certificates, to allow unimpeded growth and development of tourism as an integral part of the economic system.

Literature

1. Deđanski, S., Puzić, G. (2010): *Development management of wine tourism in Serbia as a basis for development of local communities.* Economics of Agriculture, BSAAE Belgrade, IAE Belgrade and AES Bucharest, Vol. 57, No. 3, p. 470.
2. Đukić Dojčinović, V. (2005): *Kulturni turizam,* CLIO, Beograd.
3. *Falusi turizmus tajekoztato* (2000): Falusi Turizmus Orszagos Szovetsege, Budapest.
4. Hrabovski Tomić, E. (2008): *Selektivni oblici turizma,* Fakultet za uslužni biznis, Sremska Kamenica.
5. Krmpotić, T., Vukosav, M., Bošković, J., Simić, J., Ivančević, S. (2006): *Organic food production as potential income resource,* Economics of Agriculture, Society of Agricultural Economists of SCG, Association of Agricultural Engineers and Technicians of Yugoslavia, Institute of Agricultural Economics, Belgrade, Vol. 53, No. 2, p. 338.
6. Nacionalna agencija za regionalni razvoj (2012): *Uredba o nomenklaturi statističkih teritorijalnih jedinica*, Službeni glasnik RS, br. 109/2009 i 46/2010, član 10., Aneks 2 (http://narr.gov.rs/index.php/Dokumenta/Pravni-kutak/Uredbe)
7. Reichel, A., Lowengart, O., Milman, A. (2000): *Rural tourism in Israel: service quality and orientation,* Tourism Management, Elsevier Ltd, Vol. 21, No. 5, p. 451-459, UK.
8. *Survey of Students of Economic Faculty in Kragujevac on rural tourism in Serbia*, data processing, S. Milenković and S. Utvić, May-June 2012, Kragujevac.
9. World Tourism Organization (2004): *Rural Tourism in Europe – Experiences, Development and Perspectives,* accessed Jun 2012

(www.wtoelibrary.org/content/?k=ti%3a(Rural+Tourism+in+Europe+%e2%80%93+Experience%2c+Development+and+Perspectives&Language=English&sortorder=asc)

10. www.ekoserb.sr.gov.sr/projekti/turizam/ekoturizam.php, accessed Jun 2012.

11. www.oecd.org/dataoecd/31/27/2755218.pdf, accessed Jun 2012.

IZAZOVI RURALNOG PROSTORA SRBIJE PERSPEKTIVNOJ TURISTIČKOJ AKTIVNOSTI

Svetislav Milenković[3], Svetlana Utvić[4]

Rezime

Izazovi ruralnog prostora Srbije su kopmleksna kategorija, pa je zato i rad postavio sebi cilj da pokaže koliko ti izazovi mogu da pomognu zainteresovanim njegovim stanovnicima, ali i drugima, da razvijaju i razviju turizam u granicama tog prostora. Da bi sve to dokazali u radu, moramo da koristo i kvalitativne i kvantitativne metodologije društvenih nauka sa akcentom na indukciju, konverziju, multiplikator, ankete u okviru statističkih modela i sl. S' tako postavljenom metodologijom, rad, očito, ima izražene hipoteze:

- *Ako ruralni prostor svake zemlje nosi višenamensku ekonomsku zavisnost, onda ruralni prostor Srbije mora da prihvati turizam kao svoj pozitivan ekonomski izazov; i*
- *Turizam u ruralnom prostoru, ako ima zagarantovan kapacitet podnošljivosti, onda taj ruralni prostor mora da bude povratna sprega njegovog uspešnog ekonomskog razvoja.*

Rad, potencirajući izazove ruralnog prostora u turističkoj aktivnosti, mora da da kompatibilne rezultate sa dokaznim materijalom terenskog istraživanja i da označi pravce razvoja turizma u ruralnom prostoru Srbije.

Ključne reči: *ruralni, prostor, izazov, turizam, razvoj*

3 Redovni profesor, Ekonomski fakultet, Univerzitet u Kragujevcu, Djure Pucara Starog 3, Kragujevac, Telefon: +381 34 303 556, E-mail: svetakg@kg.a.rs

4 Student master studija, Ekonomski fakultet, Univerzitet u Kragujevcu, Djure Pucara Starog 3, Telefon: +381 64 241 421 7, E-mail: scutvic@yahoo.com

Original scientific paper

Economics of Agriculture 1/2013
UDC: 005.121:502

THE INDEXING APPROACH IN MEASURING OF SUSTAINABLE SOCIETY[1]

Radojica Sarić[2], Marko Jeločnik[3], Vesna Popović[4]

Summary

Sustainable society is a society that has ability to maintain a balance between economic, social and ecological processes, or states, over the time period, in order to meet, as current as well as future needs of the population. This is a complex and multidisciplinary concept, which requires establishment of appropriate indexes for measuring of a society sustainability level. Sustainable Society Index (SSI) is considered as one of the most recognized indexes for measuring the sustainability level of a society. In the paper is presented the model of Sustainable Society Index by defining its basic characteristics and trends, parallely with quantitative-comparative analysis of the SSI value at the global level as well as at the level of the Republic of Serbia and neighbouring countries.

Key words: *sustainability, Sustainable Society Index, quantitative-comparative analysis, Serbia*

JEL: *QO1*

1 This paper is a part of research in the project *„Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region"*, No. 46006, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

2 Radojica Sarić, Master's degree in Economics, Ph.D. candidate at the Faculty of Economics, University of Belgrade, Research Assistant at the Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 (0) 11 6972 842, E-mail: saricradojica@gmail.com

3 Marko Jeločnik, Master's degree in Agro-Economics, Ph.D. candidate at the Faculty of Agriculture, University of Novi Sad, Research Assistant at the Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 (0) 11 6972 852, E-mail: marko_j@iep.bg.ac.rs

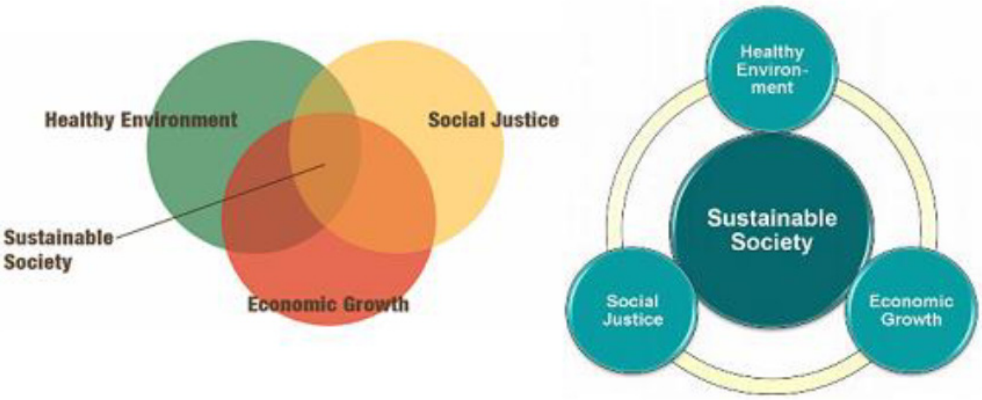
4 Vesna Popović, Ph.D. in Economics, Senior Research Associate at the Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 (0) 11 6972 854, E-mail: vesna_p@iep.bg.ac.rs

Introduction

Sustainable society is a society that its development aligns with the basic principles and requirements of sustainable development. Respectively, sustainable society provides a balance between economic growth, social justice and healthy environment *(Figure 1),* as it's going to meet the current needs, without diminishing the chances for satisfaction of future needs of the population. In other words, sustainable society (*Sustainable Society Foundation, 2010, pp. 1)* is society:

1) *That meets the needs of the present generation;*
2) *That does not compromise the ability of future generations to meet their own needs;*
3) *In which each human being has the opportunity to develop itself in freedom, within a well-balanced society and in harmony with its surroundings.*

Figure 1. Sustainable Society – balance between Economic Growth, Social Justice and Healthy Environment



Source: Available at http://plopws.sfsu.edu/sustainability/about.html and http://uncw.edu/campuslife/services/Sustainability.html (accessed on February 5, 2013).

Sustainable society is a society that exists within self-maintaining borders of its surrounding, or society that recognizes its growth limits and looks for alternative ways to grow *(Coomer, 1979)*. Establishment or achieving of sustainable society as an alternative developmental model has a great importance, because it represents an opportunity for creative evolution *(Chen, 2007)*. This means that education is one of key elements for the society development towards the concept of sustainability. At the same time, local communities are very important element in the development of society regarding to sustainability, as they are its integral part. Every society that is made of developed communities *(which are sustainable too)* can significantly prosper in short time horizon *(Sarić et al, 2011)*.

Also, there is a need for defining of appropriate strategic framework with basic guidelines and principles, which will initiate moving of one society towards sustainability. It was

established nine basic principles of sustainable society that are mutually interconnected, complementary and supportive *(IUCN, UNEP, WWF, 1991)*:[5]

1. *Respect and care for the community of life;*
2. *Improve the quality of human life;*
3. *Conserve the Earth's vitality and diversity;*
4. *Minimize the depletion of non-renewable resources;*
5. *Keep within the earth's carrying capacity;*
6. *Change personal attitudes and practices;*
7. *Enable communities to care for their own environments;*
8. *Provide a national framework for integrating development and conservation;*
9. *Create a global alliance.*

Sustainable society strives to promote economic success, respect social needs and protect the environment. Consequently, it can be said that it covers economic, social and environmental dimension of development. *The economic aspect of sustainable society* considers self-sustained economic growth and development. *The social aspect of sustainable society* implies a fair services distribution in all fields of life. *The ecological aspect of sustainable society* implies the ability of natural resources maintaining on stable level, together with biodiversity preservation.

So, consideration of sustainable society issues requires multidisciplinary approach. Also, it implicitly suggests the necessity of strategically oriented long-term vision establishment, in order to timely predict different developmental consequences that arise from mutually interlaced and conflicting economic, social and environmental goals, so on that way prevent potentially destructive disharmony of future development. Since the concept of sustainable society as a complex phenomenon integrates itself three mutually interweaved developmental aspects - *economic, social and environmental*, the real question will be measuring of sustainability level of a society. For this purpose, various indexes have been developed, which facilitate the assessment of sustainability of society development.

Model of Sustainable Society Index

Existing economic indicators, such as GDP, solely rely on economic growth and measurement of the state of economy of certain country in defined period *(European Commission, 2009)*, with neglecting of social and environmental aspects of development. In other words, GDP isn't an adequate tool for measuring of some country overall well-being, or the level of progress toward a sustainable society. According to this, during the last few decades the phenomenon of measuring of sustainability has been increasingly attracted the attention of international experts. So on global level comes to rapid development and expansion of the establishment

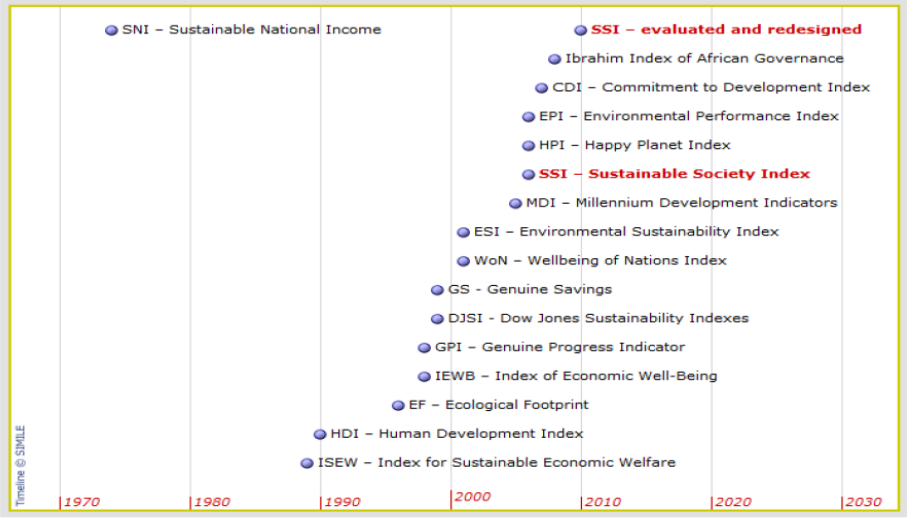
5 *Principles of a Sustainable Society, Caring for the Earth: A Strategy for Sustainable Living*, available at: www.globallearningnj.org/global_ata/principles_of_a_sustainable_society.htm (accessed on February 7, 2013)

of different indexes for measuring of sustainability that are in position to simultaneously perceive several developmental aspects *(not only the economic aspect),* thereby they can be used in different areas of development.

Generally, the *index* is a statistical indicator that provides appropriate quantified information, and which in same time simplifies the analysis process of the studied phenomenon. Development of certain index for measuring of sustainability level primarily requires determination of appropriate theoretical framework for the analysis of researched phenomenon. Mentioned approach is of great importance regarding to more correct selection of parameters that will determine the index, in other words how further steps will not endanger the quality of gained results and conclusions that are based on the index value. Most of indexes for measuring of sustainability level usually represent collective indicators, which paralelly covers many different areas. Also, by the indexes for measuring of sustainability can be done ranking of the group of countries regarding to achieved referent values *(Parris, Kates, 2003)*, as well as they can be integral parts of the mechanism that enables establishment and implementation of adequate strategically oriented developmental policy. In this sense, it is necessary to define the general *(critical)* conditions for programming of strategic development *(Njegovan, 2008)*. Their main characteristic is ability to bring down the complex structures to a very simple measure, as well as its' contribution to better understanding of the concept of sustainable development during the various comparative analyzes.

In 1974 was established *Sustainable National Income,* as a first index for measuring of sustainability. Of course, one of the most known indexes for measuring of sustainability is *Sustainable Society Index (SSI),* established in 2006 by the *Sustainable Society Foundation,* but that was in some extent redesigned and improved in 2010 *(Figure 2).*

Figure 2. Development of indexes for measuring of sustainability



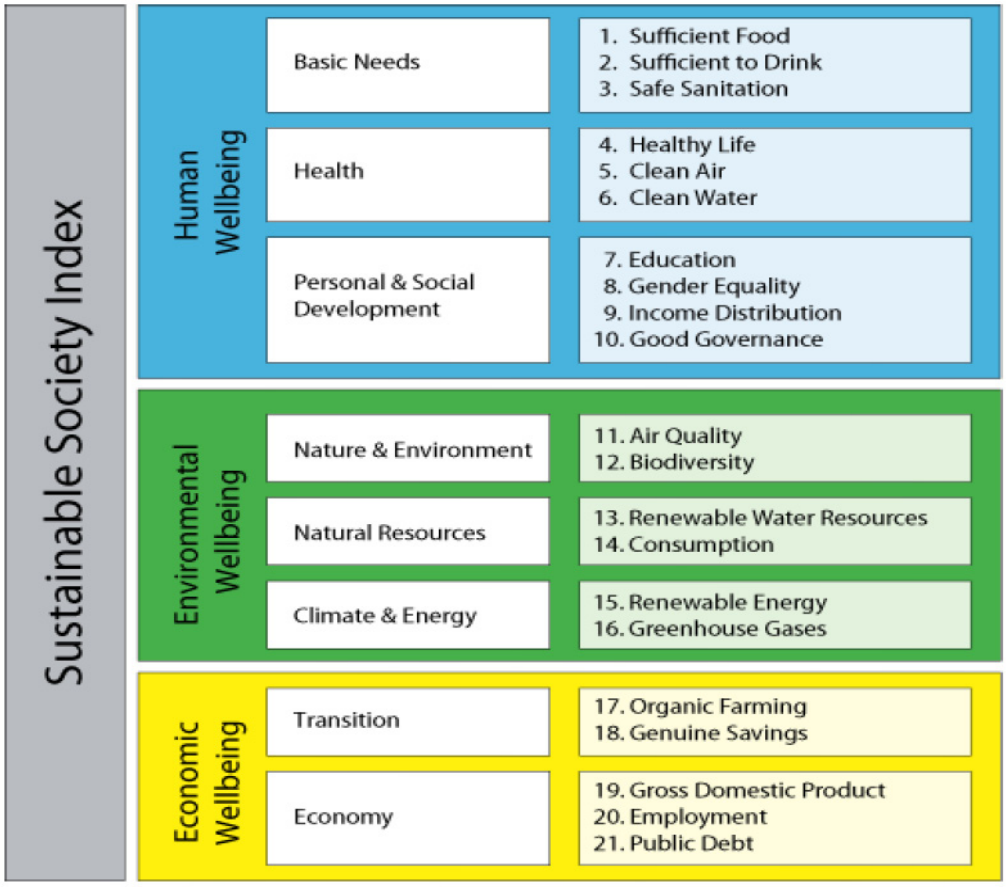
Source: Available at http://www.ssfindex.com/sustainability/timeline/ (accessed on February 10, 2013).

Sustainable Society Index is a complex index designed to wider professional audience, primarily during the process of review of achieved level of sustainability of certain society *(Van de Kerk, Manuel, 2007)*. This indicator can be used like an instrument for the management of overall sustainable development, as by the creators of developmental policies, as well as by the economic entities, educational institutions, nongovernmental sector and interested persons.

Sustainable Society Index includes, or synthesizes 3 basic dimensions through 8 categories and 21 indicators of society sustainability *(Figure 3)*. As main dimensions of sustainability *(mutualy interconnected)* are recognized:

1) *Human Wellbeing (includes 3 categories and 10 indicators);*
2) *Environmental Wellbeing (covers 3 categories and 6 indicators);*
3) *Economic Wellbeing (involves 2 categories and 5 indicators).*

Figure 3. Model of Sustainable Society Index – basic dimensions, categories and indicators



Source: Saisana, M., Philippas, D. (2012): *Sustainable Society Index (SSI): Taking societies' pulse along social, environmental and economic issues*, JRC Scientific and Policy Reports, European Commission, pp. 17.

Methodology of Sustainable Society Index establishment consists of 5 steps *(Saisana, Philippas, 2012, pp. 20)*:

- **Step 1.** *Raw data for the selected indicators are firstly checked for reporting errors and for outliers that could strongly bias the results are treated;*
- **Step 2.** *Missing data are estimated using expert knowledge;*
- **Step 3.** *Indicators are normalized by the min-max method, taking the direction of their effect into account;*
- **Step 4.** *Equal weights are assigned to the indicators within categories and within the Wellbeing dimensions;*
- **Step 5.** *Country scores on the eight SSI categories are calculated as simple geometric averages of the underlying normalized indicators. Country scores on the three SSI Wellbeing dimensions are also calculated as simple geometric averages of the underlying categories.*

The main characteristic of mentioned index is a conceptual and statistical coherence that allows a simple measuring of achieved level of sustainability of certain society in the world. It integrates three forms of sustainable *Wellbeing,* based on next assumptions:

1) *Human Wellbeing* without *Environmental Wellbeing* leads to self-destructive developmental collapse without any perspective;
2) *Environmental Wellbeing* without *Human Wellbeing* makes senseless any progress;
3) *Economic Wellbeing* is not a goal in itself, but a mean for achieving of *Human Wellbeing* and *Environmental Wellbeing*, in other words overall sustainability of 3 constitutive dimensions of *Wellbeing,* that have to be achieved during the time.

Generally, *Sustainable Society Index* is used as instrument for guidance of developmental process towards sustainability. *Index* integrates the most important aspects of sustainability and quality of life of a national society in a simple and transparent way.[6] Based on this index can be perceived achieved level of sustainability of selected society for any of three dimensions of *Wellbeing.*[7] Index is calculated for 151 countries in the world, whereby it is measured a distance level from sustainability for each society within observed countries. After calculation index takes a value *(each dimension, category and indicator that integrate the index)* in a range from 0 to 10. As the value is closer to 10, the level of sustainability is higher, and vice versa.

Global Sustainable Society Index Analysis

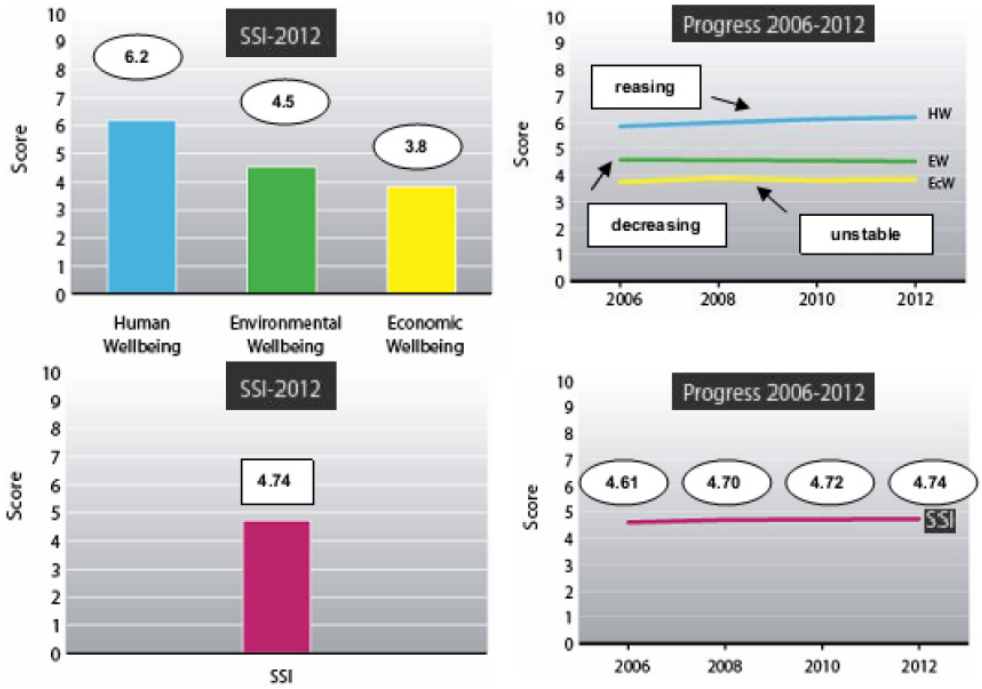
In 2012 the average value of *Sustainable Society Index* for 151 countries was 4.74, based on which can be concluded that the world as a whole is still far from the true

6 *Sustainable Society Index* (2009), available at: www.eoearth.org/article/ Sustainable_Society_ Index (accessed on February 11, 2013)

7 *Check the level of well-being and sustainability for your country* (2012), available at: http:// theblogprogress.blogspot.com/2012/11/check-level-of-well-being-and.html (accessed on February 12, 2013)

sustainability *(Van de Kerk, Manuel, 2012)*, in other words, the world has not yet crossed even the half way towards a sustainable society (*Graph 1*).

Graph 1. SSI-2012: Human, Environmental and Economic Wellbeing, together with Wellbeing dimensions and SSI progress (period 2006-2012)



Source: Authors' visual modification according to www.ssfindex.com/results-2012/world-totals/ (accessed on February 12, 2013).

By observation of each individual dimension of *Wellbeing*, it can be concluded that the best result was achieved within dimension of *Human Wellbeing* (6.2), and the worst within dimension of *Economic Wellbeing* (3.8). After analysis of basic dimensions of *Sustainable Society Index* in the period 2006-2012, following can be concluded:

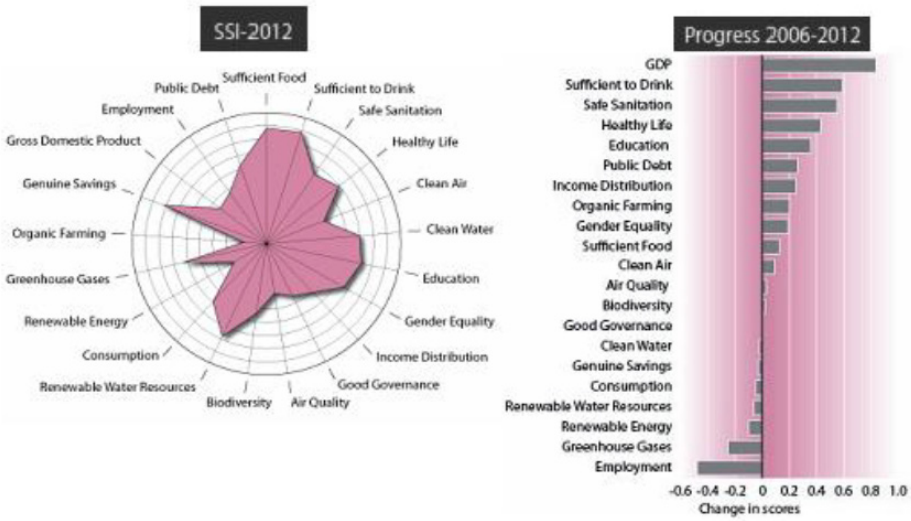
1) The greatest progress was achieved within the dimension of *Human Wellbeing*, around 5.9%, whereby this dimension during the observed period had a constant upward trend;
2) The least progress was realized within the dimension of *Economic Wellbeing*, about 2.6%, in other words twice less than at *Human Wellbeing*. This is a dimension with very unstable trend;
3) Decline of around 1.4% was achieved within the dimension of *Environmental Wellbeing*. This dimension was in mentioned period in constant, but slight fall, what can bring a certain dose of solicitude.

Observing a trend of the *Sustainable Society Index* in the period 2006-2012, it can be concluded that the sustainability of society on global level was increased for only 2.8%,

what is assessed as extremely small progress towards the achievement of a sustainable society. Despite all, encouraging is a fact that existed upward trend in mentioned period.If the present growth dynamics of *SSI* will continue in coming years, reaching of sustainable society on global level will be out of sight.

Indicators which determine the categories (*in total 21*), as well as the basic dimensions of *Sustainable Society Index* can be represented graphically using the appropriate diagram. The end points in the diagram indicate a greater contribution of the observed indicator to a sustainable society, while the points closer to centre indicate proportionally smaller contribution of observed indicator to sustainable society (*Graph 2*).

Graph 2. SSI-2012: Indicators scores and progress within the period 2006-2012



Source: Available at www.ssfindex.com/results-2012/world-totals/ (accessed on February 12, 2013).

After analysis of the diagram with sustainable society indicators in 2012, it can be concluded that the *Sufficient Food* and *Sufficient Drink* contribute the most to a sustainable society in the world. After them come the *Genuine Savings, Renewable Water Resources* and *Education*. Indicators that had the smallest contribution to a sustainable society in the world were the *Organic Farming, Renewable Energy, Air Quality, Gross Domestic Product* and *Good Governance*. Indicator with the fastest growth in the period 2006-2012 was *the Gross Domestic Product* (*GDP*). However, the problem is that a significant increase of *GDP* obviously was not used in the function of progress towards sustainability.

During the observed period the smallest progress was achieved at the indicators of *Biodiversity* and *Air Quality*, while the indicator *Employment* and *Greenhouse Gases* was the most regressed. Generally, from 21 indicators progress was achieved at 13, one did not undergo changes, while the decline was made at 7 indicators. Therefore, excluding the *status quo* at one indicator, it can be concluded that in the period 2006-2012 achieved overall progress of indicators toward a sustainable society was around 62%, where dominant role had indicators within the dimension of *Human Wellbeing*, but dimension of *Economic Wellbeing* too. The

concerning circumstance is that indicators within the dimension of *Environmental Wellbeing* have not made a progress in observed period, even they have regressed in great portion, affecting the overall sustainability of the global society.

Analysis of Sustainable Society Index in Serbia

Of great importance will be reconsideration of the progress toward a sustainable society from the standpoint of the Republic of Serbia, as one of the representatives of developing countries. Realized value of the *Sustainable Society Index* for Serbia is below the global level (*Table 1*).

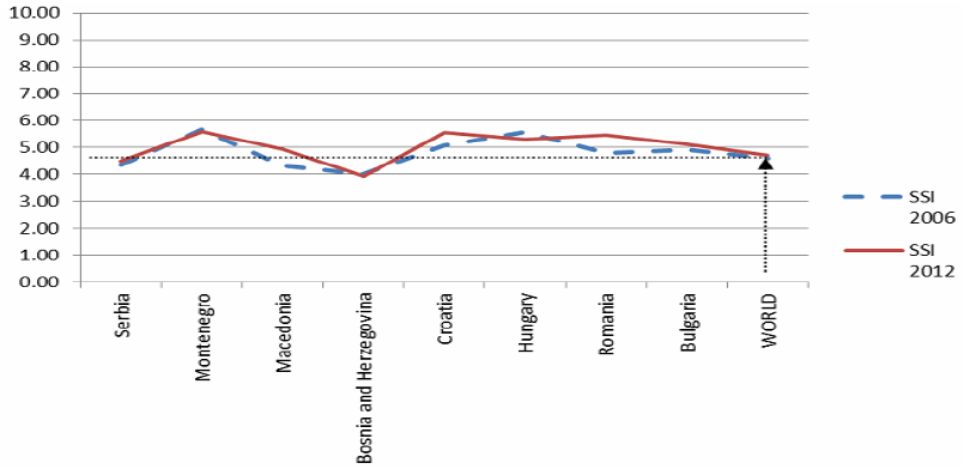
Table 1. Sustainable Society Index: basic dimensions and change for Serbia, border countries and world (2006-2012)

Country	Human Wellbeing		Environmental Wellbeing		Economic Wellbeing		Sustainable Society Index - SSI		Index of sustainable change
	2006	2012	2006	2012	2006	2012	2006	2012	2006-2012
Serbia	7.10	7.81	3.65	3.73	2.77	2.61	4.35	4.50	**103.4**
Montenegro	7.09	7.85	5.38	5.37	4.07	3.61	5.67	5.60	**98.8**
Macedonia	7.02	6.88	3.33	3.51	3.08	5.04	4.31	4.94	**114.6**
Bosnia and Herzegovina	7.46	7.57	2.76	2.59	2.78	2.72	4.01	3.92	**97.8**
Croatia	7.76	8.07	3.82	3.86	4.23	5.46	5.06	5.55	**109.7**
Hungary	8.46	8.66	5.38	3.48	5.44	4.73	5.56	5.29	**95.1**
Romania	6.71	7.37	3.53	3.99	4.83	5.66	4.79	5.48	**114.4**
Bulgaria	7.85	8.14	3.61	3.41	3.99	4.74	4.90	5.13	**104.7**
WORLD	**5.9**	**6.2**	**4.6**	**4.5**	**3.7**	**3.8**	**4.6**	**4.7**	**102.1**

Source: According to data available at www.ssfindex.com/cms/wp-content/uploads/Datatables_2006-2008-2010-2012.xls (accessed on February 15, 2013) and authors' calculations of *Index of sustainable change.*

After analysis of the *Sustainable Society Index* value in 2012 compared to 2006 it can be noticed its slight variations, where they are most expressed at *Macedonia*, *Romania* and *Croatia* (*Graph 3*).

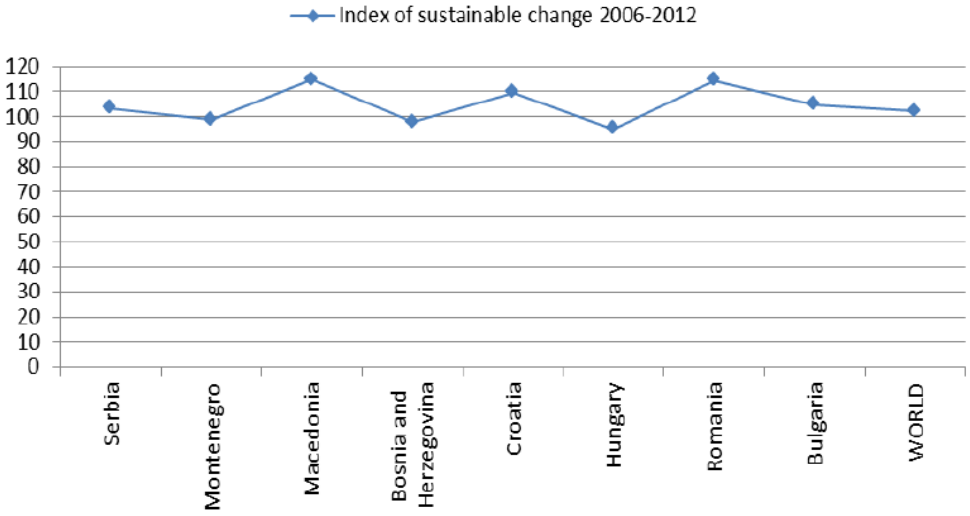
Graph 3. SSI trend for Serbia, border countries and world (2006-2012)



Source: According to data from Table 1.

Aforementioned countries succeed to significantly increase the value of the analysed Index in 2012, in compare to 2006, and thus more contribute to improvement of the sustainability of society. This statement is confirmed by the height of calculated *Index of sustainable change*, which in *Macedonia* is 14.6%, in *Romania,* 14.4% and *Croatia,* 9.7%. Value of the *Index of sustainable change* in 2012 compared to 2006 in *Serbia* is 3.4%. Countries in *Serbia's* neighbour, which had a negative trend *(unsustainable change)* in observed period are *Hungary* (-4.9%), *Bosnia and Herzegovina* (-2.2%) and *Montenegro* (-1.2%) (*Graph 4*).

Graph 4. Index of sustainable change for Serbia, border countries and world (2006-2012)

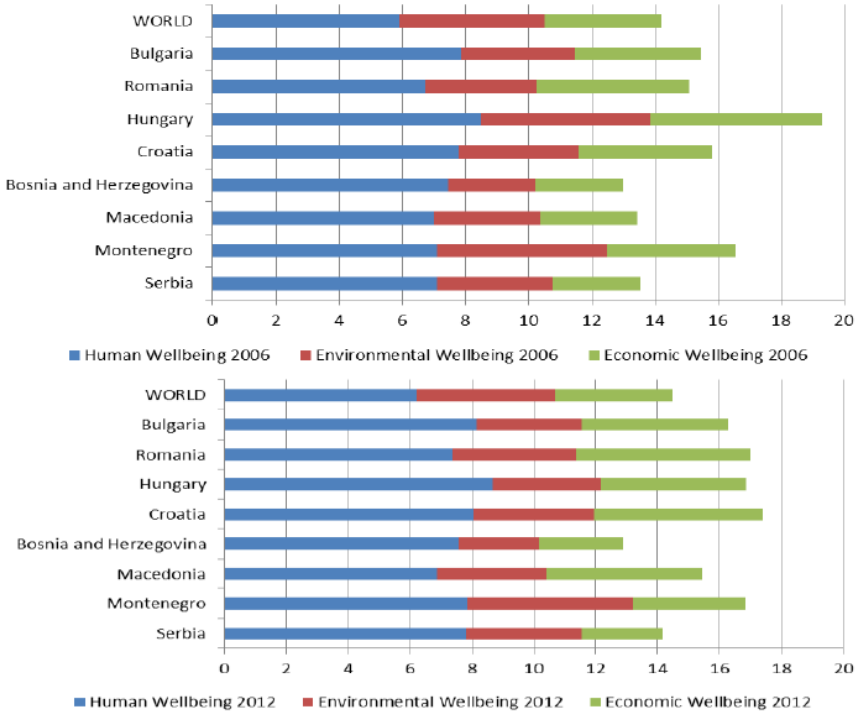


Source: According to data from Table 1.

Having in mind collective contribution of basic dimensions that determine the *Sustainable Society Index*, Serbia in 2012 achieved results, actual on global level in 2006. Also, besides *Bosnia and Herzegovina*, *Serbia* is a country in which all three dimensions, integrally contribute at least to sustainable society, as in 2006, as well as in 2012. Dimension that distinguishes the most in that contribution is the *Human Wellbeing*, followed by the *Environmental* and *Economic Wellbeing*. Such a dispersion of contributions of main *SSI* dimensions was characterized in observed years both at the global level, as in the most of the analysed countries.

Country where in 2012, compared to 2006, was recorded the largest decrease in collective contribution of basic dimensions of the *SSI* is *Hungary*, primarily caused by reduction of the *Environmental,* as well as *Economic Wellbeing*. On the other hand, *Macedonia* is the country where was achieved the largest increase in collective contribution of the basic *SSI* dimensions, primarily due to increase of the *Economic Wellbeing*. Based on the comparison of the collective contributions of *Sustainable Society Index* basic dimensions can be noticed that in 2012, compared to 2006, was made certain progress in terms of balanced progress of *SSI* achieving, through increase of, mostly *Economic Wellbeing*, what led to reduction of current gap between some countries. Certainly, according to this the countries that are still very behind are *Bosnia and Herzegovina* and *Serbia* (*Graph 5*).

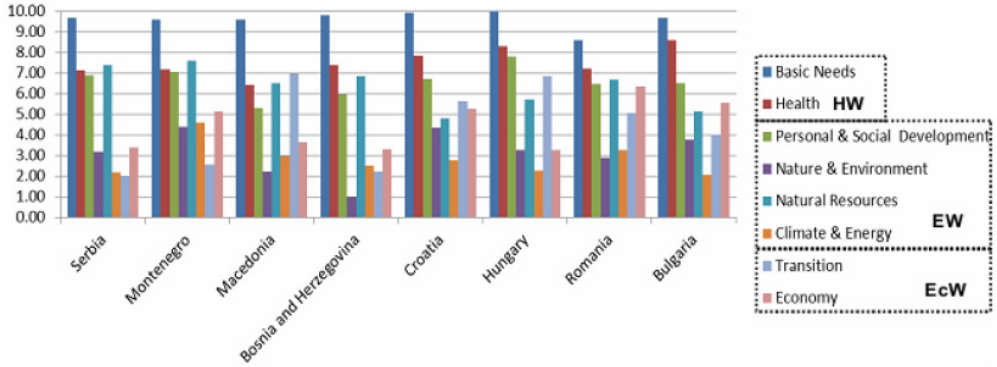
Graph 5. Collective contribution of main dimensions of the Sustainable Society Index to sustainable society: Serbia, border countris and world (2006, 2012)



Source: According to data from Table 1.

Analysing the categories within the basic dimensions of the *Sustainable Society Index*, in all observed countries as the most important category appears *Basic Needs*, which is part of a dimension *Human Wellbeing*. In other words, this category had the biggest influence on the achievement of a sustainable society in certain country in 2012. According to significance, in most countries (*Bosnia and Herzegovina, Croatia, Hungary, Romania* and *Bulgaria*) it is followed by category the *Health*, while in *Serbia* and *Montenegro* as next category by the significance appears the *Natural Resources* (*Graph 6*).

Graph 6. Categories within the main dimensions of the Sustainable Society Index (2012)



Source: According to data available at www.ssfindex.com/cms/wp-content/uploads/Datatables_2006-2008-2010-2012.xls (accessed on February 15, 2013).

It is interesting that in *Serbia* as a category with the lowest relevance for achieving of sustainable society appears the *Transition*, while this category in *Macedonia* by its impact is on second place. Also, in most of analysed countries, one of the categories with the smallest impact is the *Climate and Energy*, what can be characterized as a low level of social awareness towards to the importance of climate changes and energy efficiency.

Conclusion

Historical development of indexes for measuring of sustainability of certain society has invaluable importance. This primarily relates to developing countries, as indexes for measuring of sustainability contribute to establishment of strategically determined platform that enables the developmental integrality of society in terms of greater respect of economic, social and environmental aspects of development. For any society, in long-term, pursuit of achieving sustainability should be based on continuous improvement and dispersivity of developmental policies, which would adequately implement sustainable plans within the different economy sectors. Based on the analysis of *Sustainable Society Index*, for the period 2006-2012, it is concluded that the society at the global level is still far from the idea of sustainability. Although, existence of upward trend of observed Index is encouraging, unfortunately without acceleration of expressly slow dynamics of its growth in coming years can not be expected achievement of full capacity of sustainability by the global society.

Also, by the analysis of same indicator at level of *Serbia* and neighboring countries, it is concluded that *Serbia* achieved one of the lowest values of *Sustainable Society Index*. It

is one of the countries where all three basic dimensions of Index integrally contributed at least to a sustainable society in both analyzed years, therewith there are some indications of sustained changes of the Index that are still insufficient from an aspect of future progress. Dimension with the largest contribution to a sustainable society in *Serbia* is *Human Wellbeing*. Among categories in same position are *Basic Needs* within the dimension *Human Wellbeing* and *Natural Resources* within the dimension *Environmental Wellbeing*. Category *Transition* within the dimension *Economic Wellbeing* has the least importance according to its impact on the achievement of sustainable society in *Serbia*. Based on aforementioned it can be concluded that the current transitional changes in the form of economic system reforms did not have a significant impact on the achievement of present level of sustainable society in *Serbia*, what has to be changed in near future.

Literature

1. *Check the level of well-being and sustainability for your country* (2012), available at: http://theblogprogress.blogspot.com/2012/11/check-level-of-well-being-and.html (accessed on February 12, 2013).
2. Chen, S. (2007): *What is a Sustainable Society?*, Sustainable Society USA, available at: www.sustainablesocietyusa.com/html/SustainableSociety/20070913/24.html (accessed on January 28, 2013).
3. Coomer, J. (1979): *The Nature of the Quest for a Sustainable Society*, in: J. Coomer (Ed.), *Quest for a Sustainable Society*, Pergamon Press, Oxford.
4. European Commission (2009): *GDP and beyond - Measuring progress in a changing world,* available at: www.cros-portal.eu/content/gdp-and-beyond-measuring-progress-changing-world (accessed on February 8, 2013).
5. IUCN, UNEP, WWF (1991): *Caring for the Earth: A Strategy for Sustainable Living*, Gland, Switzerland.
6. Njegovan, Z. (2008): *Critical Framework-Conditions for Strategic Development Programming*, Economics of Agriculture, Institute of Agricultural Economics Belgrade, Vol. 55, No. 2, pp. 139-149.
7. Parris, T. M., Kates, R. W. (2003): *Characterising and measuring sustainable development*, Annual Review of Environment and Resources, Vol. 28, pp. 559-586.
8. *Principles of a Sustainable Society, Caring for the Earth: A Strategy for Sustainable Living,* available at: http://www.globallearningnj.org/global_ata/principles_ of_a_ sustainable_society.htm (accessed on February 7, 2013).
9. Saisana, M., Philippas, D. (2012): *Sustainable Society Index (SSI): Taking societies' pulse along social, environmental and economic issues*, JRC Scientific and Policy Reports, European Commission.
10. Sarić, R., Roljević, S., Grujić, B. (2011): *Konceptualizacija održivog razvoja lokalnih zajednica*, Ekonomika poljoprivrede, Institut za ekonomiku poljoprivrede Beograd, specijalni br. 1, knjiga I, vol. 58, str. 193-201.
11. Sustainable Society Foundation (2010): *Measuring wellbeing and progress towards*

sustainability, available at: www.beyond-gdp.eu/download/factsheets/Sustainable_Society_Index.pdf (accessed on February 2, 2013).
12. *Sustainable Society Index* (2009), available at: www.eoearth.org/article/ Sustainable_Society_Index (accessed on February 11, 2013).
13. Van de Kerk, G., Manuel, A. (2007): *Contribution to Beyond GDP „Virtual Indicator Expo" - Sustainable Society Index (SSI): a new comprehensive index for world-wide use,* Brussels, available at: www.beyond-gdp.eu/download/bgdp-ve-ssi.pdf (accessed on February 11, 2013).
14. Van de Kerk, G., Manuel, A. (2012): *Sustainable Society Index SSI-2012*, Sustainable Society Foundation, The Netherlands.
15. http://plopws.sfsu.edu/sustainability/about.html (accessed on February 5, 2013).
16. http://uncw.edu/campuslife/services/Sustainability.html (accessed on February 5, 2013).
17. www.ssfindex.com/sustainability/timeline/ (accessed on February 10, 2013).
18. www.ssfindex.com/results-2012/world-totals/ (accessed on February 12, 2013).
19. www.ssfindex.com/cms/wp-content/uploads/Datatables_2006-2008-2010-2012.xls (accessed on February 15, 2013).

INDEKSNI PRISTUP U MERENJU ODRŽIVOG DRUŠTVA

Radojica Sarić[8], Marko Jeločnik[9], Vesna Popović[10]

Sažetak

Održivo društvo je društvo koje ima sposobnost održavanja balansa između ekonomskih, socijalnih i ekoloških procesa, ili stanja tokom vremena, s ciljem da se zadovolje kako sadašnje, tako i buduće potrebe stanovništva. Reč je o kompleksnom i multidisciplinarnom konceptu koji nalaže kreiranje odgovarajućih indeksa za merenje nivoa održivosti društva. Jedan od najpoznatijih je indeks održivog društva. U radu se razmatra model indeksa održivog društva kroz definisanje njegovih osnovnih karakteristika i trendova, i sprovodi kvantitativno-komparativna analiza vrednosti ovog pokazatelja na globalnom nivou i na nivou Srbije i susednih zemalja.

Ključne reči: *održivost, indeks održivog društva, kvantitativno-komparativna analiza, Srbija*

8 Radojica Sarić, master ekonomista, doktorant na Ekonomskom fakultetu u Beogradu, istraživač saradnik u Institutu za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, Srbija, telefon: +381 (0) 11 6972 842, e-mail: saricradojica@gmail.com

9 Marko Jeločnik, M.A., doktorant na Poljoprivrednom fakultetu u Novom Sadu, istraživač saradnik u Institutu za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, Srbija, telefon: +381 (0) 11 6972 852, e-mail: marko_j@iep.bg.ac.rs

10 Dr Vesna Popović, viši naučni saradnik u Institutu za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, Srbija, telefon: +381 (0) 11 6972 854, e-mail: vesna_p@iep.bg.ac.rs

Original scientific paper
Economics of Agriculture 1/2013
UDC: 339.188.2

CROSS DOCKING IMPLEMENTATION IN DISTRIBUTION OF FOOD PRODUCTS

***Dragan Vasiljevic*[1], *Miroslav Stepanovic*[2], *Oliver Manojlovic*[3]**

Summary

The research domain of this paper is food distribution improvement using the logistic concept of cross docking. The study purpose is to explore, analyse and demonstrate effects of cross docking implementing in business trading company and the factors influencing to implementation effectivness, as well. The metodology used in the study includes the actual logistics and supply chain management literature review and the real-world study with the concept implementation. The main achieved results are that under defined circumstances cross docking can be suitable tool for food distribution improvement and valuable for the company's competitivness increasing. The validity of the cross docking implementation is reflected in multiple (direct and indirect) benefits not only for the company, but also for the whole supply chain.

Key words: *distribution strategy, cross doking performance factors, trading chain, case study, process improvement.*

JEL: *D39, L81, M19, Q13, R41.*

Introduction

In today's business and logistics environment, which often requires frequent deliveries and small orders, cross docking can serve as one of the logistics concepts that contribute to the achievement of timeliness and economical supply. Cross docking is defined as a logistic concept used to consolidate shipments from inbound trailers to outbound trailers in the warehouse/distribution facilities, known as cross docks. Inbound trailer (transportation vehicles) typicaly arrives from a different origin points, carrying shipments for different

1 Dr Dragan Vasiljevic, associate professor, Facilty of Organizational Sciences, Jove Ilica Street 154, Belgrade, Phone: +381 69 889 34 89, E-mail: vasiljevic@fon.rs

2 M.Sc. Miroslav Stepanovic, IDEA d.o.o, Autoput za Zagreb 11/a, Belgrade, Phone: +381 63 719 32 37, E-mail: mstepanovic@gmail.com

3 B.Sc. Oliver Manojlovic, Faculty of Organizational Sciences, Jove Ilica Street 154, Belgrade, Phone: +381 64 483 89 16, E-mail: okimane@gmail.com

destinations. The shipments are then unloaded, sorted, consolidated and reloaded into outbound trailers (transportation vehicles). It is common that all shipments handling is completed with minimal retention and no holding of stock in the cross dock.

Cross docking can contribute to achieving significant benefits. Instead of shipping small orders, that do not occupy the entire cargo area, directly on the trailers (Less-Than-Truckload, i.e. LTL), cross docking consolidates small orders into one big shipment, in order to fullfill the entire cargo area (Truck-Load, i.e. TL). Thus, with the help of a cross docking, more frequent and more economical deliveries could be made, because, with every other delivery, orders meet the entire cargo area in trailers. With these just-in-time deliveries, inbound shipments are transferred directly to outbound shipments with little, if any, warehousing.

Globalization trend exposes Serbian food chain to higher level of competition with entering domestic market by foreign companies and market deregulations. The process of transition of Serbian food sector is still ongoing and many changes happen on every level of food chain. Besides costs, the main characteristics of the current food distribution systems in Serbia are the requirements of just-in-time delivery and flexibility. Most buyers on Serbian food market expect the delivery within one or two days or even the same day („day for day" delivery), as the authors [5] and [14] point out. This was a major impetus for our research.

This paper has following structure. Part of the work entitled as Theoretical background includes a review and analysis of attitudes of recognized researchers and authors in terms of precise definition of the concept, systematization and classification of the cross docks, as well as conditions and resources necessary to implement the concept. The third part deals with the systematization and analysis of factors influencing the success of the cross docking operations. The fourth chapter, given as a real-world case study, represents the implementation of cross docking in a food distribution company. In the conclusion we discuss about the achieved results and give concluding remarks and some possible directions for future research.

Theorethical background

In the scientific and professional literature that belongs to the field of *Logistics & Supply Chain Management, i.e. L&SCM*, there are a number of studies that indicates different aspects of a cross docking. However, there are not many authors who were researching on implementing of cross docking in the food industry, especially in Serbia.

Although cross docking is considered as a relatively new logistics strategy according to [19], its roots are tied for 1930s. Even if there are claims that it is used in U.S. military operations in the supply during WWII, the business world has recognized the importance of the cross docking concept until the late of 1980s, when it was applied by the retail chain Wal-Mart, which thereby achieve significant savings.

Although there are many authors that have been regard cross dock and warehouse as identical, [2] point out the basic difference between them, indicating that goods are stored in the facility (Cross Docking Centre, i.e. CDC) for at most 24 hours, which made a clear distinction from conventional or tradicional warehousing.

During the 1990s a mainly issues of the authors heve been addressed by the forms and modeling of cross docking, the resources needed to carry out operations themselves, as well as the implementation of the concept. In this view, the authors in [18] indicates the three basic models of cross docking: manufacturing cross docking, distribution cross docking and terminal cross docking, while most of the authors consider only the terminal cross docking, as the way of sorting and consolidation of goods in cross dock center and their transportation to and from the center. Nevertheless, there are some extensions of mentioned classification. The authors [11] and [17] suggest the models of retail and opportunistic cross-docking. It is the same logistics technics and the diferences between cross-docking models are related to the place of cross docking application (manufacturing plant, distribution system, retail outlets). According to time when customer is assigned to a product the author [8] differs pre-distribution and post distribution cross docking. But generally speaking, as pointed out [16] the best candidates for cross-docking are fast-moving products with constant demand. The authors [3] classify cross dock as: a single-stage, a two-stage and free-staging. In the first case, pallets (e.g. goods) are unloaded and placed into staging lines that correspond to either the receiving or shipping gates, depending on whether there is known final destination. Two-stage cross dock allows workers in the CDC to sort out pallets from the staging lines that correspond to the receiving gates into the staging lines that correspond to the shipping gates, which is advantageous in terms of greater flexibility and transparency of the process. A free-staging cross dock does not use any queue (e.g. stages, lines) where pallets are placed at one end and pulled from the other. Instead, a free staging area is reserved next to each receiving, shipping, and/or both gates. There are also authors, like [6], which suggest that receiving shipments need to diverte to a special section for reallocation and repackaging items, before they are being transported to the shipping gates.

There are opposing opinions on the implementation of a cross docking, among the authors. Specifically, one group of authors, including [18], considers that the implementation of the concept is relatively simple if you clearly define the company's specific needs for cross docking. In contrast to such views, most authors, including [20], considers that the implementation of the cross docking concept is a complex process which, if not done properly, can have the outcome in the form of traditional warehouse and distribution processes. What speaks for the complexity of the implementation process is the research group of authors [15] who have tried using simulation techniques to ensure that the concept is implemented exactly as it was planned. An important success factor of the implementation of the concept is location of cross dock center, and some authors such as [1] and [7] dealing with the problems of determining the optimal location of such a center. It is alleged that this problem is NP-hard, and authors such as [9] using the heuristic methods does not always find an optimal solution, but the suboptimal and feasible solutions. In our paper the problem of optimal location of cross–docking center is not considered because the company in the focus has reorganized distribution proces using its own facility without green-field investment. Generally, most of the authors belives that the cross docking is widely applicable. According to [2], in certain circumstances, cross docking can be perfectly applicable in agri-food industry and distribution of perishable goods. Moreover, cross docking should improve coordination and cooperation

in distribution chain, and the authors [10] have the oppinion that coordination mechanisms must be reconsidered in agri-food chain's efficiency term. In that sence, the authors [12] and [13] underline the influence of knowledge sharing, cooperative and collaborative concepts on efficiency and organizational performances in agro-business sector.

Factors influencing cross docking effectivness

Greatest benefits of cross-docking operations are shipment consolidation and customization, reduced transportation cost, reduced needs for warehouse space and labor cost, just-in-time of deliveries, improved service level and demand and supply balancing. The main factors influencing cross docking effectivness are following:

1) Pallet handling
2) Freight mix
3) Number of forklifts
4) Number of receiving gates
5) Gates layout and size of a cross dock.

For handling pallets between the incoming (inbound) and outgoing (outbound) trailers, a manager has the options of direct or indirect pallets manipulation. In the case of indirect pallets manipulation (indirect unloading and/or indirect loading) storiging areas (buffers) are used between the incoming and outgoing trailers. In that view, there are the four basic options of pallets handling shown in Table 1:

Table 1. Pallet handling options

Option	Inbound storaging	Outbound storaging
1	No (Direct unloading)	No (Direct loading)
2	Yes (Indirect unloading)	No (Direct loading)
3	No (Direct unloading)	Yes (Indirect loading)
4	Yes (Indirect unloading)	Yes (Indirect loading)

Option 1 eliminates double handling of goods, while options 2 and 3 require additional lifting and lowering operations beside ingoing or outgoing gates. Option 4 requires two additional handling operations and additional hyman resources, but it maximizes the capacity of a cross dock facility.

When it is about freight (pallet) mix, according to [4] authors showed that the flow rates to different destinations typically differ by a factor of 2 to 10. They examined two pallet mixes: Uniform and Bayes'. Under the Uniform pallet mix, each pallet received is assigned a destination with equal probability, while under the Bayes'pallet mix; each pallet is randomly assigned a destination such that 70% of the pallets are directed to 30% of the destinations. Usually in practice, a few outgoing gates take over most of the transported goods and the cross dock managers must focus their attention on these gates.

Number of forklifts is also a very significant factor of cross docking effectivness. In most cross docks, each forklift is assigned to a certain number of receiving gate to move pallets from its assigned gate to any shipping gates. However, when more forklifts are assigned, it will increase congestion and slow pallet movements process. Thus, the problem of determining the optimal number of forklifts and transport vehicles is particularly significant.

As for the number of receiving gates, many cross dock managers are interested, mainly due to several reasons, to minimizing the number of receiving gates. One reason is to reduce the number of security and receiving inspection points by opening fewer gates. Second reason lies in the fact that delays are more predictible by ingoing than outgoing gates (theoreticaly all forklifts can be simultaneously on the same outgoing gate). Another important reason is a smaler number of gates means less transported distance.

The size and internal layout of the receiving and shipping gates also have affect at the cross docking process performance. In practice, usually there are four combinations of gate layouts: (1) LALS (*i.e. Left Arrival and Left Shipping*) layout uses receiving gates from left to right and assigns destinations with the heaviest traffic to shipping gates from left to right, (2) LARS (*i.e. Left Arrival and Right Shipping*) layout uses receiving gates from left to right and assigns destinations with the heaviest traffic to shipping gates from right to left, (3) CACS (*i.e. Central Arrival and Central Shipping*) layout uses receiving gates in the central part of the cross dock and also assigned destinations with heaviest traffic to shipping gates nearer to the central part of the cross dock, and (4) SASS (*i.e. Spread Arrival and Spread Shipping*) layout attemps to spread the traffic as evenly as possible along the entire cross dock.

Cross docking based distribution of food products: A real world case study

To evaluate the validity of using cross docking in real industrial conditions, for the purpose of this research, concept of cross docking has been tested on the example of a large retail chain in Serbia. This retail chain, with over 3000 employees, has its own wholesale trade facilities in several cities in Serbia and also has dozen retail stores. It has its own fleet of vehicles for different purposes and capacities used for distribution of goods. Also, a certain number of vehicles have been taken on lease.

Analyzing logistics costs in this company it was noted that transportation costs, as well as in most other companies in this industry, have the largest share. Costs of transportation goods from wholesale trade object in Belgrade to the 21 retail stores in Vojvodina were very high, so a primary goal of this study was to reduce them by using a cross docking concept. One of the possible solutions is to make entire transportation of ordered goods from Belgrade to the wholesale center in Subotica town, which shall serve as a cross dock center, and then send goods from Subotica to retail stores.

This study contains an overview of the starting condition in the distribution sector (before the implementing of the cross docking concept), the situation after the implementing of this concept and calculated effects that cross docking brings. The observed time horizon in this study was one quarter of a year e.g. three months. The transportational goods structure

consists of packeted goods (50%) and fruits and vegetables (50%). Initial constraint, that must be taken into account, is that wholesale center in Subotica has no refrigeration or special storage equipment required for perishable goods.

The initial strategy was based on the distribution of direct deliveries from the central wholesale center in Belgrade to 21 retail stores in Vojvodina, with an average of 7 trucks per day. The fuel price that the company purchased in that period was 75 [RSD/l]. Driver's hourly wage was 150 [RSD/h], while the cost of leasing was approximately 2080 [EUR/vehicle] (the price is converted from euros into dinars with the average exchange rate for the reference month; 1 EUR=76,73–91,63 RSD, data from 4th quartal of 2008 year, source: National Bank of Serbia). Calculated toll rates were: Belgrade-Novi Sad 710 [RSD] and Novi Sad-Subotica 990 [RSD], one dirrection only. The individual and the total amount of costs for the three-month period before the implementing a cross-docking are shown in Table 2.

Table 2. The Distribution costs of goods from Belgrade to the retail-store objects

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
Distance crossed [km]	47.330	41.357	48.360	137.047
Fuel consumpion [litre]	11.832	10.339	12.090	34.261
Value of fuel consupmion [RSD]	887.437	775.443	906.750	2.569.630
Total time spend on touring [hour]	1.148	974	1.527	3.649
Value of total time spend on touring [RSD]	172.260	146.053	229.093	547.406
Number of tours [1]	197	157	204	558
Toll value [RSD]	669.800	533.800	693.600	1.897.200
Number of pallets transported [piece]	2.358	1.953	2.719	7.030
Total weight transported [kg]	1.205.200	858.450	1.422. 232	3.485.882
Vehicle maintence costs [RSD]	1.111.576	994.913	1.174.420	3.280.909
Lease costs [RSD]	1.442.815	1.362.643	1.697.352	4.502.810
Total sum [RSD]	4.283.888	3.812.852	4.701.215	12.797.955

Source: Own calculations based on a survey
Note: The values in the table are calculated without VAT (Value Added Tax)

After putting cross dock center in Subotica into operational mode, the new business strategy required the distribution of fruit and vegetables directly from Belgrade to retail stores in Vojvodina, while packaged goods first transported from Belgrade to the cross dock center, and from there, using only three trucks, further distributed to retail stores in Vojvodina. Thus, by implementing a cross dock center, distribution costs of goods asquire following structure: the cost of distribution of fruit and vegetables from Belgrade to the retail-store objects in Vojvodina (Table 3), the cost of distribution of packaged goods from Belgrade to Subotica via transport service (Table 4), and distribution costs of packaged goods from Subotica to retail-store objects in Vojvodina (Table 5).

Table 3. The Distribution costs to the retail-store objects in Vojvodina

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
Distance crossed [km]	23.665	20.678	24.180	68.523
Fuel consumpion [litre]	5.916	5.169	6.045	17.130
Value of fuel consupmion [RSD]	443.718	387.721	453.375	1.284.814
Total time spend on touring [hour]	574	487	764	1.825
Value of total time spend on touring [RSD]	86.130	73.026	114.546	273.702
Number of tours [1]	98	77	102	277
Toll value [RSD]	334.900	266.900	346.800	948.600
Number of pallets transported [piece]	1.179	976	1.358	3.513
Total weight transported [kg]	602.600	429.225	711.116	1.742.941
Vehicle maintence costs [RSD]	555.788	497.457	587.210	1.640.455
Lease costs [RSD]	721.407	681.321	848.676	2.251.404
Total sum [RSD]	2.141.943	1.906.425	2.350.607	6.398.975

Source: Own calculations based on a survey

Table 4. The Distribution costs of packaged goods from Belgrade to Subotica via transport service

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
Number of pallets transported [piece]	1.179	976	1.358	3.513
Number of tours [1]	37	31	42	110
Transportation costs [RSD]	1.079.000	876.500	1.209.500	3.165.000

Source: Own calculations based on a survey

Table 5. The distribution cost of packaged goods from Subotica to retail-store objects

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
Distance crossed [km]	12.926	11.295	13.208	37.429
Fuel consumpion [litre]	3.231	2.823	3.302	9.356
Value of fuel consupmion [RSD]	242.378	211.790	247.653	701.821
Total time spend on touring [hour]	314	266	417	997
Value of total time spend on touring [RSD]	47.048	39.890	62.570	149.508
Number of tours [1]	98	77	102	277
Toll value [RSD]	0	0	0	0
Number of pallets transported [piece]	1.179	976	1358	3.513
Total weight transported [kg]	602.600	429.225	711.116	1.742.941
Vehicle maintence costs [RSD]	203.858	164.970	224.806	593.634
Lease costs [RSD]	480.938	454.214	565.784	1.500.936
Total sum [RSD]	974.222	870.864	1.100.813	2.945.899

Source: Own calculations based on a survey

Total sum of the distribution costs after implementing cross docking concept for the three-month period is shown in Table 6.

Table 6. Total costs of goods distribution using a cross docking concept

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
The distribution costs of fruits and vegetables from Belgrade [RSD]	2.141.943	1.906.425	2.350.607	6.398.975
Transport service costs [RSD]	974.222	870.864	1.100.813	2.945.899
The distribution costs of packeted goods from Subotica [RSD]	1.079.000	876.500	1.209.500	3.165.000
Total sum [RSD]	4.195.165	3.653.789	4.660.920	12.509.874

Source: Own calculations based on a survey

Considering distribution costs before and after implementing cross docking concept, Table 7 presents accomplished savings:

Table 7. Cost savings using a cross docking concept

Indicators	Periods			Total
	Month 1	Month 2	Month 3	
The distribution costs of goods from Belgrade [RSD]	4.283.888	3.812.852	4.701.215	12.797.955
The distribution costs with cross dock [RSD]	4.195.165	3.653.789	4.660.920	12.509.874
Total cost savings [RSD]	88.723	159.063	40.295	288.081

Source: Own calculations based on a survey

Therefore, recording the current situation it was found that the total cost of distribution of goods amounted to 12797955 [RSD] for the period of 3 months. By implementing cross dock center in Subotica, the total distribution cost of goods have been reduced to 12509874 [RSD], thus, saving in the amount of 288,081 [RSD] in one quarter of a year. For the expectation is that annual savings amounted to around 1200000 [RSD]. If we consider impossibility of cross dock centre in Subotica to store fruits and vegetables, it is reasonable to analyze the feasibility of equipping such centre with cooling systems that would allow short-term storage of perishable goods, which will eliminate a need for holding such goods in central warehouse in Belgrade.

Conclusion

The main conclusion that arises from the above is that the cross docking implementation in food products distribution can lead to the significant cost advantages and savings. It schould be noted that these savings are realized under particularly favorable circumstances or that company owned storage facility located in Subotica and adapted it into cross-docking center with insignificant investements and no extra-maintenance costs. These savings could be significantly higher if the investment is made in appropriate equipment to implement cross docking concept on the entire contingent of goods, not only the packeted goods. From

the designing and managing cross docking aspect it is important to consider factors such as size of a cross dock, the number and capacity of inside transport vehicles, the number of receiving gates and their layouts, etc. Also, by oppening to many receiving gates in a cross dock will increase the cost of security and inspection and it will have a negative effects on the performance of a cross dock. If the objective is to maximize the capacity of a cross dock, indirect unloading and indirect loading seems to be the best solution. Hence, it is interesting direction for our future research in domain of the organization analisys of CDC and impact quantitatification of all identified factors that determine the performance of a cross docking approach.

Literature

1. Agustina, D., Lee, C. K. M., Piplani, R. (2010): *A Review: Mathematical Models for Cross Docking Planning,* International Journal of Engineering Bussines Management, InTech, Vol. 2, No. 2, pp. 47-54, China.
2. Apte, U. M., Viswanathan, S. (2000): *Effective Cross Docking for Improving Distribution Efficiencies,* International Journal of Logistics Research and Applications, Taylor & Francis, Vol. 3, No. 3, pp. 291-302, London.
3. Baptiste, P., Maknoon, M. Y. (2007): *Cross-docking: Scheduling of incoming and outcoming semi trailers,* CD Proceedings of the 19th International Conference on Production Research, 29 July – 2 August, Valparaiso, Chile, International Foundation of Production Research, pages unmarked.
4. Bartholdi, J., Gue, K. R. (2004): *The best shape for a cross-dock,* Transportation Science, The Institute for Operations Research and The Management Sciences, Vol. 38, No. 2, pp. 235-244, USA.
5. Berkum, S. van, Bogdanov, N. (2012): *Serbia on the road to EU: Consequences for agricultural policy and the agri-food chain*, CABI, Wallingford, UK.
6. Bogetic, Z., Acimovic, S. (2009): *ECR strategija - koncepcija i alati za doba privredne recesije,* Montenegrin Journal of Economics*,* Economic Laboratory for Transition Research, No. 10, pp. 53-63, Podgorica.
7. Dobrusky, F. G. (2003): *Optimal Location of Cross-Docking Centers for a Distribution Network in Argentina*, (unpublished master thesis), Massachusetts Institute of Technology, USA.
8. Gue, K. (2001): *Crossdocking: Just-in-time for distribution*, Tech. Report, Naval Postgraduate School, Monterey, CA.
9. Li, Z. P., Low, M. Y. H., Shakery, M., Lim, Y. G. (2009): *Crossdocking planning and scheduling: Problems and algorithms,* SIMTech technical reports, Singapore Insitute of Manufacturing Technology, Vol. 10, No. 3, pp. 159-167, Singapore.
10. Manole, V., Andrea, R. (2006): *Coordination models for agro-food chains,* Economics of Agriculture, IAE, Belgrade, No. 1/2006, pp. 63-71.

11. Napolitano, M. (2000): *Making the move to crosdocking: a practical guide to planning, designing, and implementing a cros dock operation,* Warehouse Education and Research Councel, Oak Brook.
12. Nedita, G., Stoian, M., Radulescu, A. E. (2010): *Designing the collaborative platform meant to increase organizational competitivness in agrofood research*, Economics of Agriculture, IAE, Belgrade, Special Issue -1, pp. 223-230.
13. Popescu, G., Constantin, F., Menda, T. (2010): *Efficient transfer of knowledge in agriculture through cooperative structures*, Economics of Agriculture, IAE, Belgrade, Special Issue -1, pp. 239-245.
14. Popovic, R. (2009): *Effects of market structure changes on dairy supply chain in Serbia,* Proceedings of International Food and Agribuseness Management Association Forum and Symposium, June 20-23, Budapest, Hungary, pages unmarked.
15. Rohrer, M. (1995): *Simulation and Cross Docking,* Proceedings of the 1995 Winter Simulation Conference, 3-6 December, Arlington, USA, Alexopoulus C., Kang K., p. 846-850.
16. Ross, A., Jayaraman, V. (2008): *An evaluation of new heuristics for the location of cross-docks distribution centers in supply chain network design,* Computers & Industrial Engineering, Elsevier, Vol. 55, pp. 64-79, USA.
17. Shaffer, B. (2000): *Implementing the crossdocking operation,* IIE Solution, Institute of Industrial Engineers, Vol. 32, No. 5, pp. 20-23, USA.
18. Thapa, G.B., Dhamala, T.N., Pant, S.R., (2011): *Cross-Docking Operations for Supply Chain Logistics in JIT Production and Distribution Systems,* Journal of the Institute of Engineering, Tribhuvan University, Vol. 8, No. 1, pp. 219-230, Nepal.
19. Zecevic, S., Gojkovic, P. (2010): *Logisticki trendovi,* Zbornik radova 1. Međunarodne naučno-stručne konferencije LOGISTIKA 2010, 18-19 Novembar, Doboj, Saobracajni fakultet - Doboj, str. 1-10.
20. Zhengping, L., Malcolm, Y. H. L., Roland, Y. G. L. (2009): *Optimal Decision-making on Product Rankins For Crossdocking/Warehousing Operations,* International Journal of Services Operations and Informatics, Inderscience Publishers, Vol. 4, Issue 4, p. 352-365, UK.

PRIMENA CROSS DOCKING KONCEPTA U DISTRIBUCIJI PREHRAMBENIH PROIZVODA

***Dragan Vasiljevic*[4]*, Miroslav Stepanovic*[5]*, Oliver Manojlovic*[6]**

Rezime

Problem koji se u radu istražuje je mogućnost unapređenja distribucije prehrambenih proizvoda primenom logističkog koncepta cross docking. Cilj rada je da se analiziraju i istaknu prednosti i mane primene ovog koncepta u poslovanju trgovinskog preduzeća, kao i faktori koji utiču na uspešnost implementacije koncepta. Metodologija koja je korišćena u istraživanju obuhvata pregled savremene literature u oblasti distribucije i upravljanja lancima snabdevanja, kao i primenu koncepta na realnoj studiji slučaja sa prikazom ostvarenih ušteda. Osnovni zaključak koji se nameće je da u definisanim uslovima koncept cross docking može biti u funkciji unapređenja distributivnog procesa trgovinskog preduzeća u industriji hrane, kao i njegove kompetitivne prednosti u celini. Društvena opravdanost primene cross docking-a se ogleda u direktnim i indirektnim benefitima ne samo za preduzeće, već i za lanac snabdevanja u celini.

Ključne reči: *strategija distribucije, činioci performansi cross docking-a, trgovinski lanac, studija slučaja, unapređenje procesa.*

4 Dr Dragan Vasiljević, vanredni professor, Fakultet organizacionih nauka, Jove Ilića 154, 11000 Beograd, Telefon: +381 69 889 34 89, E-mail: vasiljevic@fon.rs

5 Miroslav Stepanović, diplomirani inženjer – master, IDEA D. O. O., Autoput za Zagreb 11/a, 11000 Beograd, Telefon: +381 63 719 32 37, E-mail: mstepanovic@gmail.com

6 Oliver Manojlović, diplomirani inženjer, Fakultet organizacionih nauka, Jove Ilića 154, 11000 Beograd, Telefon: +381 64 483 89 16, E-mail: okimane@gmail.com

Review Article

Economics of Agriculture 1/2013
UDC: 338.48-44(1-22)(497.13)

POTENTIALS AND LIMITATIONS FOR THE DEVELOPMENT OF RURAL TOURISM IN VOJVODINA

Tatjana Bošković[1], Radovan Tomić[2], Danilo Tomić[3]

Summary

The natural attractiveness of rural areas in Vojvodina is a good basis for a rural tourism development. However, the available natural resource base is not sufficient to ensure the rapid and successful development of tourism in rural areas in Vojvodina. In this process all available resources need to be activated. The human and financial resources for rural tourism development in the region of Vojvodina are the subject of this research. The aim of this research is to determine the condition of existing resources and propose measures for their improvement.

Key words*: Rural tourism, resources, potentials, limitations, Vojvodina*

JEL: *R51, R23*

Introduction

The advantages of rural areas of Vojvodina for the development of tourism are reflected in a preserved environment and the rich rural heritage and culture. Vojvodina has a rich and varied resource base consisting of natural, cultural and historical attractions. However, the suitable natural and social resource base of rural Vojvodina is not sufficient to ensure the rapid and successful development of tourism in this region. In this process, all available resources need to be activated, among the primary financial and human recourses. "With planned and meaningful activities, rural tourism in conjunction with other economic activities could bring the country significant economic benefits" (Ranđelović, N. et al. 2012., p.336).

1 M.Sc., Lecturer, Higher School of Professional Business Studies, Vladimira Perića-Valtera 4, 21000 Novi Sad, Phone: + 381 21 485 4000, E-mail: tatjanab@uns.ac.rs

2 Ph.D., Professor, Higher School of Professional Business Studies, Vladimira Perića-Valtera 4, 21000 Novi Sad, Phone: +381 21 485 4000

3 Ph.D., Professor, Higher School of Professional Business Studies, Vladimira Perića-Valtera 4, 21000 Novi Sad, Phone: +381 21 485 4000, E-mail: dtomic@uns.ac.rs

Materials and Methods

The results of previous research in this area, the results of the Official Statistical Office of Serbia and the Ministry of Agriculture, Forestry and Water Management in the period 2002-2009, the results of Serbian Tourism Development Strategy 2005-2015, a Tourism marketing strategy of Vojvodina and the Master Plan for the development of rural tourism in Serbia are used in this paper. The authors use method of analyses above mention documents and comparison of financial data in different periods of time.

Results and Discussion

Rural tourism in strategic documents - In the tourism development strategy of Serbia (for the period 2005-2015, adopted in 2006.) rural tourism is recognized not only as one of priority Serbian tourism products, but also as one of six key tourism products of Vojvodina. However, it was concluded that despite good resource potential of rural tourism in Serbia is not adequately structured and organized, and it should take the necessary actions in order to create a rural development process.

An important step in accelerating this process is the adoption and implementation of the Master Plan for rural tourism development in Serbia for this year and it should contribute significantly to this process. It is one of the first documents in the UN project - "Sustainable Tourism for Rural Development." This latest strategic document is developed by the World Tourism Organization with the cooperation and support of Serbian Ministry of Economy and Regional Development, Ministry of Agriculture, Forestry and Tourism Organization of Serbia, with a significant contribution of the UN partners (FAO, UNICEF, UNDP and UNEP). Its implementation is envisaged in the 19 municipalities in four regions, namely: South Banat, Eastern Serbia, Central Serbia and the Lower Danube.

Master Plan as its goal emphasizes the identification and development of clusters of rural tourism in Serbia. The document lists 12 of the Cluster of rural tourism (CRT) in Serbia, which are grouped into four groups of clusters (Table 1):

Table 1. Clusters of rural tourism in Serbia

Cluster groups of rural tourism	Clusters of rural tourism (CRT)
CRT Group 1: Central and Western Serbian	CRT 1: Golija
	CRT 2: Zlatar Zlatibor
	CRT 3: Kopaonik
	CRT 4: Central Serbia
CRT Group 2: South Banat and Lower Danube	CRT 5: Lower Danube
	CRT 6: South Banat
CRT Group 3: East Serbia	CRT 7: Soko Banja
	CRT 8: South Serbia
	CRT 9: South-East Srbija
CRT Group 4: Vojvodina	CRT 10: Fruska Gora
	CRT 11: Upper Danube
	CRT 12: North Serbia

Source: Sustainable Tourism for Rural Development, MDG Achievement Fund, the Government of the Republic of Serbia, 2010.

As it can be seen in Table 1, in the area of Vojvodina there are significant concentrations of rural resource, so that the area is set aside as a separate cluster group of rural tourism. Although the Master Plan emphasizes the development as the goal of CRT in Serbia, however, it suggests that the distribution of financial resources and more attention should be paid to the so-called priority clusters. As clusters of priorities, they will have the greatest return for each dinar invested in rural tourism. Based on the analysis of certain factors, it was found that clusters Golija, Zlatar, Zlatibor and Kopaonik have the highest priority in Serbia. When comparing the 12 clusters of rural tourism, the following factors are discussed: natural, cultural and man-made attractors; seasonality; availability and infrastructure; unemployment rate; currently catering beds and the capacity and experience in tourism. When it comes to Vojvodina, Fruska Gora has been marked as a cluster of the highest priority, followed by clusters of the Upper Danube, North Serbia and South Banat. Therefore, these are areas in Vojvodina that have been marked as a priority when it comes to distribution of financial resources to accelerate development of rural tourism in this area.

The economic importance of rural development justifies (or confirms the need of) investment in this area. There are data that show that rural tourism in Serbia also generates significant revenue. According to the latest data from the Master Plan, the total number of beds (more than 32,000 registered and unregistered) in rural areas annually generates more than 50 million euros of revenue from accommodation and about 50 million euros contributes to more direct income in the tourism sector. As stated, the estimated amount of approximately 100 million euros represents 16% of direct tourism GDP in Serbia in 2010 (the Direct Travel and Tourism GDP), which calculates the WTTC (World Tourism and Travel Council) and which is 620 million euros. Both these data and estimates confirm that the direct economic contribution of rural tourism in Serbia will reach 450 million euros in the next 10 years and the need for investment in this area. However, according to the Master Plan, *"there are limits to the value generated by rural tourism of Serbia, which is primarily a consequence of the limited use of resources and limited support structures"*.

According to the review of strategic documents it can be concluded that rural tourism in Serbia enjoys *"declarative" support*. However, for successful realization of the objectives in this area it is necessary to have a *"real" support* in the form of approval of incentive funds by the state.

State support for the development of rural tourism in Vojvodina **-** The issue of rural development includes a variety of institutions dedicated to various forms of support. One of the most important aspects is the financial support by the state. Since 2006 both Ministry of Agriculture and Forestry and Water Management of Republic of Serbia have financially supported and encouraged the development of tourism and the diversification and expansion and improvement of economic activities in rural areas.

According to the approval of the budget, Ministry wants to support "the small family farms that intend to engage in rural tourism, stimulate people to stay in the country and reduce the depopulation of rural areas and contribute to creating new business opportunities and reducing regional imbalances in the development of rural areas, contribute to the

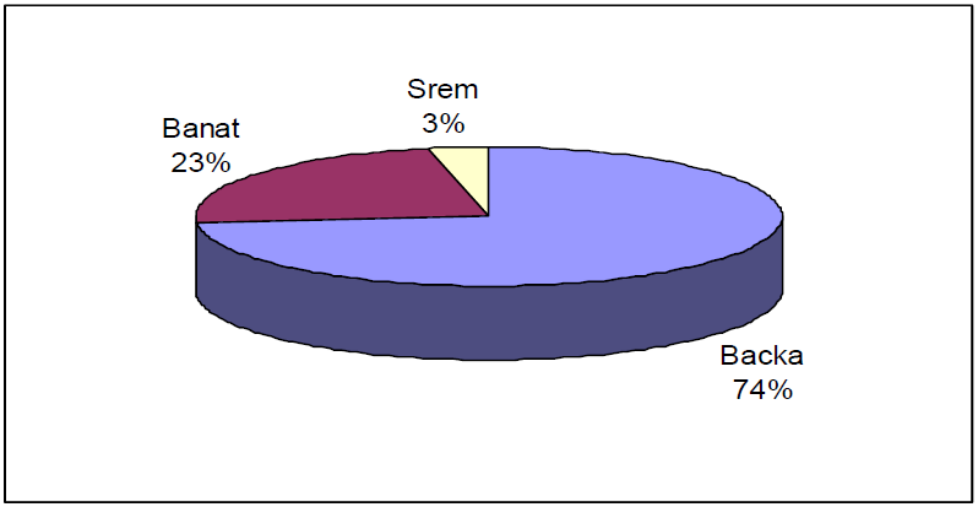
diversification of rural economy, improving the quality of life in the country, as well as the significant commercial and economic development." (Ministry of Agriculture, Forestry and Water Management, 2009)

All categories of rural population, individuals - owners of agricultural households, entrepreneurs, cooperatives, churches and monasteries and association of citizens and agricultural extension have the right to the use of financial incentives. This solution can be described as beneficial in terms of impact on the development of rural tourism. A wide range of potential users ensures that all interested parties can apply and the larger amount of funds can be realized in that purpose. In addition, it contributes to the development of all forms of rural tourism which would not be the case if certain categories of rural population were left out.

In 2007 and 2008 budgetary support for tourism development and diversification of economic activities in rural areas in Serbia amounted to 400,000 euros a year (the data on the size of budget support in the first year of implementation of these incentives is not known). According to the Ministry, in the period 2006-2008 the total realized (paid) resources in Serbia, on the basis of these measures amounted to € 915,800 (of which 13.3% realized in Vojvodina).

Vojvodina is the second most important user of financial incentives along with the Central region, while the Western region of Serbia which has been realized as 55% of the funds took first place. When it comes to allocation of resources in Vojvodina in the period 2006-2008, much of the funds are distributed in Bačka (74%), while 23% of the funds is realized in Banat, and only 3% in Srem (Figure 1.).

Figure 1. Distribution of funds in Vojvodina (2006-2008)

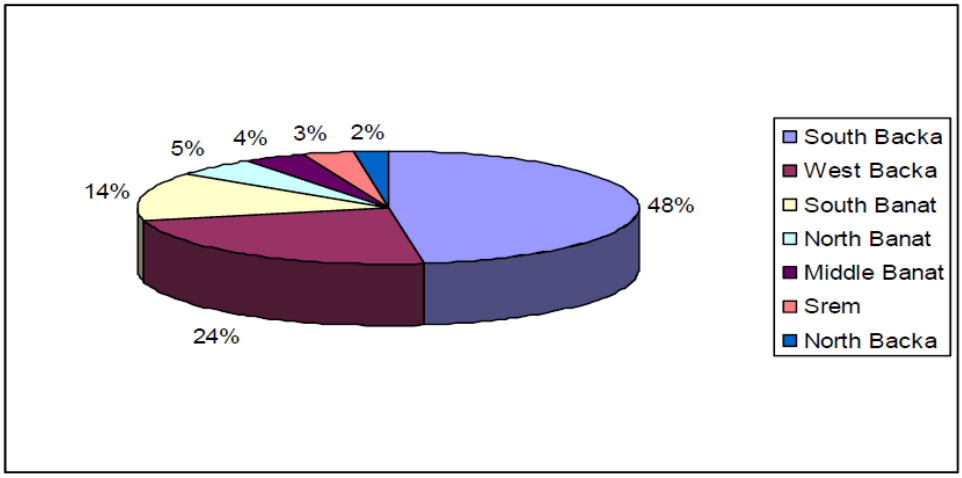


Source: Sustainable Tourism for Rural Development, MDG Achievement Fund, the Government of the Republic of Serbia, 2010.

This distribution of incentive funds in Vojvodina indicates the following: the high percentage of the funds executed in Bačka indicates a significant concentration of rural resources in this area and their better use in comparison with Banat and Srem.

When it comes to distribution of incentive funds for districts in Vojvodina, variation in the distribution is observed, as it can be seen in Figure 2.

Figure 2. Distribution of funds by districts in Vojvodina (2006-2008)

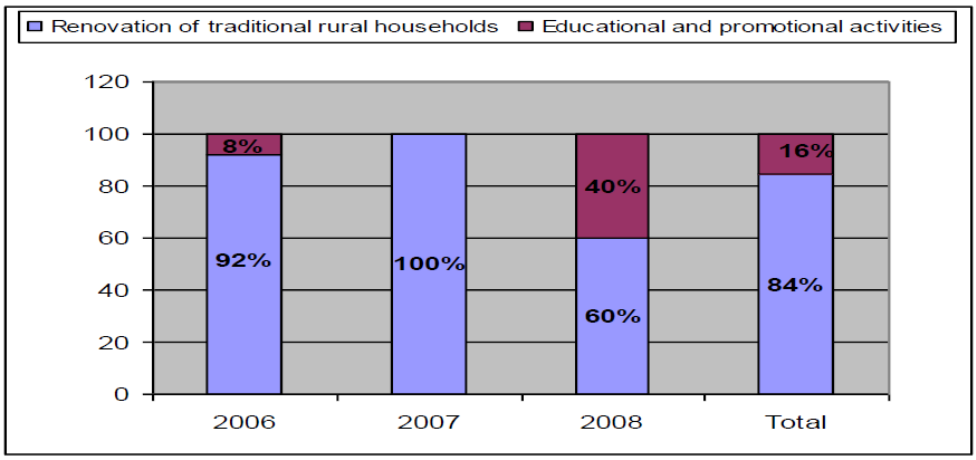


Source: Sustainable Tourism for Rural Development, MDG Achievement Fund, the Government of the Republic of Serbia, 2010.

As can be seen from the Figure 2, the highest percentage of financial incentives was implemented in South Bačka District (48%), while the other two most important beneficiaries of the funds are Western Bačka and South Banat district. The lowest percentage of funds was implemented in the North Bačka region (only 2%). Explanation of this phenomenon lies in the abundance of attractions in the South Bačka District. This fact represents a good basis for starting and developing rural tourism. Otherwise, Vojvodina as a whole has a rich and varied attraction base consisting of cultural and historical monuments, Fruškogorski monasteries, castles and forts, national parks, stables, ethno houses, Tiganjica ethnic village, nature reserve "Zasavica", sport hunting and fishing, wine houses and cellars, pedestrian and bike lanes, nautical programmes, thermal springs, events and festivals, gastronomy and many more. In "Marketing strategy of tourism development" (which was published 2009) the offer of the South Bačka District was rated as the most important for the "identity of Vojvodina tourist offer" (p. 149).

Besides the territorial distribution of incentive funds, it is important to analyze the distribution of funds according to the type of investment. As far as the purposes for which the Ministry granted funds are concerned, the majority of funds in Vojvodina has been invested in the restoration of traditional rural households in the function of rural tourism (renovation, construction, renovation, purchase, etc.). Distribution of funds in Vojvodina according to the type of investment is shown in the Figure 3.

Figure 3. Distribution of funds according to the type of investment in Vojvodina (2006-2008)



Source: Sustainable Tourism for Rural Development, MDG Achievement Fund,the Government of the Republic of Serbia, 2010.

As can be seen from the Figure 3, 84% of the total funds realized in Vojvodina were invested in the restoration of traditional rural households, while only 16% for educational and promotional purposes. Low percentage of assets invested in educational and promotional purposes is a limiting factor in the process of the development of rural tourism. Specifically, in addition to financial, human resources are also considered of primary importance in the process of starting and developing this type of tourism as well as education as a key investment in human resources.

The introduction of state support to the establishment and development of rural tourism is certainly a measure that contributes to faster development process of this sector and improvement of the economic status of the population in rural areas. For example, based on the study results, it has been showed that the *average net income from dealing with rural tourism* per household in Serbia is on average about 218 EUR per month. Bearing that in mind, conditions are favourable that the amount of budget support increases from year to year. Thus, in 2009, it amounted to 590,000 euros and 800000 euros in 2010. Also, the number of interested parties is growing, but on the basis of previous studies (Boškovic et al. 2010) it was found that during the three-year period the amount of realized funds is less in relation to the authorized funds for that purpose. The reasons for this can be found in the lack of adequate information and unprofessional preparation of tender documentation by potential users. The cause of this phenomenon is also the insufficient education of the local population, which confirms that in the future more attention should be paid into human resources investment.

Human resources in Vojvodina **-** Senilisation processes, migration of population from villages to cities and depopulation affect the village extinction which creates unfavourable demographic, social and economic situation in rural areas, region and

entire country (Boškovic et al. 2010). Such movements are also recorded on the territory of Vojvodina which reflects negatively on the initiation and development of rural tourism in this area.

Statistical data show that in the second half of the twentieth century, as a result of industrialization and urbanization, in Vojvodina there were significant changes in the structure of the population exactly through internal migration from villages to cities. According to the data from Statistical Office of the Republic of Serbia, the percentage of urban population in Vojvodina was 29.5% in 1953, and reached 56.7% in 2002. In contrast, in the same period, the percentage of agricultural population has drastically reduced. The percentage of agricultural population in Vojvodina was 62.9% in 1953, and it was only 10.6% in 2002. These trends in population structure have a negative effect on rural development in this area, and thus on rural tourism, because the agricultural population is a key factor in the initiation and development of this sector.

In addition to this limiting factor, age and educational structure of the population in Vojvodina can also be a barrier to the development of rural tourism. This is confirmed by data on the average age of the population and an aging index of the Serbian population (the ratio of old (60 and over) and young (0-19 years) population): in 1953, the average age was 29.4 years, and the aging index was 24.1%, while in 2007 recorded average age of population was 40.9 and the aging index was 103.2%. According to recent research, the least favourable age structure of population in Vojvodina is in rural municipalities Nova Crnja, Alibunar, Sečanj, Žitište and Plandište (Njegovan and Pejanović 2009)**.** The high share of aged population (over 65) in the structure of the rural population is a phenomenon that does not contribute to the development of rural tourism as future development of this activity lies precisely in a middle-aged population. Survey results from 2009 show that more than half (56%) employed in rural tourism are aged over 40 years.

In addition to age, educational structure of Vojvodina, as an important indicator of the quality of human resources, cannot be evaluated favourably. The reason is low percentage of educated population (9.48%), a high proportion of the population with incomplete education (20.81) in the total population of Vojvodina.

Recent studies have showed that in the rural municipalities of Vojvodina, in relation to the city municipalities, a lower percentage of educated population is recorded. Municipalities in Vojvodina, where the educational structure is the most favourable are Zrenjanin and Vrbas, and the most unfavourable situation is in the municipalities of Žitište, Kovačica, Alibunar and Bač (Njegovan, Pejanović 2009). Unfavourable educational structure in rural areas is often explained by the departure of young people to urban centres, unfavourable age structure, limited opportunities for education and other factors.

Positive changes in all previously analyzed structures of the population in Vojvodina could undoubtly encourage the development of rural tourism in the future.

Conclusions

In the field of financial resources a number of limiting factors has been identified:

- financial resources are insufficient and unevenly distributed regionally;
- education is necessary for beneficiaries of the resources when they apply for grants, and then for more efficient use of these grants;
- insufficient investment in education and promotion.

By analysing the structure of human resources one can see:

- the tendency of continuous decrease in the share of agricultural population in overall population;
- unfavourable age and educational structure of rural population, which results in insufficient motivation of the population to deal with tourism.

Future development of this activity will depend on the relationship between state, local government and local people towards this activity. „Education of all the participants in the process of development of rural tourism should be a significant part of those activities. The education programme should include rural households that participate directly in creating and providing of tourist products and local communities as indirect participants (Boškovic et al. 2010., p. 258). Also, the financial support of the state for the development of rural tourism has to be much stronger than it has been the case until now. Stronger public support and appropriate education for rural people could create favourable conditions for the development of rural tourism in Vojvodina.

References

1. *Analiza budžetske podrške razvoju seoskog turizma u Srbiji i diversifikaciji ekonomskih aktivnosti na selu* (2009), Ministarstvo poljoprivrede, šumarstva i vodoprivrede Republike Srbije, Sektor za ruralni razvoj, Beograd, pp. 17.
2. Andrić, N., Tomić, D., Tomić, G. (2010): *Status and Perspectives of Development of Rural Tourism in the Autonomous Province of Vojvodina*, 118th EAAE Seminar - Rural development: governance, policy design and delivery, Ljubljana, August 2010, available at: http://ageconsearch.umn.edu/bitstream/95305/2/Andric-Status_and_perspectives_of_development_of_rural _tourism-207.pdf.
3. Bošković, T., Andrić, N., Tomić, D. (2010): *Ljudski i finansijski resursi – činioci razvoja ruralnog turizma u AP Vojvodini*, Naučno-stručno savetovanje - Selo i turizam, jun 2010, Velika Plana.
4. Bošković, T., Tomić, D., Andrić, N. (2010): *Rural Population – Factor of Development of Tourism in Vojvodina,* Multifunctional agriculture and rural development (V) regional specificities, Economics of agriculture, SI - 2, IAE Belgrade, pp. 251-259.
5. *Marketing strategija turizma Vojvodine* (2009), Izvršno veće, Sekretarijat za Privredu, Novi Sad, pp. 223.

6. Njegovan, Z., Pejanović, R. (2009): *Ruralna regionalizacija AP Vojvodine*, Poljoprivredni fakultet, Departman za ekonomiku poljoprivrede i sociologiju sela, Novi Sad, pp. 249.
7. Ranđelović, N., Stefanović, V., Azemović, N. (2012): *Suva Planina as development area of Rural Tourism,* Economic of Agriculture, vol. 59, no. 2, pp. 333-343.
8. *Rezultati ankete o efektima mere za podsticaj seoskog turizma u Srbiji i diversifikaciju ekonomskih aktivnosti na selu* (2009), Ministarstvo poljoprivrede, šumarstva i vodoprivrede Republike Srbije, Sektor za ruralni razvoj, Beograd.
9. *Statistički godišnjak Srbije* (2009), Republički zavod za statistiku Srbije, Beograd.
10. *Strategija razvoja turizma Srbije* (2006), Ekonomski fakultet Beograd, Horwath Consulting Zagreb.
11. *Sustainable Tourism for Rural Development* (2010), MDG Achievement Fund, Vlada Republike Srbije, Beograd, pp. 75.

POTENCIJALI I OGRANIČENJA U RAZVOJU RURALNOG TURIZMA U VOJVODINI

Tatjana Bosković[4], Radovan Tomić[5], Danilo Tomić[6]

Sažetak

Prirodna atraktivnost ruralnih područja Vojvodine predstavlja dobru osnovu za razvoj ruralnog turizma. Međutim, raspoloživa prirodna resursna osnova nije dovoljna da obezbedi rapidan i uspešan razvoj turizma u ruralnim područjima Vojvodine. U ovom procesu je neophodno aktivirati sve raspoložive resurse. Predmet istraživanja su humani i finansijski resursi za razvoj ruralnog turizma u regionu Vojvodine. Cilj istraživanja je utvrdivanje stanja postojećih resursa i predlaganje mera za njihovo unapređivanje.

Ključne reči: *Ruralni turizam, resursi, potencijali, ograničenja, Vojvodina*

4 Magistar ekonomskih nauka, predavač, Visoka poslovna škola strukovnih studija Novi Sad, Vladimira Perića Valtera 4, 21000 Novi Sad, Telefon: +381 21 485 40 00, E-mail: tatjanab@uns.ac.rs

5 Doktor ekonomskih nauka, profesor, Visoka poslovna škola strukovnih studija Novi Sad, Vladimira Perića Valtera 4, 21000 Novi Sad, Telefon: +381 21 485 40 00.

6 Doktor poljoprivrednih nauka, profesor, Visoka poslovna škola strukovnih studija Novi Sad, Vladimira Perića Valtera 4, 21000 Novi Sad, Telefon: +381 21 485 40 00, E-mail: dtomic@uns.ac.rs

Review Article

Economics of Agriculture 1/2013
UDC: 631.11:005.591.4

MARKETING CONCEPT IN TERMS OF AGRICULTURAL ENTERPRISES DEVELOPMENT IN TRANSITIONAL COUNTRIES[1]

Drago Cvijanović[2], Saša Trandafilović[3], Nedžad Imamović[4]

Summary

A subject of the research in this paper are agricultural enterprises in transitional countries, their business orientation, as well as restructuring processes, aiming to adjust to new market and economic trends. The goal of the research is to analyse business changes in agricultural enterprises during the transitional period, as well as recognizing current characteristics and role of agricultural enterprises in agrarian reproduction process.

Privatization of public combines and food industry has disturbed previously set connections in value chain of agro-food products, while facing the economy globalization and harsh competition in the process of trade liberalization has led to new concepts and postulates in these enterprises' functioning. The agricultural enterprises should develop new concept of management and marketing, in order to develop a profitable business strategy and to provide growth of production and sale, based on new market and economic circumstances.

Key words*: agricultural enterprise, restructuring processes, marketing orientation.*

JEL: *Q13, Q10*

Introduction

In accordance to their characteristics, the agricultural enterprises and combines do not differ significantly from other enterprises. As well as other enterprises, the agricultural enterprises have a legal obligation to keep business books, to pay sales tax, property

1 The paper represents a part of the research at the project III 46006 – Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals' realization within the Danube region.

2 Professor Drago Cvijanović, Ph.D., Principal Research Fellow, Institute of Agricultural Economics, 11060 Belgrade, 15 Volgina Street, Serbia, Phone: +381 11 697 28 58, E-mail: drago_c@iep.bg.ac.rs

3 Colonel Saša Trandafilović, Ph.D., Chief of Administration, Head Office for Budget of the Ministry of Defense, 5 Bircaninova Street, 11000 Belgrade, Serbia, E-mail: sasa.trandafilovic@gmail.com

4 Colonel Nedžad Imamović, Ph.D., Head of Centre, Accounting Centre of the Ministry of Defense, 7 Gardijska Street, 11000 Belgrade, Serbia, E-mail: nedzad.imamovic@rc.mod.gov.rs

tax, realized profit, so, in that sense, their formal-legal position is far more unfavourable than the position of family agricultural husbandries.

What makes these enterprises different from the others are:

- Accent is on less work-intensive production lines and specialization level is relatively high within some production units,
- Development of agricultural infrastructure (irrigation/drainage systems, hail protection),
- High level of agro-technical measures application,
- Very complex and often too dissected organizational structure, caused by development and number of business functions, formal-legal position, production specialization, etc.

The complex agro-systems/combines were scarce, highly developed giants in transitional countries' agriculture, which has been, and still is, prevalently traditional and small. The complex business systems consist of more organizational units, for which have been characteristic relatively huge scope of independent business decision making. The most often, the complex business system has been made of more special economic entities, which have special legal and economic status. What connects these enterprises into a complex business system is ownership, i.e. controlling shareholders' interests. The enterprises within the complex business systems in agro-industry are mostly mutually connected in production-technological way and mainly organized after the strategic business units' principle, i.e. profit centres. In that case, a priority goal is not individual enterprises' profit, but maximal total profit at the complex system entirety level and it does not represent a simple sum of individual enterprises' maximized profits, due to synergetic connections which exist among them. As basic characteristics of the complex business systems in agro-industry could state the following (Novković, Šomođi, 2011: 144):

- Great value of engaged capital, production size and number of employees,
- Diversified production program and business activity, first of all, vertically,
- More owners, shareholders,
- Very complex and developed organizational structure,
- Developed management hierarchy.

Big agro-systems are a crowbar and an axle of modern agrarian sector in many countries, especially in USA. For example, during the YU combines birth (integration of production by vertical and horizontal line), almost the same processes have happened in the most developed world agriculture – in the USA. The combines in ex-SFRY republics were echo of what happened within the modern complex for production and distribution of food worldwide (Vujatović, Zakić, 2011:171). There from could be said with certainty that are superfluous dilemmas regarding needs of this type of enterprise existence, as a synonym of big agro-business, in transitional countries' agriculture. More serious

analyses, which would include also a genesis of big agro-systems making, could badly deny their survival's legitimacy.

Change of business orientation of agricultural enterprises

All agricultural enterprises and complex business systems (agro-combines) of transitional countries (period of socialism) have based their business on scale economy, which made conditions for applying modern technique and technology and setting up and development of seed production. As such, the enterprises were a stimulating factor for emergence and development of food industry in the same organizational frames of combine types. Through public/state property has been assigned to them a role of cheap products producers, and according to such concept of agriculture development, the enterprises had in that period a typical ***production business orientation***. Agro-engineers and technical experts had a dominant position and role in the enterprise, and production was the most important function. Other functions of the enterprise have followed the production development, but without taking care of costs and financial effect of the production (Cvijanović, 1996:113).

If neglects ideology (under political and legal duress, the agricultural enterprises and cooperatives had been formed on confiscated and nationalized land), a role of agricultural enterprises and combines had reflected in the following (Novković, Šomođi, 2011: 67):

- Concentration of land and capital had led to using the effects of economy of scale;
- Economies of scope had provided the application of modern technique and technology and setting up and development of seed production,
- Concentration of professional staff had provided development of science and agro-technique and their transfer to rural husbandries,
- Agricultural enterprises were a trigger for appearance and development of food industry in the same organizational frames of combine type,
- State/public property, as a base for setting up the state impact on agricultural enterprises, has assigned them the role of cheap products producer in terms of basic agricultural products' self-sufficiency preservation, strategic stability of the country and social safety of population,
- Agriculture development concept, which had provided a direct administrative control of flows in agriculture, had given these enterprises the role of a mediator between rural husbandries, on one hand, and food industry inputs producers, on the other hand.

It is important to emphasize that, within big agricultural enterprises and complex business systems in agriculture and agro-industry have been done numerous businesses in **cooperation with individual agricultural husbandries**, of mutual interest. These cooperation activities were extensive and significant, so they were, in organizational sense, often separated into a special business function (organization of cattle service fattening, turnover and repurchase of finished products, purchase and distribution of seed, fertilizers, subsistence production crediting, storage service, drying and veterinarian services).

With segregation of food industry enterprises from agricultural enterprises and combines[5], with privatization processes (ownership restructuring and later every other restructuring), trade liberalization and world economy globalization, with accelerated technical-technological progress, the agricultural enterprises of transitional countries have indispensably changed, and gradually have accepted a marketing business orientation.

The marketing business orientation basically means putting an accent at recognizing consumers' needs and desires, which strive to satisfy along with the lowest costs. The marketing business orientation is determined by the market with high competition level. Leaders in agricultural enterprises direct their activity toward finding enough buyers and markets, and in this business orientation is very strong connection between scientists, agricultural engineers, financiers and marketing experts. Together with accepting the marketing business strategy, in agricultural enterprises and combines, comes to introduction of a marketing research concept. Collecting information on a target market, according to which is possible to plan agricultural production, is marketing research. All collected data must adequately process, submit to adequate managers promptly, in order to make right business decisions. The collected data, after the adequate analysis, are kept in marketing information system of agricultural enterprise.

Adopting the marketing business concept was not able to reduce negative tendencies, which have gone along with the privatization and enterprises restructuring during the transitional period. Most of agricultural enterprises in transitional economies, especially the enterprises in ex-SFRY, today also have unfavourable business performances and unfavourable results regarding the privatization course and results (often new owners had no clear vision of enterprises development and ended their activity). In some privatized enterprises, the new owners have big problems to keep the production profitability level, to service a capital which origin from bank credits and to invest in development and capacity strengthening.

Except the transitional requirements that enterprises and business practice be compatible with market economies, there is necessary further restructuring of agricultural enterprises and combines in direction of:

- ***finishing proprietary restructuring*** transformation of social/public capital into a stock capital);
- ***market restructuring*** which represents market redefining on which enterprise performs, aiming to improve sale and business of enterprise; for successful market restructuring is necessary to dispose with appropriate information on changes in the environment, primarily on the market of agro-food products, in order to minimize risk and uncertainty,
- ***organizational restructuring***, i.e. change of enterprise's organizational model and functioning concept; in this restructuring dimension is necessary analysis, i.e. a condition diagnosis in organization and adequate intervention strategy,
- ***business restructuring***, which should result by significant changes in businesses

5 Significant part of food industry during the transition had been privatized and, in organizational and ownership sense, had separated from the agricultural enterprises and combines' structure.

done by agricultural enterprise: finishing some businesses and starting the others, fusion and merging of enterprises, interventions in the field of production and technology; all interventions goal is to increase economic value of agricultural enterprise and to improve its negotiating powers on the market; successful business restructuring implies the analysis of various methods of combining market and agro-food products, as basic potentials for agricultural enterprise

- ***Financial restructuring*** which implies change in enterprise's capital structure, by which changes relation among ownership and debt; the agricultural enterprises have disturbed financial balance, inappropriate structure of assets resources, as well as high debiting; in non-privatized agricultural enterprises could go for debt settlement and reprogram, and in privatized agricultural enterprises, the financial restructuring refers to shares operations.

The quoted restructuring directions represent the activities necessary for agricultural enterprises, in order to improve their performances and to create a permanent turning point toward profitable businesses. There can expect that the agricultural enterprises, after restructuring, will enter the period of efficient business, when they will be qualified for adjusting to modern market trends.

Marketing orientation of agricultural enterprise

The marketing business orientation is not easy to introduce to the agricultural enterprise, and often the management by itself is a significant hindrance. As a rule, the marketing business orientation introduces gradually, step by step. There should keep and increase a size of production and sale short-term, while in long-term sense observed, should develop the operational marketing, the marketing planning, realization and control.

In the process of the marketing orientation introduction, the managers should create a critical mass of collaborators, not only followers, where must be clear and decisive action in conducting the marketing business orientation (Cvijanović, et al., 1994:72). During introduction of marketing concept of business, it is important to have in mind production-market peculiarities, which is very complex production and requires realization of all requirements by control, inspection, certification houses, then choosey buyers on domestic and especially foreign market, etc.

The marketing concept has originated from the market practice, as a new orientation in business, which starts from buyers, consumers, users of products or services, i.e. from needs and interests of consumers for some product or a service. In its interest's focus, the marketing business orientation puts the market, i.e. buyers' needs.

The application of this business orientation in agricultural enterprise implies that all of its functions are comparably subordinated to the market requirements and that all employees are aware that a profit realization is functional depending on the extent in which were revealed, and then successfully satisfied the consumers' needs. The modern marketing concept has several business activities: market research, i.e. marketing, marketing

management, development of products, economic propaganda, sale, distribution, purchase, marketing organization, etc. The marketing research is a fundamental function of the marketing concept, as well as planning or development of a new product.

The market of agro-food products is very specific, while the buyers of these products are very heterogeneous by their requirements. At the same time, the agricultural production is specific by its character, and agro-food products have different usability and different categories of buyers. Some of agricultural products are in researching phase (secondary raw materials processing), some in introduction phase (some crop cultures processing), some products are in growing phase (meat and sugar processing) and some in maturity phase (livestock and crop products). The agro-food products in saturation phase are in minority. But, due to a real income decrease, many agro-industrial products are in phase of, so called, saturation – because there are no buyers or they buy in small amounts. In case of market saturation with some products, the marketing sector works on the market research and buyers' requirements and aspires to reveal new needs of buyers and efficiently „meet their needs".

The marketing business orientation is committed itself by the market with high level of competition, and it means that the main problem is to sell, not to produce. In the agricultural enterprise, the main job of a manager is to find enough buyers, which must be more satisfied with products in regard to the competition. The enterprise tests needs and desires of buyers, in order to improve its supply and find new products, which the buyers would like potentially to buy. In this business orientation is strong connection among scientists, agricultural engineers, financiers and marketing experts, who research the market, determine the production strategy, have effect on design, price, distribution channels and all other activities for sale improvement.

Creating the marketing business orientation in the agricultural enterprise is very tough job for the managers in the enterprise. As a rule, the finances are limiting factor for the market research, for a new product development and/or improvement of the existing one, for an advertising campaign, etc. In order for the agricultural enterprise to pass from the existing production and/or sales onto the marketing orientation, there must be the whole management's hard decision.

The marketing sector is a basic function and a place for managing and control of the total marketing activities of every agricultural enterprise. The basic tasks of the agricultural enterprise's marketing sector are:

- Analysis of market possibilities,
- Research and selection of target markets,
- Marketing strategy development,
- Marketing strategy planning,
- Apply and control of marketing action,
- Operational marketing (purchase and sale).

Marketing information system

It is impossible to conduct an objective market analysis, marketing planning and to make right business decisions without having data on buyers, competition, suppliers, market condition and all other factors linked to the business. Collecting the data (registered facts) on some phenomenon, process and relation, in order to get known with a specific system functioning, is important function of the enterprise's marketing sector. Transforming those data into information we get specific meaning and values for the one who should use the information. The data are inputs and the information is outputs, while that data processing and transforming into the information represents the information production. The information should be: appropriate, timely, correct, to reduce uncertainty and to include an element of surprise (Hanić, 2008:277).

One of the market characteristics is a constant change, so the marketing, in fact, is a constant process of making different business decisions – which are, in fact, a reaction to the changes in micro and macro environment. The information, which managers gets, must be: correct (true, reliable and precise picture of reality), sufficient number (a number of available information by which explains a specific situation), relevant (specific information must be connected to the specific situation), simple (to be understandable), prompt (available at any time), adjusted (to communicate). The information prepared in that way determines also a quality of manager's decision, who manages the enterprise. The information are efficient and useful if their benefit during decision-making is higher than the costs, appeared during their collection.

Regardless that a buyer is always in focus of the research, the marketing research can be of internal and external type. A first research level refers to the research, which the enterprise undertakes in order to get high quality information on a product, i.e. market reactions to all characteristics, on prices and factors which affect them, connected to own product on distribution and promotion of a product and market to which is intended the entire marketing effort of the enterprise. A second level of the marketing research is the macro environment research, conjuncture, competition, technological researches and demand research.

In order to collect and analyse the data, systematically and continuously, and then present the information for making prompt marketing decisions, it is necessary to form a marketing information system (MIS). The MIS represents one of the most important dynamic parts of the enterprise, which connects different functions of the enterprise in unique way, by which provides rational functioning of the enterprise and efficient management of the entire system. The whole MIS operates through three different information flows: a) input information – they collect in the environment on customers, sales channels, competition, economic policy measures, b) internal course of information are information which collect within the enterprise, from services in charge for data collecting, c) output information – information which the enterprise sends to consumers and public- its social and business environment.

Conclusion

The agricultural enterprises and complex business systems/agro-combines provide higher production, using the effects of economy of scale, better application of scientific solutions and technical-technological inventions. A need for their existence has not been especially proven, because it is more than clear in empirical and theoretical researches that big agricultural systems, if they have been well managed by their management and if they do business in stimulating and arranged business environment, they provide economic and profitable agricultural production.

In transitional countries, the agricultural enterprises, although ruined, with numerous organizational-financial problems, still dispose with certain facilities for storing and finishing the agricultural products. That is to say, if major part of food industry has separated, in organizational sense, from the agricultural enterprises structure into the special business systems, certain part of facilities for storing and finishing and primary processing of agricultural products have still retained within the agricultural enterprises and combines.

Reviving the agricultural production in the transitional countries has been unbreakable connected to these enterprises/combines restructuring and with their reorganization, in accordance with market trends and scientific assumptions of modern system of integral management and marketing. The agricultural enterprises and combines still can be productive and export force of the national agricultural production, but only if it would be guided by the skilful management and if it would get necessary financial and political support for development.

One of the elements of the agricultural enterprises reorganization is introduction of the marketing business orientation in agricultural enterprises, which basically means that the enterprise, while planning its activities and development, puts in focus the market research and buyers' needs. The modern marketing orientation is the only business orientation which can give to the managers a real picture of their enterprise condition, if their products are competitive in regard to the same or similar products, where are they in regard to competition, in regard to suppliers and in which direction should develop their enterprise in the future.

Whether or not introduce the marketing orientation in agricultural enterprises is not a dilemma, but how and in what way to introduce this business orientation, which ensures beneficial development of the enterprise and high profit. As a rule, the marketing business orientation introduces gradually, step by step, along with tough decision and consensus of the entire management.

Generally, the marketing business orientation is not easy to introduce into the agricultural enterprise, and often the management by itself is the restraint. This business orientation implements very slowly for several reasons. Primarily, the managers do not wish to comprehend the advantages of this business orientation in regard to the production and sale, because they are afraid of changing condition, loosing positions, etc. Great influence on the agricultural enterprises and combines business has the state and politicians, which,

by making unfavourable business environment/business climate, maintain the current condition in enterprises and stop every change. Besides these limits, the finances are also a limiting factor: lack of financial resources for the market research, for development of new product and/or improvement of the existing one, for advertising campaigns, etc.

Literature

1. Cvijanović, D., Bekrić, A. (1994): *Neke karakteristike menadžmenta u agroindustrijskim preduzećima Srbije,* Ekonomika poljoprivrede, IEP Beograd, Vol. 45, br. 3-4, str. 69-77.
2. Cvijanović, D. (1996): *Dimenzija marketing koncepta preduzeća u tranzitnom periodu*, Ekonomika Poljoprivrede, IEP Beograd, Vol. 43, br. 2, str. 111-118.
3. Hanić, H. (2008): *Upravljane marketingom*, Beogradska Bankarska Akademija, Fakultet za bankarstvo, osiguranje i finansije, Beograd.
4. Novković, N., Šomođi, Š. (2001): *Organizacija u poljoprivredi*, Poljoprivredni fakultet, Novi Sad.
5. Paraušić, V., Cvijanović, D. (2006): *Međunarodna marketing strategija kao pretpostavka konkurentnosti agrosubjekata na inostranom tržištu,* Ekonomika, Ekonomski fakultet Niš, Vol. LII, br. 1-2, I-IV 2005, str. 93-103.
6. Vujatović Zakić, Z. (2001): *Agrarna ekonomija*, Ekonomski fakultet, Beograd.

MARKETING KONCEPT U FUNKCIJI RAZVOJA POLJOPRIVREDNIH PREDUZEĆA U TRANZICIONIM ZEMLJAMA

Drago Cvijanović[6], Saša Trandafilović[7], Nedžad Imamović[8]

Rezime

Predmet istraživanja u ovom radu jesu poljoprivredna preduzeća u tranzicionim zemljama, njihova poslovna orijentacija, kao i procesi restruktiranja, koji su u cilju prilagođavanja novim tržišnim i ekonomskim trendovima. Cilj istraživanja jeste analiziranje poslovnih promena u poljoprivrednim preduzećima tokom tranzicionog perioda, kao i sagledavanje sadašnjih karakteristika i uloge poljoprivrednih preduzeća u procesu agrarne reprodukcije.

Privatizacija državnih kombinata i prehrambene industrije narušila je ranije uspostavljene veze u lancu vrednosti poljoprivredno prehrambenih proizvoda, a sučavanje sa globalizacijom privrede i oštrom konkurencijom u procesu trgovinske liberalizacije, dovelo je do novih koncepata i postulata u funkcionisanju ovih preduzeća. Poljoprivredna preduzeća morala su da razviju nov koncet menadžmenta i marketinga, kako bi na osnovu novih tržišnih i ekonomskih okolnosti, mogla da razviju profitabilnu strategiju poslovanja i obezbede rast proizvodnje i prodaje.

Ključne reči: *poljoprivredno preduzeće, procesi restrukturiranja, marketing orijentacija.*

6 Prof. dr Drago Cvijanović, naučni savetnik, direktor, Institut za ekonomiku poljoprivrede, Volgina 15, 11060 Beograd, Telefon: +381 69 72 858, E-mail: drago_c@iep.bg.ac.rs

7 Pukovnik dr Saša Trandafilović, načelnik uprave, Uprava za budžet Ministarstva odbrane, Birčaninova 5, 11000 Beograd, E-mail: sasa.trandafilovic@gmail.com

8 Pukovnik dr Nedžad Imamović, načelnik centra, Računovodstveni centar Ministarstva odbrane, Gardijska 7, 11000 Beograd, E-mail: nedzad.imamovic@rc.mod.gov.rs

Review Article

Economics of Agriculture 1/2013
UDC: 581.5:631.11

THE INFLUENCE OF AGRICULTURAL HOLDINGS ON THE NATURAL ENVIRONMENT

Adam Kagan [1]

Summary

Agriculture is the production field, which depends on the condition of the natural environment because it uses the natural processes of growth and reproduction of living organisms. The agriculture itself also affects the environment. The effects of this interaction, both positive and negative, are additionally shaped by the social, political, economic, technical and technological surroundings. The factors determining the agriculture's impact on a macro scale on the environment may, however, by brought down and subordinated to the main constituents, namely: the size of human population, demand for agricultural raw materials, the applied production technology (classical IPAT equation) and agro-climatic conditions. Based on the available forecasts and materials the potential directions and effects of constituents of the equation were analysed at the global level. However, establishing the environmental performance of a given agricultural holding and agriculture at the local level requires a different methodological approach. The article presents the method for measuring an agricultural holding's individual impact on the environment in the form of one indicator synthetic measure.

Key words: *natural environment, agricultural holding, synthetic ratio, diagnostics features, IPAT equation*

JEL: *Q15, Q24, Q56, Q57, Q58.*

Introduction

The issue corresponding to the protection of the natural environment, the depletion of natural resources, and the resultant threats of a local and global nature, are not only slogans popularised by certain groups of people (activists) searching for new political and social ideas. Forecast and prepared dramatic scenarios picturing the vision of global natural disaster effecting from human acts were causing and still cause the evolution of social values, not only in highly developed states, but also in those definitely poorer ones.

1 Economics of Farm Holdings Department, Institute of Agricultural and Food Economics, National Research Institute, Swietokrzyska Street 20, 00-002 Warsaw, Poland, Phone: +482 250 544 44, E-mail: kagan@ierigz.waw.pl

The occurring change of the global climate in a manner not yet fully recognised, but potentially concealing serious dangers, focuses the social attention on all kinds of consequences of human impact on the environment, but will it be effective enough to change the human habits, needs and behaviours? But is it effective enough to cause a change in agricultural raw materials production systems into more environment friendly ones? What are the possibilities of reducing the negative impact and increasing the positive effect of agricultural activity on the environment and what role in this respect will be played by the surroundings of the agricultural holdings?

This article aimed at analysing on a macro scale the direction of changes as regards the main factors determining the mutual relationship between the environment and agricultural activity as one of the areas of human economic activity. The paper also presents a method enabling to measure the impact of a given agricultural holding on the natural environment in the form of one synthetic measure, which may be applied to establish its efficiency in this area and agricultural policy programming.

The impact of agriculture on the natural environment – the theoretical aspect

The theoretical construction resulting from the public discussion among P. Ehrlich, J. Holdren and B. Commoner, often called as the IPAT equation, is a starting point for the establishment of relations between the natural environment and the functioning of human beings [Chertow, 2000]: $I=P^{X}A^{X}T$ /1/

Where:

I – total impact of human activity on natural environment
P – population size,
A – affluence - global (or national) gross product per capita,
T – technology (impact of global or national) gross product unit on natural environment.

This was an attempt at a response on the epic questions about relations among people, economic development, technical and technological advancement, and the natural environment. In the search for a response on the impact of individual components of the model, many publications were prepared referring to different variants of this equation, where variables were differently developed and interpreted. One of them has become the basis for industrial ecology [Schulze, 2002, Fan et al., 2006, Dietz et al., 2007, Sachs, 2008, Mitchell, 2012].

The impact on the natural environment, as one of derivatives of human activity is the sum of all areas of their functioning. Therefore, index I may be de-aggregated and assumed as a determinant of, e.g., areas of the global (national) economy:

$$\Delta I = I_P + I_B + \ldots + I_R \qquad /2/$$

Where:

ΔI *– total impact of human activity on natural environment,*
I_P *–industrial impact,*
I_B *–construction impact,*
I_R *– impact of agriculture, etc.*

Therefore, the question arises as to what are the possibilities of preventing the worsening of the natural environment, and what is the role of agriculture in this sphere? How can we influence agriculture in order to make it favourable for improvement rather than damaging the natural environment, and how can it contribute towards its competitiveness?

The impact of agriculture itself on the natural environment may be translated into the following formula: $I_R = P_t^X F_t^X T_R^X K_t$ /3/

Where:

I_R – *impact of agriculture on natural environment,*
P_t – *population size in period t,*
F_t – *value (quantity) of agricultural products manufactured calculated per person in period t,*
T_R – *average impact on natural environment of a unit of value (quantity) of agricultural raw materials manufactured,*
K_t – *the impact of agriclimate in period t, being the component of* I_R.

The identification and precise establishment of the impact of agriculture on the natural environment is a very difficult task, i.a. due to sectoral flows, but also to the wide spectrum of interdependencies. Because agriculture is not only the source of food, but there are also skins, fibres, raw materials for power and cosmetics purposes, etc. On the other hand, it utilises goods manufactured in different areas, i.a. it is a "consumer" of power carriers, mineral fertilisers, plant protection means, machines, building materials, etc. The process of manufacturing or obtaining these foods also has an impact on the natural environment, causing specific consequences [Pretty, 2008].

The factors determining the impact of agriculture on the natural environment

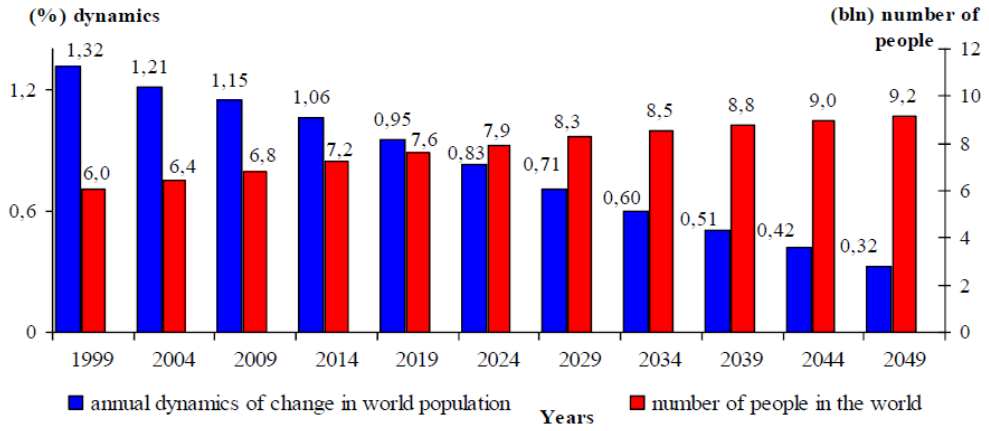
Changes in population on the global scale (P) as the basic component of the equation /3/ show a constant increasing trend (Chart 1).

The dynamics of the increase in the population in the world are weakening, but due to the so-called base effect (the increment will exist at an increasing number of population) it is estimated that by the year 2050, the number of people around the world will increase by 2.3 billion people as compared to the year 2009, namely it will increase by nearly 34% [OECD, 2010].

Considering the changes in the population, an increase in the pressure on the part of agriculture towards the natural environment as a result of a growing demand for agricultural products on the global scale should be expected. According to expectations, this will provoke the doubling of the demand for food in 2050 as compared to the year 2000 [Bruinsma, 2009]. The increase in the number of inhabitants of the Globe will be accompanied also by higher utilisation of power carriers that according to forecasts will increase by 46% by 2030 as compared to the present level, and partially supplemented with raw materials of an agricultural origin. Increases in agricultural production will effect an increase in the utilisation of water for production purposes; as an optimistic variant, it

is forecast at 30% in 2030 [Institution, 2011]. However, the most serious challenge will undoubtedly be posed by the process of urbanising provoking pressure on the utilisation of land from production and agriculture to building purposes assigned for housing, as well as the construction of remaining, indispensable infrastructure, roads, airports, recreational areas, etc. [Smith et al., 2010].

Chart 1. The dynamics of change in the human population in years 1999-2049



Source: own work based on [OECD, 2010].

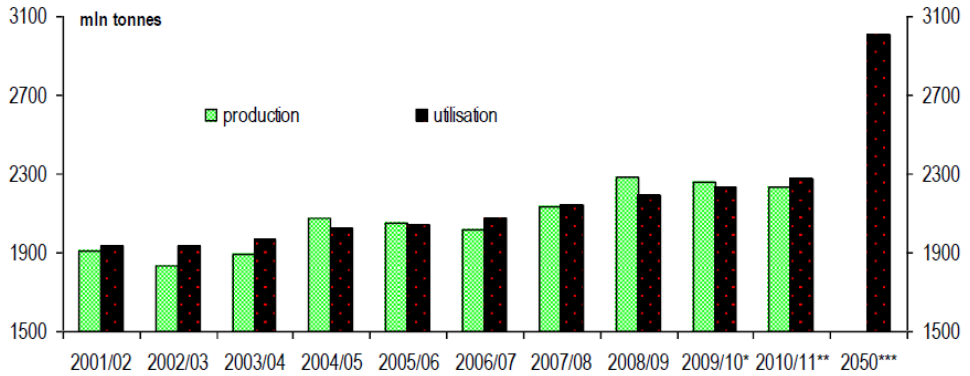
Under the new circumstances, agriculture will have to satisfy not only basic nutritive demands, but also demand resulting from higher aspirations and expectations towards improvements in existence in the states commonly defined as developing ones (increase in the consumption of food in these countries calculated per capita is expected to rise) and will have to compete for the above-mentioned resources with other areas of the world's economy.

According to FAO forecasts, the process of increasing the level of fulfilment of nutritive needs on the global scale, calculated as number of calories consumed per capita in the whole predictive period (2007- 2050) will increase. Changes in the structure of diet caused by the higher consumption of animal origin products in developing and developed countries are also expected. Consequently, despite the use of agricultural raw materials for non-agricultural needs, in order to fulfil the nutritive needs of the increasing population and expectations on the structure of consumption, an increase in global agricultural production by 2050 is expected on the level of nearly 70% as compared to the years 2005-2007. The estimates show, i.a., that the total demand for cereals in 2050 will amount to over 3 billions tonnes annually, namely it will be increased by over 800 million tonnes as compared to the level from the economic year 2008/2009 (Chart 2). As far as meat is concerned, its consumption in the same period will be increased from 249 mln tonnes to 463 mln tonnes [Alexandratos, 2009].

The manner of the realisation of increases in global agricultural production is important from the perspective of the impact on the natural environment. Therefore, two basic methods in this respect are present. The process of the enlargement of the acreage of

crops for direct consumption by people and animals is one of them; the second refers to increases in expenditures and changes in plant production technology at the use of present surface of cropable land [Bruinsma, 2003].

Chart 2. The volume of production and utilisation of cereals in global scale



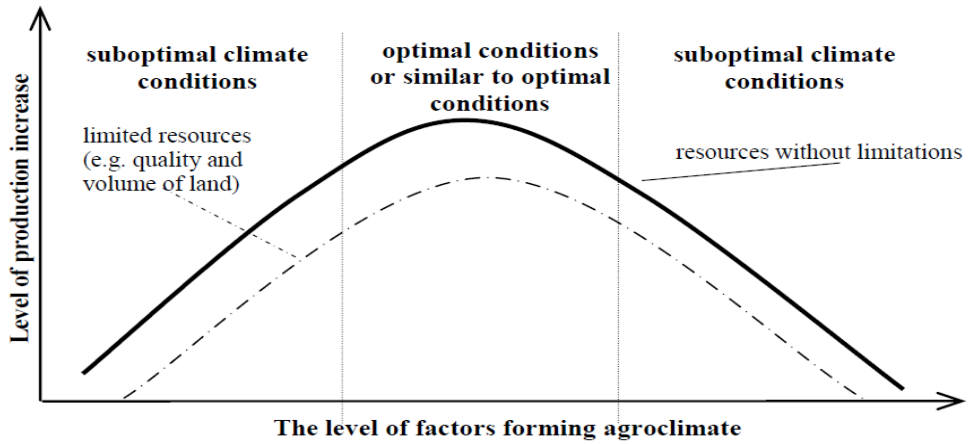
* estimates, ** forecast, *** forecast omitting demand for power purposes
Source: prepared on the basis of [Alexandratos, 2009, FAO, 2010].

The increasing population is accompanied by changes in agricultural and climatic conditions, being the next important factor having an impact on the differentiating of both the production and environmental effects of agriculture. Agroclimate is composed of, e.g. the insolation of land, the content of carbon dioxide in the atmosphere, number of days of vegetation, humidity, interpreted as the quantity and frequency of precipitations, and, one of the crucial components, temperature. The increased intensity of particular elements along with the maintenance of proportions with different factors in the framework of their combination to some extent facilitates the achievement of higher yields and capacity for animal production, and, consequently, higher global production. A good example is the increase in the temperature and content of carbon dioxide that at the suitable humidification increases the photosynthesis process (stimulates it), and, in consequence, potential production output [Agrawala et al., 2010]. However, the excess of a limit point results in the opposite effect (become de-stimulators), e.g. the potential plant production yield and the level of animal production drops as a result of reactions to disadvantageous living conditions (Chart 3).

Climate changes observed nowadays and independent from causes of this phenomenon facilitate the predicting of significant increases in global temperatures until the end of the present century. The most frequent simulations show an increase in the average annual temperature from 2 to 4°C. For many places all over the world, it means significant excess in the limit of optimum climatic conditions for agricultural production, and entering the area of an increases agroclimatic barrier for growth in the production output [Mendelsohn, Dinar 2009]. Therefore, there is a risk that the pace of technological and technical progress in terms of improved possibilities for increasing production will not be able to level the disadvantageous impact of changes in climate conditions in order to fulfil global nutritive

needs, and maybe energetic ones. The limitation in the productivity of resources resulting from climate changes and insufficient natural capital (natural resources), especially agricultural land, may be an important barrier for the economic development of a given region of the world or a country. In these circumstances, conducting pro-environmental activities relying on the protection of agricultural land and its productive capacities, as well as the adjustment processes to the new agroclimate, social and economic conditions, seem to be important [Mitchell, 2012].

Chart 3. The impact of climate and its interactions with resources for increases in of agricultural production



Source: based on [Mendelsohn, Dinar, 2009].

The possibility of reversing the disadvantageous impact of agriculture on the natural environment should be then considered as lying in the betterment of technology and techniques of manufacturing. A change in the average impact of value (quantity) unit of manufactured agricultural raw materials on the natural environment seems to be the only currently-available tool facilitating an improvement in the mutual relations between agriculture and the natural environment [Alston et al., 2009, Sachs, 2008]. There is a possibility to invest in renewable natural resources (natural capital) aimed at the betterment of the condition of the environment. The cultivation of plants for green fertilisers (ploughing) is a good example of this type of investment. Cessation of harvesting plants results in an improvement in the humus content in soil, but also a decrease in the current quantity of agricultural raw materials assigned for consumption that, according to neoclassical theory, may be presented in the form of the equation [Pender, 1998.]:

$$C_t = (F(P_t, K_a, K_n) - p_a N_a - p_n N_n)/P_t \quad /4/$$

Where:

C_t – *level of consumption of agricultural resources calculated per capita,*
K_a – *owned capital of anthropogenic origin,*
K_n – *owned natural capital,*
N_a –*expenditures on capital of anthropogenic origin,*

N_n – *expenditures on natural capital,*
p_a – *market price of anthropogenic capital unit,*
p_n – *natural capital restoration coefficient,*
P_t – *abundance of population in period t.*

Investment in natural capital refers to that part of resources of the renewable type, e.g. those quantity or quality of which may be bettered. It should be remembered that expenditures on renewable capital do not cause their increase to an equal degree. In the example presented above, ploughing of green fertiliser brings organic mass to the soil, but this does not cause an increase in humus to the same quantity. As a result of processes occurring in the soil, part of organic fertiliser will be subordinated to mineralisation and is reduced to basic chemical compounds of the non-organic type, including carbon dioxide emitted into the atmosphere.

Investment in renewable natural resources will increase the productive options of future agriculture, although at the same time it will limit present consumption of agricultural raw materials (C_t). The far-reaching investments of this type are therefore feasible under significant over-production of food and its availability. The non-renewable type, namely the one that cannot be restored after use, is differentiated in the framework of natural capital. The biodiversity of plants and animals and petroleum among raw materials is the most important element from the agriculture perspective.

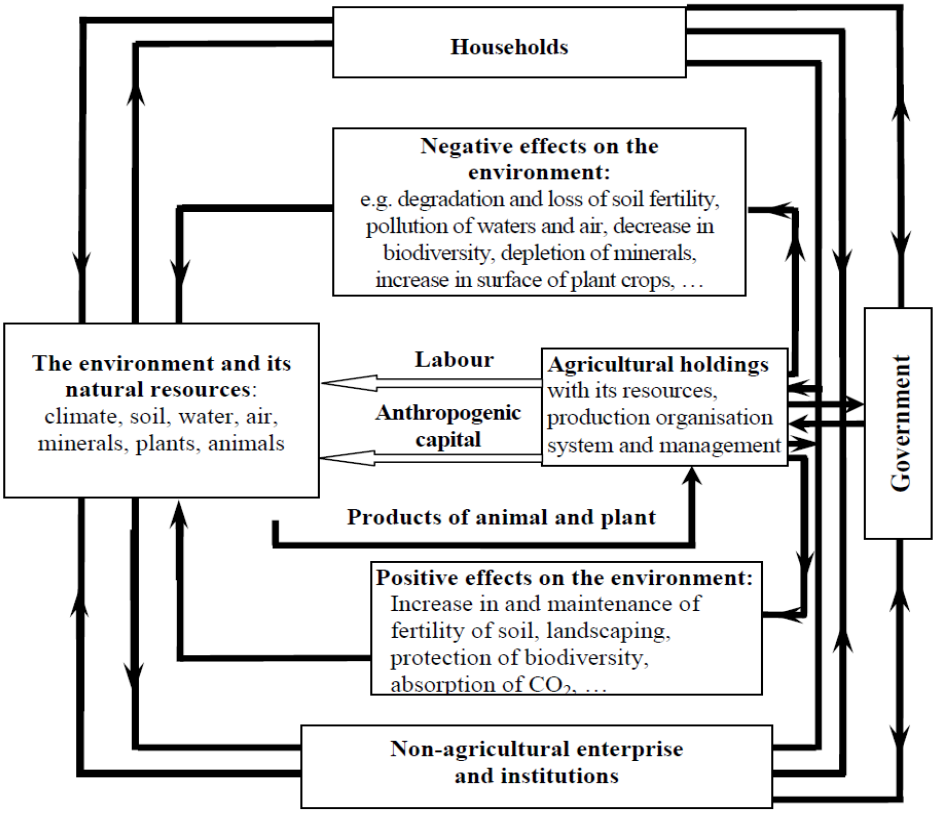
Agricultural production depends on the utilisation of production resources, not only of natural kind (natural capital), but also of a type of anthropogenic origin. At least partial, mutual substitution of classical factors of production and natural capital is also possible, although sometimes with negative consequences for the environment. An example of this type of activity includes the limitation of the rotation of crops of plants through the simplification of rotation with a simultaneous increase in the chemicals applied – pesticides having a negative impact on, e.g. biodiversity, and a deterioration in water and soil quality. Another example includes specialisation of production through the elimination or significant limitation of organic fertilising through pulling out of animal production on a given farm on the fulfilment of the present demand of plants for nutritive components in the form of mineral fertilising only [Ruggeri, 2009].

The specialisation of production is important not only from the perspective of needs and the grade of utilisation of property capital, but it also impacts on the organisation of labour, and the necessary range of knowledge and experience of employees. At the same time, the incorrect selection of cropable plants (a negative organic matter balance) leads to the lowering of the humus content in soil as a result of the advantage of the mineralisation process over humification. However, the negative results of this procedure for a household itself, contrary to productive, organisational, and financial effects, may be noticeable gradually and significantly delayed in time.

Not only do agricultural holdings interact with the natural environment, but they also function in a specific social, political, economic and technical environment (Chart 4).
Therefore, survival interpreted as secured access to resources necessary for the existence of

agricultural holdings in the long-term perspective is the basic goal of activities conducted under changing external conditions. This goal is of the resource type, because it corresponds with the acquisition and maintenance of the relevant quantity of land, and the number of employees with adequate qualifications as well as tangible and current assets. It also has a financial aspect, most often identified with liquidity, namely financial security interpreted as the ability of the concurrent payment of obligations, and in holdings employing only the owners, securing their minimum level of consumption. The pressure of the environment, usually closely related, namely recipients, owners, suppliers regarding increases in the utilisation of resources (the correlation of quantity of foods obtained with expenditures from material and financial capital, as well as labour) may induce permanent neglect or periodic neglect of very negative, or generally negative, environmental effects. This is possible particularly in a crisis situation, when a holding is threatened with bankruptcy (legal entity holding), is faced with significant limitation of production resources, or the production and economic surplus generated is not sufficient for the basic living needs of owners and their families (small family farms) [Lichtenberg et al., 2010].

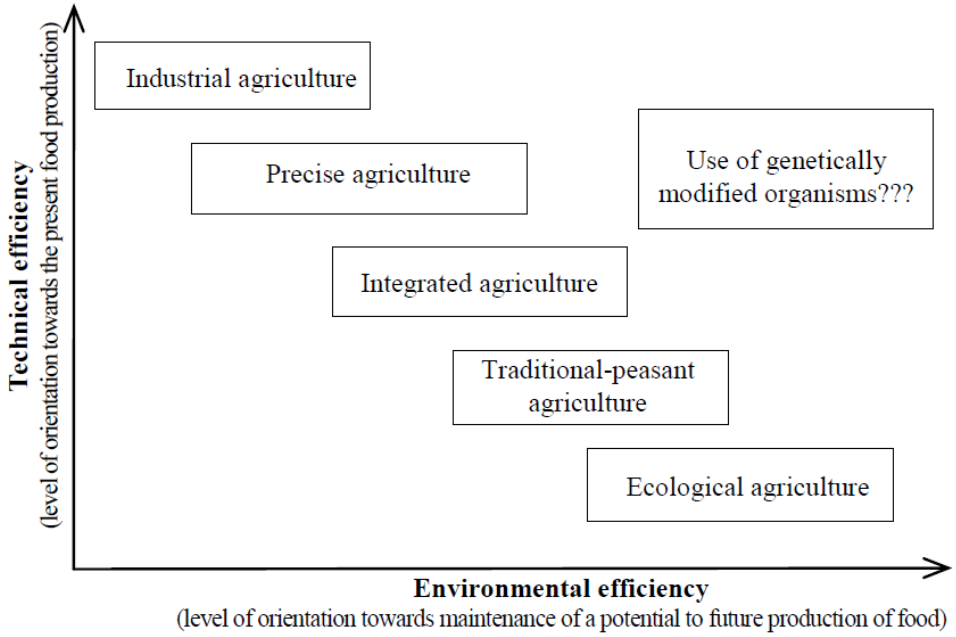
Chart 4. The interaction between agricultural holdings and the environment: political, economic, natural, technical and technological



Source: based on [Nigel, 2006, Kinzig et al., 2006, Runowski, Zietara, 2011].

The extent of the impact of agriculture on the natural environment is determined by the approved production system observed in agricultural holdings (Chart 5).

Chart 5. The productive and environmental efficiency of selected agricultural systems



Source: based on [Kerselaers et al., 2011].

Not all the negative effects of agricultural activity affect only the production potential of agriculture (these are local effects). The disadvantageous impact on the natural environment may be of a global or regional nature (the emission of carbon dioxide, ammonia, water pollution, etc.), and their effects are to a greater extent noticeable by other users of the natural environment, rather than agricultural holdings themselves. If so, we may deal with the classical shifting of the effects of activity in the form of pollution to third entities. Because most often the impact of agricultural holdings on the natural environment is of a non-market nature (neither positive nor negative effects are estimated in monetary units), their owners do not receive complete information on burden resulting from the negative impact of on ecosystem. Therefore, according to classical economic theory, they are not able to include them in the costs of activity. Then, we may observe the phenomenon of the partial or complete socialisation of the negative effects of their impact with the simultaneous improvement in the production and economic situation of a given entity. It is favoured by the social consent for the application of these practices (fear of loss of employment, nutritive self-sufficiency of the country, insufficient information, etc.), lack of negative or positive impulses from the state (legal regulations, financial instruments: penalties and charges, subsidies and budget subventions), and often– only knowledge and awareness of the effects of activities taken or neglect by owners and the administrators of such entities [Stiglitz, 2000, Zegar, 2007].

The practical measurement of the impact of agricultural holdings on the natural environment

The quantification of the impact of agricultural holdings on the natural environment in the form of a single measure or coefficient is a difficult task considering the mentioned lack of unidirectionality of interdependencies, multi-faceted nature of the impact of both systems and their infiltration in different spheres of activity of analysed units and the environment.

There are different systems, coefficients, and ways of measuring the impact of agricultural holdings on the natural environment [Van der Werf, Petit, 2002, Goodlass et al., 2003, Kuosmanen, Kuosmanen, 2009, Mayer, 2008, Jan et al., 2012]. In our institute, since 2007 for this purpose we have applied, i.a., non-standard methods of multidimensional comparative analysis (MCA) facilitating a synthetic approach to complex phenomena described by many variables (diagnostic features). It refers to the multidimensional transformation of a space of selected diagnostics features describing a given phenomenon by one synthetic variable (measure). This facilitates the ordering of tested subjects in terms of the analysed phenomenon, namely the impact of the agricultural holding on the natural environment as given in this example, and through the simplification of this impact to one coefficient of a continuous nature.

A series of diagnostics features is selected under the rule stating that these should be based on the comparison and verification of application of adequate agricultural practices, largely reflect the impact of agricultural holdings on the ecosystem, and at the same time it should be founded on a well-documented source material. The following fragmentary indicators were used for the construction of a synthetic measure:

- biodiversity and correctness of crop rotation (point-based measure),
- balance of organic matter in soil expressed as the equivalent of the dry mass of manure (*dt1/ha*),
- share of permanent pastures used for production in the structure of agricultural land (%),
- balance of nitrogen and amount of oversized emissions or shortage of nitrogen as translated into a clear component (*dt1/ha*),
- anti-erosion protection expressed by share of surface of arable lands covered with vegetation in wintertime (%).

The biodiversity of plant production and the correctness of rotation is assessed as a pointwise-measure calculation based on the crops structure in a given calendar year, taking into account the number of individual plant groups cultivated by an agricultural farm, as well as the area these plants cover within the arable land. It has been assumed that an agricultural farm should grow plant species from at least three separate groups out of the following: cereal, fabaceae, oilseeds, root vegetables, poaceae grown on arable land, and other. The assumption has also been made that the cultivation of plants belonging to a given group should not take place more often than for two consecutive years. In the light of the above assumptions, in order for the rotation to be correct, and thus securing biodiversity,

the plant group cultivated on the largest area (predominant within the crop structure) may not exceed 60% of the cultivated arable land. Accordingly, the area of the plant group that has the second-largest proportion in the crop structure forms no less than 20% of the cultivated arable land, while the area of the remaining plant groups collectively forms at least 20% of total crops and plantings. Any deviations from these principles, consisting of a lower proportion of the respective plant groups, result in negative points, the number of which is equal to the actual observed values and the assumed limit values (60%, 20%, 20%). The calculation of the negative points rests on the assumption that 1% difference corresponds to one negative point.

The balance of the organic matter in the soil forms another variable used as the diagnostic feature for the assessment of the environmental impact of agricultural farms. It is estimated based on the crop structure and the stock volume of animals bred by an agricultural unit. The balance is prepared by comparing the loss of the organic matter resultant from the cultivation of plants that reduce the soil fertility and the increase attributable to the cultivation of plants contributing to the reproduction of the organic matter in the soil. The resultant difference was adjusted by the potential increase in organic matter achieved through infusing the soil with other organic fertilisers produced by the farm (straw, manure, cowpat, slurry). The balance was prepared using the reproduction and degradation ratios of the organic matter in soil relevant to the medium soil.

For the agricultural entities engaged in breeding animals, the number of animals was calculated into the volume of produced organic fertilisers, expressed as tonnes of dry manure mass. In addition, a balance of the demand for straw was prepared, whereby for the agricultural farms with an excess volume of straw, including stockless farms, the organic matter introduced, along with the incorporation of its surplus, was taken into account. At the same time, it was assumed that, with the nitrogen balance being below -5 kg/ha, the manure did not raise the humus pool in the soil. The assumption was also made that each organic fertilisation in excess of 10 tonnes of dry manure mass per hectare did not increase the humus pool in the soil as well.

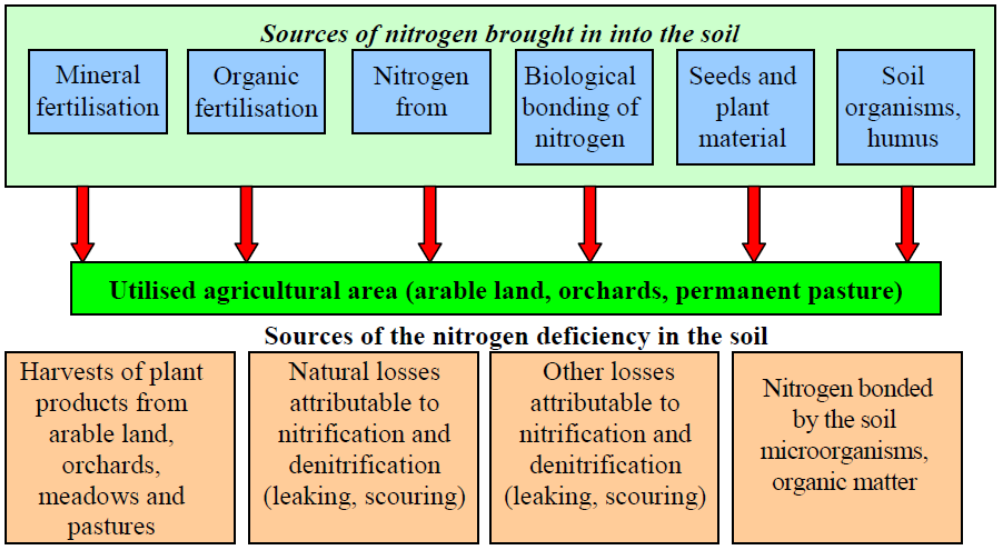
A positive balance of the organic matter is contributory to maintaining fertility, and, consequently, to the productivity of the agricultural soil. An increase in its value per hectare of the area of the arable land within an agricultural farm was incorporated as a stimulant variable for the synthetic environmental impact ratio of agricultural farms.

Permanent pasture plays an important role as the element with key implications for the environmental impact of agricultural farms, since it provides for a stronger protection of the soil, functions as a habitat and natural compensatory site, and also provides flood protection, while at the same time regulating the water balance, sequestrating carbon dioxide and shaping the landscape. Permanent pasture in an agricultural farm is something of a "burden" on production and finances – the fact that it is continued to be maintained can be explained by the limited possibilities of the alternative utilisation of the land (terrain, hydrographic conditions). The fodder produced from it is usually of a much lower quality than that of the produce which could be potentially harvested, if the permanent pasture were used as arable

land. However, in order for the meadow and pasture ecosystems to exist, it is essential to pursue agricultural activity to suppress the plant succession. The proportion of the permanent pasture used in an agriculturally-appropriate manner is therefore a measure of the positive impact that an agricultural farm has on the environment. Hence, both the decision to change the way they are used through ploughing and to cease its utilisation and convert it into set-asides and brownfield land is unfavourable.

Nitrogen, and, more specifically, its inorganic compounds resulting from the processes related to agricultural activity, may be a source of significant water and air pollution. As a result of nitrogen conversion, such substances as methane, ammonia or nitric oxides are released to facilitate the greenhouse effect. When washed out of the water, nitrogen converts into various forms of nitrates and nitrites to form a significant source of environmental pollution. Nitrogen's reactivity, as well as its diverse behaviour in natural circumstances, make its circulation more complex than is the case with the other fertiliser components, since nitrogen is also an essential component for plants used, i.a., to build proteins, nucleotides, alkaloids and chlorophyll. Given the fact that the major portion of this element typically is in organic form, it determines the soil fertility. When assessing the environmental impact of the agricultural farm in this respect, one should estimate the balance of this component as a reference point. For the purposes of the study in question, this feature was estimated for the farms based on the volume of the component brought in by each individual source (incoming factor) and the direction of its discharge – the outcoming factor (Chart 6).

Chart 6. Major components in the nitrogen (N) balance in the top layer of the utilised agricultural area



Source: based on [OECD, 2001].

Not only the surplus in nitrogen, but also its deficiency, has an adverse impact on plants and the metabolism of organic matter. The undesired effect is assumed to consist of losses arising from oversized nitrogen emission into the environment as part of the "other losses" (more than 5 kg per hectare) as well as the volume of its potential deficiency in plants (less than -5k per hectare).

For agricultural farms engaged in breeding animals, the nitrogen level provided with the organic fertilisation was estimated based on the assumed norms and their annual average status. Where the ceiling volume of the organic fertilisation was exceeded beyond the limit set out in the Nitrogen Directive, the total surplus was classified under "other losses".

When preparing the balance of the nitrogen compounds, an equal amount of this component that reaches the soil with rainfall (17 kg per hectare yearly), as well as the amount of nitrogen from the atmosphere bonded by microorganisms living in symbiosis with the fabaceae, was taken into consideration (100 kg per hectare yearly). For the outcomings and the amount of nitrogen discharged by the soil microorganisms, the value was assumed at 10 kg per hectare yearly.

Anti-erosion protection, i.e. covering the arable land with vegetation in the winter period, is yet another feature taken into consideration for establishing the synthetic measure of the environmental impact of agricultural farms. The plant layer inhibits the degradation of the top layer – which is one of the most important soil layers – through the processes of lixiviation, entrainment and disintegration, as a result of the action of wind and flowing water. These processes depend on the weather and are particularly intensive when occurring in winter on bare soil. The best protection from this is therefore the highest-possible proportion of winter cereals grown as the main crop or the intermediate crop remaining on the field at that time. In the Poland has seen no progress in recent years in terms of reducing the area of arable land exposed to individual erosions. The devastating effect of wind continues to pose a significant threat to 27.6% of the area of utilised agricultural land, while water erosion has an adverse effect on 28.5% of the area of utilised agricultural and forest land, with gully erosion posing a risk to 17% of the utilised forest and agricultural land.

Due to the fact that the specific rates illustrated below have diverse denominators, they were subjected to normalisation through the zero-unitarisation method. For the majority of them (apart from the nitrogen balance), the following stimulant variable formula was applied [Diaz-Balteiro, Romero, 2004]:

$$Z_i = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

Where:

Z_i – *normalised variable,*

X_i – *variable before normalisation,*

X_{min} – *for the organic matter balance, the minimum observed value, absolute*

minimum for the biodiversity ratio (-80 points), for the proportion of permanent pasture (0%), for anti-erosion protection (0%),
X_{max} *–for the organic matter balance, the maximum value observed, the maximum absolute value for the biodiversity ratio (150 points), the proportion of permanent pasture (100%), the anti-erosion protection (100%).*

The nitrogen balance is a destimulant variable with the veto threshold for the parameter within the -5 (*kg1/ha*) do 5 (*kg1/ha*) range, and therefore requires not only to be normalised, but at the same time to be converted into the stimulant variable. To this end, the following forumla has been applied:

$$Z_i = \begin{cases} \text{for } X_i < -5 \text{ kg} \times \text{ha}^{-1} & \dfrac{X_{max} - /X_i/}{X_{max} - X_{min}} \\ \text{for } X_i \in \langle -5 \text{ kg} \times \text{ha}^{-1}; 5 \text{ kg} \times \text{ha}^{-1} \rangle & 1 \\ \text{for } X_i > 5 \text{ kg} \times \text{ha}^{-1} & \dfrac{X_{max} - X_i}{X_{max} - X_{min}} \end{cases}$$

With the following conditions met: $X_{max} \neq X_{min}$ oraz $X_{max} > /X_i/$.

The synthetic ratio of the environmental impact of the agricultural farm (*Ws*) has been calculated as the arithmetic mean:

$$Ws = \frac{100}{m} \sum_{j=1}^{m} Z_{ij} \quad i = 1,\ldots n, j = 1,\ldots m$$

Where:

Z_{ij} – *Normalised value of the j-th feature and for the i-th facility*
n – *The number of the analysed facilities*
m – *The number of the adopted features*

The synthetic ratio did not include the balance of the other macrocomponents such as phosphorus and potassium, despite the fact that the first might cause significant water pollution when discharged into it. As shown by the data provided by the OECD, however, agriculture in Poland is responsible for the emergence of this phenomenon only to a very limited extent, and agriculturally-generated phosphorus compounds do not burden the environment in a significant way [OECD, 2008]. What is more, phosphorus emission can emerge only within 25% of the utilised agricultural land in Poland, as only this percentage of the land shows a high proportion of this element in the soil. What can make for a serious problem in establishing the way phosphorous management influences environmental impact exerted by agricultural farms is the element's mobility in the soil. A potential measurement of the emission would therefore entail specialist examination of water and soil.

The described method has one drawback in that it fails to take into account the impact of pesticide use, expressed, e.g. as an index of the active substances applied per one hectare. However, the expenditures on chemical agents used in agriculture make it impossible to assess the level of environmental burden in a reliable manner. A more extensive use of both agrochemicals and agents, which are more environment-friendly, i.e. are highly selective and their biodegradation process is faster, may result in increased expenditures, as their unit prices are understandably higher. A lower amount dedicated to this end does not necessarily mean less extensive use of agrochemicals. Agricultural farms with lower expenditures may utilise "cheaper agents", discharging into the environment a higher volume of active substances or substances with a more adverse effect on the environment.

Summary and conclusions

In order to improve the natural environmental impact of agriculture, it is essential to be persistent in seeking and implementing ecological innovations, i.e. techniques and technologies designed to reduce the adverse environmental impact of agriculture. To this end, both agricultural farms and the other entities involved in the food economy should undergo changes. To ensure that agriculture is more effective and efficient in striving to be environmentally friendly, it is essential to change the perception of the problem across the whole of society, not only at the local level, but also on a global scale.

In pursuing changes within the sphere of the natural environmental impact exerted by agricultural farms, one needs to launch joint initiatives and establish uniform norms or limitations to set a framework for the conditions under which the agricultural production ought to be pursued. Also, it is equally important to facilitate the transfer of knowledge as well as the new techniques and technologies to the developing countries, and to curb poverty among people engaging in agriculture, and also in those countries that are considered developed.

Both globally and for individual agricultural farms, one of the crucial factors to determine the way agriculture will develop in the future is the availability of agricultural land and the preservation of its fertility. To maintain the production capacity it is important that the government provides appropriate protection to the agricultural land through setting policies that regulate the way this production input is utilised and using economic tools to influence the market.

The presented method of measuring the impact of agricultural holding on the environment is a practical manner of expressing the phenomena by way of a synthetic measure. Despite its weakness and still model approach, it can be used to monitor the phenomena in practice and draw up rankings of agricultural holdings in respect to their environment friendliness. The manner of establishing the synthetic measure of environment friendliness presented in the article was targeted at measuring the capability of agricultural holdings to preserve the natural capital and hence the production potential in the future.

References

1. Agrawala, S., Kramer, M. A., Prudent-Richard, G., Sainsbury, M. (2010): *Incorporating climate change impacts and adaptation in Environmental Impact Assessments: Opportunities and Challenges,* OECD Publishing, OECD Environmental Working Paper, no. 24, pg. 1-37.
2. Alexandratos, N. (2009): *World food and agriculture to 2030/2050: Highlights and views from mid-2009,* Paper for the Expert Meeting on "*How to Feed the World in 2050*", FAO, Rome, 24-26 June 2009, (accessed on May 5. 2012), pg. 1-32.
3. Alston, J. I. M., Beddow, J. M., Pardey, P. G. (2009): *Mendel versus Malthus: research, productivity and food prices in the long run*, Staff Papers, University of Minnesota, Department of Applied Economics, no. 53400, www.econpapers.repec.org/ paper/ agsumaesp/53400.htm (accessed on Jun 16. 2012), pg. 1-42.
4. Bruinsma, J. (2009): *The resource outlook to 2050: By how much do land, water and crop yields need to increase by 2050?,* Paper for the Expert Meeting on "*How to Feed the World in 2050*", FAO, Rome, 24-26 June 2009, (accessed on January 30 2012), pg. 1-33.
5. Bruinsma, J. (ed.) (2003): *World agriculture: towards 2015/2030 An FAO perspective,* Earthscan Publications Ltd, FAO London, pg. 232-262.
6. Chertow, M. R. (2000): *The IPAT Equation and Its Variants,* Journal of Industrial Ecology, vol. 4, issue 4, pg. 13-29.
7. Diaz-Balteiro, L., Romero, C. (2004): *In search of a natural systems sustainability index,* Ecological Economic, vol. 49, issue 3, pg. 401-405.
8. Dietz, T., Rosa, E.A., York, R. (2007): *Driving the human ecological footprint,* Frontiers in Ecology and the Environment, vol. 5, issue 1, pg. 13-18.
9. Fan, Y., Liu, L. C., Wu, G., Wie, Y. M. (2006): *Analyzing impact factors of CO2 emissions using the STIRPAT model,* Environ Impact Assess, vol. 26, no. 4, pg. 377–395.
10. FAO (November 2010): *Cereals,* Food Outlook, Global Market Analysis, www.fao.org/docrep/013/al969e/al969e00.pdf (accessed on March 8. 2012), pg. 1-117.
11. Goodlass, G., Halberg, N., Verschuur, G. (2003): *Input output accounting systems in the European community an appraisal of their usefulness in raising awareness of environmental problems,* European Journal of Agronomy, vol. 20, issue 1-2, pg. 17-24.
12. Institution of Mechanical Engineers (January 2011): *Population: one planet, too many people?* Institution of Mechanical Engineers, UK, London 2011, pg.1-46.
13. Jan, P., Dux, D., Lips, M., Alig, M., Dumondel, M. (2012): *On the link between economic and environmental performance of Swiss dairy farms of the alpine area*,The International Journal of Life Cycle Assessment, vol. 17, issue 6, pg. 706-719.
14. Kerselaers, E., Rogge, E., Dessein, J., Lauwers, L., Van Huylenbroeck, G. (2011): *Prioritising land to be preserved for agriculture: A context-specific value tree,* Land Use Policy, vol. 28, issue 1, pg. 219–226.

15. Kinzig, A. P., Ryan, P., Etienne, M., Allison, H., Elmqvist, T., Walker, B. H. (2006): *Resilience and regime shifts: assessing cascading effects,* Ecology and Society, vol. 11, no. 1, http://www.ecologyandsociety.org/vol11/iss1/art20/

16. Kuosmanen, T., Kuosmanen, N. (2009): *How not to measure sustainable value (and how one might),* Ecological Economics, vol. 69, issue 2, pg. 235–243.

17. Lichtenberg, E., Shortle, J., Wilen, J., Zilberman, D. (2010): *Natural Resource Economics and Conservation: Contributions of Agricultural Economics and Agricultural Economists,* American Journal of Agricultural Economics, vol. 92, no. 2, pg. 469-486.

18. Mayer, A. L. (2008): *Strengths and weaknesses of common sustainability indices for multidimensional systems,* Environment International, vol. 34, issue 2, pg. 277–291.

19. Mitchell, R. B. (2012): *Technology Is Not Enough: Climate Change, Population, Affluence and Consumption,* The Journal of Environment & Development, vol. 21, no. 1, pg. 24-27.

20. Nigel, J. (2006): *Concepts of efficiency in ecological economics: Sisyphus and the decision maker,* Ecological Economic, vol. 56, issue 3, pg. 359-372.

21. OECD (2001): *Environmental Indicators for Agriculture. Methods and Results. Executive Sumary,* OECD Publishing, Paris, France, pg. 22-23.

22. OECD (2008): *Environmental performance of Agriculture in OECD countries since 1990,* OECD Publishing, Paris, France, pg. 102-106.

23. OECD (2010): *Economic, Environmental and Social Statistics,* OECD Factbook 2010, OECD Publishing, http://www.oecd-ilibrary.org/economics/oecd-factbook-2010/population-growth-rates-table_factbook-2010-table4-en;jsessionid=54cobv95blugq.delta (accessed on January 11. 2012).

24. Pender, J. L. (1998): *Population growth, agricultural intensification, induced innovation and natural resource sustainability: An application of neoclassical growth theory,* Agricultural Economics, vol. 19, issue 1-2, pg. 99-112.

25. Pretty, J. (2008): *Agricultural sustainability: concepts, principles and evidence,* Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences, vol. 363, no. 1491, pg. 447-465.

26. Ruggeri, J. (2009): *Government investment in natural capital,* Ecological Economic, vol. 68, issue 6, pg. 1723-1739.

27. Runowski, H., Zietara, W. (2011): *Future Role of Agriculture in Multifunctional Development of Rural Areas,* Applied: Studies in Agribusiness and Commerce, vol. 5, no. 1-2, pg. 29-37.

28. Sachs, J. D. (2008): *Common Wealth: Economics for a Crowded Planet,* Penguin Press, New York, USA, pg. 31-33.

29. Schulze, P. C. (2002): *I=PBAT,* Ecological Economics, vol. 40, issue 2, pg. 149-150.

30. Smith, P., Gregory, P. J., Van Vuuren, D., Obersteiner, M., Havlík, P., Rounsevell, M., Woods, J., Stehfest, E., Bellarby, J. (2010): *Competition for land,* Philosophical Transactions of the Royal Society B, vol. 365, no. 1554, pg. 2941-2957.

31. Stiglitz, E. J. (2000): *Economics of the Public Sector,* Third Edition**,** W. W. Norton & Company, pg. 127-141.

32. Van der Werf, H. M. G., Petit, J. (2002): *Evaluation of the environmental impact of agriculture at the farm level: a comparison and analysis of 12 indicator-based methods,* Agriculture, Ecosystems and Environment, vol. 93, issue 1-3, pg. 131-145.

33. Zegar, J. (2007): *Przesłanki nowej ekonomiki rolnictwa*, *[The premise of the new economics of agriculture],* IERiGŻ-PiB, Zagadnienie Ekonomiki Rolnej, nr. 2, pg. 5-27.

Review Article

Economics of Agriculture 1/2013
UDC: 663.8:634.1/.7(497.11)

DEVELOPMENT OF FRUIT PRODUCTION AND PROCESSING IN THE REPUBLIC OF SERBIA

Mirjana Lukač Bulatović, Zoran Rajić, Jelena Đoković[1]

Summary

Although Serbia is characterized by favourable natural conditions for growing most of the continental fruit species, the full potential of their exploitation has not been reached yet. The main indicators of this underutilisation are values of main parameters of fruit production during longer periods of time. Due to its mostly extensive feature, the fruit production in Serbia has been ground to a halt for a considerable period of time, and has even shown the signs of reduction. In the period from 1981 to 2011, orchard areas in Serbia covered 252,364 ha on average, with the annual reduction rate of -0.40%.

During the analysed period (2001-2010), the highest production volume of processed fruit products (semi-processed and finished products) was recorded in fruit juices (155,012 t) and frozen fruits (24,602 t). Fruit juices and frozen fruits account for 93% of the total processed fruit products in Serbia. The processed fruit production during the analysed period increased at the average annual rate of change of 14.82%.

Key words: *orchard areas, fruit production, semi-processed fruit products, finished fruit products*

JEL: *Q15, L66*

Introduction

Considering all favourable natural conditions for fruit growing, the production of fresh and processed fruits in Serbia is rather insufficient. It can be freely stated that orchard areas in Serbia surpass the demand for fruits. Intensive fruit production in smaller orchard areas could provide significantly larger quantities of high-quality fruits (by increasing the yield per unit area). Therefore, provided the yield is increased to 15 t/ha, plum production

1 Mirjana Lukač Bulatović, Ph.D., Assistant Professor, University of Novi Sad, Faculty of Agriculture, Novi Sad, Trg Dositeja Obradovića 8, Phone: +381 63 892 97 21, E-mail: mirjanalukac@gmail.com (lmirjana@polj.uns.ac.rs); Zoran Rajić, Ph.D., Associate Professor, University of Belgrade, Faculty of Agriculture, Zemun, Nemanjina 6, Phone: +381 63 108 59 15, E-mail: zorajic@agrif.bg.ac.rs, Jelena Đoković, assistant, University in Belgrade, Faculty of Agriculture, Zemun, Nemanjina 6, Phone: +381 11 261 53 15/ext. 406, E-mail: jdjokovic@agrif.bg.ac.rs

(which is the most prevalent and cost-effective fruit production in Serbia) could achieve the current volume of production on 35,000-40,000 ha in contrast with over 100,000 ha of the present plum plantations in Serbia (Obradović, 2001, Milić et al., 2005).

Observed as a whole, the fruit growing in Serbia is in a rather poor condition. Small areas of fruit plantations impede the application of high-capacity machinery for cultural practices. The high prevalence of obsolete (antiquated) varieties and great diversity of varieties cause considerable hardships in the supply of high-quality fruits on the market. Moreover, other unresolved issues (such as the production of high-quality planting material, the required funding for fruit growing and production, etc.) also pose a great hindrance to the improvement of fruit production.

Although the need for integrated fruit production and processing is often emphasised, the generally accepted solution of their vertical relationship has not been found yet. However, intensive fruit production cannot be established without modern high-technology processing capacities. The modernisation of fruit processing capacities simultaneously enhances fruit production. Therefore, fruit processing capacities should be closely connected to raw materials due to high safety requirements in continuous raw material supply.

Research aims, data resources and work methods

The principal aim of this research is a review of general tendencies in the fruit production and processing in Serbia. The analysis of production volume change was conducted in several major fruit species during 1981-2011, as well as major semi-processed and finished fruit products during 2001-2010.

The analysis of parameter values and tendencies in fruit production and processing was conducted based on the published and internal data of the Statistical Office of the Republic of Serbia and the Federal Statistical Office of Yugoslavia (the Bulletin of Crop Science, the Bulletin of Fruit Science and Viticulture, and the Bulletin of the Industry of Serbia) for the analysed period.

The aim of the research and available data resources were expressed by means of descriptive statistics: the arithmetic mean, the interval of variation, and the coefficient of variation. The assessment of parameter value changes was done by means of the average annual rate of change based on the exponential trend:

In the exponential trend: $\hat{Y}$ is the value of the dependent variable, x is the independent variable, a and b are the parameters of the exponential trend.

Research results

Fruit production capacity

In the period from 1981 to 2011, the total orchard area in Serbia covered 252,364 ha on average, with the variations ranging from 237,640 ha in 2006 to 265,817 ha in 1983 (Table 1). The orchard areas in the analysed period reduced at the average annual rate of change of -0.40%.

The status and importance of fruit production in the Serbian agriculture is evident from the share of orchard area in the total arable land. In the analysed period (1981-2011), the share of orchard area in the total arable land was 5.61%.

Table 1. The share of orchard area in the total arable land in the period 1981-2011

Indicators	Arable land (ha)	Orchard area (ha)	Orchard area share in the total arable land (%)
Average: 1981-2011	4,502,812	252,364	5.61
Minimum	4,211,377	237,640	5.44
Maximum	4,742,683	265,817	5.78
Annual Rate of Change (%)	-0.51	-0.40	0.11
Coefficient of Variation (%)	5.11	3.79	1.87

Source: The calculation was based on the data obtained from the Statistical Office of the Republic of Serbia and the Federal Statistical Office of Yugoslavia

Although Serbia is characterized by favourable natural conditions for growing most of the continental fruit species, the share of orchard area in the total arable land has been slightly increasing (at the rate of change of 0.11%) due primarily to larger reduction of the arable land in comparison with the reduction of orchard area.

The analysis of structural changes in fruit growing according to fruit species can only be conducted based on the number of productive fruit trees (the number is recorded by the official statistical office). Therefore, the analysis of the number of productive fruit trees can show the structural tendencies in fruit production, considering the fact that the number of fruit trees is one of the indicators of fruit production capacity and that the variations of growth habits change the number of trees per unit area.

Table 2. The number of productive fruit trees in Serbia in the period 1981-2011

Fruits species	Average number of productive fruit trees (1000)	Interval of variation		Annual rate of change (%)	Coefficient of variation (%)	Structure (%)
		Min.	Max.			
Apple	13,727	11,151	16,042	0.95	8.94	16.78
Pear	5,906	4,404	7,198	-1.45	15.57	7.22
Plum	44,710	40,822	50,438	-0.67	6.30	54.67
Cherry	1,868	1,804	1,933	-0.12	1.56	2.28
Sour cherry	8,528	6,022	9,527	0.15	7.91	10.43
Peach	3,846	3,563	4,800	0.57	8.29	4.70
Apricot	1,549	1,376	1,781	0.53	5.81	1.90
Walnut	1,654	1,424	1,757	0.55	5.51	2.02
Total	81,788	78,912	85,921	-0.25	2.81	100.00

Source: The calculation was based on the data obtained from the Statistical Office of the Republic of Serbia and the Federal Statistical Office of Yugoslavia

The number of productive fruit trees increased in most of the analysed fruit species (Table 2). In the analysed period (1981-2011), the largest increase of the number of productive fruit trees was recorded in apple production, in which the number of productive fruit trees increased at the average annual rate of change of 0.95%. The number of productive fruit trees in all the other analysed fruit species increased ranging from the average annual rate of 0.15% in cherry production to 0.57% in peach production.

The total number of the analysed productive fruit trees was 81.8 million. With 44.7 million productive trees on average, plum trees account for 54.67% of the total productive fruit tree number in Serbia, followed by apple trees (16.78%), sour cherry trees (10.43%), and pear trees (7.22%). The productive tree number of the other analysed fruit species (such as peach, cherry, walnut, and apricot trees) was below 4.70% of the total productive fruit tree number in Serbia. Therefore, plums are traditionally most extensively grown fruit species in the Serbian fruit production. The vast majority of farmers in Serbia grow plums due to traditional plum brandy production (*Slivovitz*) and minimal requirements of this fruit species in terms of natural conditions and cultural practices.

In the period 1981-2011, the average fruit production in Serbia was 1,025,411 t, with the variations ranging from 585,866 t in 2002 to 1.4 million t in 1996. High fruit production variations over the years were confirmed by the difference between the minimal and the maximal interval of variation which equals to 817,304 tonnes in the analysed period (Table 3). The total fruit production increased at the average annual rate of change of 0.37%.

Table 3. The fruit production in Serbia in the period 1981-2011

Fruits species[2]	Average production (t)	Interval of variation		Annual rate of change (%)	Coefficient of variation (%)	Structure (%)
		Min.	Max.			
Apple	213,712	95,584	306,950	-0.17	21.57	20.84
Pear	68,172	33,645	96,400	-1.55	20.80	6.65
Plum	459,712	197,486	680,566	0.35	28.59	44.83
Cherry	25,288	15,726	30,823	-0.18	15.78	2.47
Sour cherry	80,691	48,919	112,326	-0.07	19.88	7.87
Peach	50,246	36,873	77,230	1.32	21.50	4.90
Apricot	20,630	5,592	40,754	1.11	40.28	2.01
Walnut	19,018	10,238	25,172	1.58	22.90	1.85
Strawberry	30,336	20,004	39,707	0.80	16.76	2.96
Raspberry	57,606	17,432	93,982	5.00	41.36	5.62
Total	1,025,411	585,866	1,403,170	0.37	19.86	100.00

Source: The calculation was based on the data obtained from the Statistical Office of the Republic of Serbia and the Federal Statistical Office of Yugoslavia

2 Fruit species with the published data by the Statistical Office of the Republic of Serbia were included (only quince production was not included due to its irrelevance with the share of 0.8% in the total Serbian fruit production).

The largest increase in production volume was recorded in raspberry production (at the 5.00% rate of change) and walnut production (at the 1.58% rate of change). The total raspberry production increased from 17,432 tonnes in 1981 to 93,982 tonnes in 2011 due primarily to the increased demand for this fruit species on the international market. The 41.36% coefficient of variation indicates the precariousness of this production. The increase in production volumes of other analysed fruit species was recorded ranging from the average annual rate of change of 0.35% in plum production to the average annual rate of change of 1.58% in walnut production.

The tendencies of orchard area decrease and production volume increase indicate the intensification of fruit production in Serbia, especially during the final years of the analysed period.

Plum and apple production account for the greatest share of the total fruit production in Serbia (65.67%), followed by sour cherry (7.87%), pear (6.65%), and raspberry production (5.62%). The share of the other analysed fruit species ranged from 1.85% (walnut) to 4.90% (peach). Therefore, plums, apples and sour cherries are the most prevalent fruit species in the Serbian fruit production according to both the number of productive trees and the volume of production.

Table 4. Production of major fruit species in Serbia

Period	Fruits species				
	Apple	Pear	Plum	Sour cherry	Raspberry
1981-1990					
Average production (t)	234,660	81,191	471,962	84,709	34,341
Annual Rate of Change (%)	-1.71	1.59	-3.35	3.45	14.46
Coefficient of Variation (%)	16.15	11.35	25.20	15.42	44.85
1991-2000					
Average production (t)	191,113	68,960	404,946	74,740	51,417
Annual Rate of Change (%)	0.97	-1.53	0.96	-4.42	4.98
Coefficient of Variation (%)	16.35	11.52	24.83	18.29	19.22
2001-2011					
Average production (t)	215,212	55,621	498,361	82,450	84,381
Annual Rate of Change (%)	7.71	3.46	6.84	3.33	0.26
Coefficient of Variation (%)	26.48	20.23	31.86	24.13	6.81

Source: The calculation was based on the data obtained from the Statistical Office of the Republic of Serbia and the Federal Statistical Office of Yugoslavia

The Serbian share in the total European production of the analysed fruit species accounts for 3.71%. In the total European plum production (Table 5), Serbia participates with 426,846 tonnes (15.41%) and immediately follows Romania, which is the leading plum producer in Europe with the annual plum production of 624,884 t. Furthermore, Serbia also significantly participates in the total European production of raspberries (21.43%), sour cherries (9.08%), and walnuts (6.54%). The Serbian share in the European production of the other analysed fruit species is below 2.92%.

Table 5. The Serbian share in the total European fruit production in 2010

Fruit species	Production (t)		Serbian share in the European fruit production (%)	Serbia's rank in Europe
	Republic of Serbia	Europe		
Apples	239,945	13,715,674	1.75	14
Pears	47,501	2,874,697	1.65	13
Plums and sloes	426,846	2,770,496	15.41	2
Cherries	22,201	759,419	2.92	13
Sour cherries	66,224	729,179	9.08	4
Peaches and nectarines	68,636	4,017,093	1.71	5
Apricots	22,936	795,759	2.88	9
Walnuts	21,419	327,641	6.54	5
Strawberries	32,973	1,432,945	2.30	11
Raspberries	83,870	391,455	21.43	3
Total	1,032,551	27,814,358	3.71	10

Source: The calculation was based on FAO

Fruit processing

Nowadays, Serbia possesses considerable capacities of fruit processing and cooling. However, for the last decade of its development, this industry has been facing the issues of facility underutilisation (because the increased capacity demands the increased volumes of raw material for a wide array of high-quality processed fruit products). Approximately 10% of the total fruit yield is processed, which is rather low in comparison with the USA where approximately 45% of produced apples and 70% of produced plums are processed (Jovanović et al., 1996). This is undoubtedly a consequence of the discrepancy between the fruit production and the fruit processing industry (Milić, Radojević, 2003). The current utilisation of processing capacities is far below its potentials and amounts to approximately 30% (Lukač Bulatović, 2004). According to different production lines, the capacity utilisation ranges from 3.1% (in the concentrated fruit juice production line) to 38% (in the frozen fruit production line). The reason of this capacity underutilisation is also the low marketability of processed fruit products. Processed fruit products in Serbia are still mostly produced by national resources as a consequence of the consumers' low standard of living, and the low quality and array of products.

Fruit processing is mostly located in the region of Central Serbia. In the total fruit processing industry of Serbia, Vojvodina participates with the share of 28.3% in semi-processed fruit products and 19.0% in finished fruit products. In contrast with the fruit processing industry of Central Serbia (which offers a wide assortment of semi-processed fruit products), the fruit processing industry of Vojvodina offers only frozen fruits, fruit pulp, and fruit puree (Lukač Bulatović, 2010). In order to enrich the assortment of processed fruit products, minimize the seasonal feature of fruit processing and increase the utilization of equipment and infrastructure, fruit processing technology ought to (especially fruit drying technology which is still mostly related to plum drying) include other fruit species such as apricots, peaches, grapes (Gvozdenović et al., 1997).

Considering that fruits of many species are not favourable raw materials for obtaining high-quality processed fruit products (especially for the international market), the production of industrial fruits (the fruits which is exclusively used for processing) should be enhanced. The high-quality raw materials, with high technological value and standardised quality, ensure the uniformity of processed fruit products. Consequently, the fruit processing industry is constantly supplied by high-quality raw materials at acceptable prices. Certain industrial peach cultivars (such as clingstone peaches *Pavia*) are mostly used in the processing industry. The largest quantity of these fruits is preserved (approximately 40%), 1-2% is dried, 5-6% is marketed as frozen, and 2-3% is processed into jams, jellies, brandies and juices (Ognjanov, 2003, 2004). The supply of fruits for processing is rather poor and unvaried in Serbia. The processed fruits are usually fresh fruits with certain flaws, mechanical damages or signs of rot and mouldiness. However, plums (*Prunus domestica*), apricots and small fruits are very favourable for high-quality processing.

Table 6. The processed fruit production in Serbia in the period 2001-2010

Type of processed fruit	Average 2001-2010	Interval of variation		Annual rate of change (%)	Coefficient of variation (%)	Structure (%)
		Min	Max			
Fruit pulp and puree - frozen	2,285	14	4,778	-42.45	85.55	1.18
Concentrated fruit juice	5,032	53	11,172	45.10	83.21	2.60
Frozen fruit	24,602	18,375	42,709	3.48	28.86	12.73
Semi-processed fruit products	31,919	24,772	51,949	5.14	25.89	16.51
Fruit juice	155,012	49,947	251,057	19.08	46.61	80.18
Fruit syrup	1,044	266	1,706	-13.43	42.32	0.54
Preserved fruit	576	27	1,505	-28.23	94.59	0.30
Jam	4,449	3,038	6,193	-4.78	23.60	2.30
Dried fruit	329	16	1,145	22.04	106.28	0.17
Finished fruit products	161,410	53,346	257,084	17.40	44.03	83.49
Total	193,329	84,118	284,463	14.82	39.18	100.00

Source: The calculation was based on the data obtained from the Statistical Office of the Republic of Serbia

In the period 2001-2010, the total production volume of processed fruit products in Serbia amounted to 193,329 tonnes ranging from 84,118 tonnes in 2001 to 284,463 tonnes in 2008 (Table 6). The highest production volume was recorded in fruit juices (155,012 t) and frozen fruits (24,602 t). These processed fruit products account for 92.91% of the total analysed processed fruit products in Serbia. The production volumes of the other analysed processed fruit products ranged from 329 tonnes (dried fruits) to 5,032 tonnes (concentrated fruit juices).

In the analysed period, the total processed fruit production increased at the average annual rate of change of 14.82%. The highest production volume increase was recorded in concentrated fruit juices (the 45.10% rate of change) and dried fruits (the 22.04% rate of change). The

calculated coefficients indicate high variations of the production volumes, especially in dried fruits (CV=106.28%) and compotes (CV=94.59%).

Table 7. Production of major processed fruit products in Serbia per year (2001-2010)

Years	Production (t)		
	Concentrated fruit juice	Frozen fruit	Fruit juice (clear, cloudy and pulpy)
2001	1,155	21,064	49,947
2002	734	25,426	65,967
2003	1,838	19,591	76,665
2004	53	25,543	124,673
2005	2,950	20,533	164,546
2006	6,029	18,375	170,247
2007	9,900	26,946	219,912
2008	7,265	19,738	251,057
2009	9,226	42,709	226,520
2010	11,172	26,092	200,583

Source: Statistical Office of the Republic of Serbia

According to the analysed production lines in Serbia in 2010, the capacity utilisation amounts to 54.4% in the dried fruit production line, 45.8% in the fruit juice production line, 45.5% in the frozen fruit production line, 33.9% in the fruit concentrate production line and 30.8% in the jam production line (Table 8). The capacity utilization of the other analysed production lines was lower than 9.2%.

Table 8. The capacity utilisation in fruit processing lines in 2010

Processed fruit products	Potential production volume (t)	Realised production volume (t)	Capacity utilisation (%)
Fruit pulp and puree	2,600	99	3.81
Concentrated fruit juice	33,000	11,172	33.85
Frozen fruit	57,313	26,092	45.53
Fruit juice (clear, cloudy and pulpy)	438,384	200,583	45.76
Fruit syrup	30,725	535	1.74
Preserved fruit	850	78	9.18
Jam	15,591	4,799	30.78
Dried fruit	1,354	737	54.43

Source: The annual report of the Statistical Office of the Republic of Serbia (Published tables for 2010)

Conclusion

The fruit processing and cooling industry in Serbia is facing the increasing problem of capacity underutilisation. The increase in processing capacity has not been accompanied with the increase in the quality and assortment of raw materials due to the uneven development of primary fruit production and processing. It should be especially highlighted that optimal conditions for the development of fruit production in the private sector have not been created yet. Moreover, it has not been generally accepted that the

development of industrial processing capacities is not paralleled with the development of primary fruit production.

In the period 1981-2011, fruit production covering 252,364 ha on average had the share of 5.61% in the total Serbian arable land. This share has been increasing due to the fact that the arable land in Serbia is decreasing more rapidly than orchard area.

The highest production volume was recorded in plum (459,712 t) and apple production (213,712 t), and these fruit species account for 66% of the total fruit production in Serbia. The total production volume of the analysed fruit species shows the increasing tendency (with the 0.37% rate of change). The highest increase in the production volume was recorded in raspberry production (with the 5.00% rate of change).

In the period 2001-2010, the highest production volume on average was recorded in fruit juices (155,012 t) and frozen fruits (24,602 t), and these processed fruit products account for 93% of the total analysed processed fruit production in Serbia. The realised production volume of all other analysed processed fruit products ranged from 329 tonnes (dried fruits) to 5,032 tonnes (concentrated fruit juice).

The total production of processed fruit products increased at the average rate of change of 14.82%. The most significant increase in production volume was recorded in concentrated fruit juices (the rate of change of 45.10%) and dried fruits (the rate of change of 22.04%). The calculated coefficients indicate high variations of the production volume, especially in dried fruits (CV=106.28%). The highest capacity utilisation was recorded in dried fruit production (54.4%) and fruit juice production (45.8%). The lowest capacity utilisation was recorded in fruit syrup production (1.7%) and compote production (9.2%).

References

1. *Food and Agriculture Organisation of the United Nations* (FAO)/FAOSTAT (http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567)
2. Gvozdenović, D., Curaković, M., Lazić, V., Vujičić, B., Vračar, Lj., Dimić, N. (1997): *Berba, pakovanje, čuvanje i prerada voća*, Jugoslovensko voćarstvo, Jugoslovensko naučno voćarsko društvo, Čačak, vol. 31 (no. 119-120), p. 351-358.
3. Jovanović, M., Bogdanović, J. (1996): *Stanje voćarske proizvodnje u Republici Srbiji i mere za njen razvoj*, Jugoslovensko voćarstvo, Jugoslovensko naučno voćarsko društvo, Čačak, vol. 30 (no. 113-114), p. 21-34.
4. Lukač Bulatović, M. (2004): *Proizvodni i ekonomski efekti u proizvodnji i preradi voća*, Magistarski rad, Poljoprivredni fakultet, Novi Sad.
5. Lukač Bulatović, M. (2010): *Ekonomska efikasnost proizvodnje i prerade važnijih voćnih vrsta u Republici Srbiji*, Doktorska disertacija, Poljoprivredni fakultet, Novi Sad
6. Lukač Bulatović, M. (2010): *Proizvodno-ekonomska obeležja prerade voća*, Ekonomika poljoprivrede, NDAEB, Beograd, IEP, Beograd, ASE, Bukurešt, vol. 57, no. 1, p. 111-123.

7. Milić, D., Radojević, V. (2003): *Proizvodno-ekonomska i upotrebna vrednost voća i grožđa*, Poljoprivredni fakultet, Novi Sad.
8. Milić, D., Rajić, Z., Lukač Bulatović, M. (2005): *Promene u strukturi voćarske proizvodnje Republike Srbije*, Ekonomika poljoprivrede, NDAEB, Beograd, IEP, Beograd, ASE, Bukurešt, vol. 52, no. 1, p. 71-78.
9. Obradović, Ž. (2001): *Program unapređenja proizvodnje, prerade i plasmana šljive u Srbiji za period 2002-2007. godine*, Proizvodnja, prerada i plasman šljive i proizvoda od šljive, September 8-9, Koštunići, p. 215-240.
10. Ognjanov, V. (2003): *Breskva, nektarina i industrijska breskva,* Voćarstvo i vinogradarstvo, Društvo voćara Vojvodine i Departman za voćarstvo, vinogradarstvo i hortikulturu Poljoprivrednog fakulteta u Novom Sadu, vol. I (no. 2), p. 10-11.
11. Ognjanov, V. (2004): *Savremeni trendovi u proizvodnji breskve, Voćarstvo i vinogradarstvo*, Društvo voćara Vojvodine i Departman za voćarstvo, vinogradarstvo i hortikulturu Poljoprivrednog fakulteta u Novom Sadu, vol. II (no. 4), p. 4-5.
12. Republički zavod za statistiku (2001-2005): *Bilteni Industrija Srbije/Industrijski proizvodi/Prerada i konzerviranje voća i povrća/poglavlje 1*, Beograd.
13. Republički zavod za statistiku (2002-2004): Statistički godišnjak Srbije/ Poljoprivredne površine prema kategorijama korišćenja zemljišta/Obradive površine/Površine voćnjaka/Voćna stabla i proizvodnja voća/poglavlje 8, Beograd.
14. Republički zavod za statistiku (2005-2010): Statistički godišnjak Republike Srbije/ Poljoprivredne površine prema kategorijama korišćenja zemljišta/Obradive površine/ Površine voćnjaka/Voćna stabla i proizvodnja voća/poglavlje 12, Beograd.
15. Republički zavod za statistiku (2006-2010): Publikacione tabele za period 2006-2010/Prerada i konzervisanje voća i povrća/Iskorišćenost kapaciteta prerade, Godišnji izveštaji Republičkog zavoda za statistiku, Beograd.
16. Republički zavod za statistiku (2011): Publikacione tabele za 2011/Poljoprivredne površine prema kategorijama korišćenja zemljišta/Obradive površine/Površine voćnjaka/ Voćna stabla i proizvodnja voća, Godišnji izveštaji Republičkog zavoda za statistiku, Beograd.
17. Savezni zavod za statistiku (1981-2001): Bilteni Ratarstvo, Voćarstvo i Vinogradrstvo/ Poljoprivredne površine prema kategorijama korišćenja zemljišta/Obradive površine/ Površine voćnjaka/poglavlje 1, Beograd.
18. Savezni zavod za statistiku (1981-2001): Bilteni Ratarstvo, Voćarstvo i Vinogradrstvo/ Voćarstvo/Voćna stabla i proizvodnja voća/ poglavlje 3, Beograd.

RAZVOJ PROIZVODNJE I PRERADE VOĆA U REPUBLICI SRBIJI

Mirjana Lukač Bulatović, Zoran Rajić, Jelena Đoković[3]

Rezime

Iako u Srbiji postoje veoma povoljni prirodni uslovi za uzgoj većine kontinentalnih voćnih vrsta, mogući nivo iskorišćenosti ovih uslova još nije postignut, što potvrđuje i kretanje najvažnijih kapaciteta voćarske proizvodnje u dužem vremenskom periodu. Zbog pretežno ekstenzivnog karaktera, voćarska proizvodnja u Srbiji već duže vremena stagnira ili se čak i smanjuje. U proseku za period 1981-2011. godine površine voćnjaka u Srbiji su iznosile 252.364 ha, sa tendencijom opadanja po prosečnoj godišnjoj stopi promene od -0,40%.

U proseku za ispitivani period (2001-2010) najveći obim proizvodnje prerađevina od voća (poluprerađevine i gotovi proizvodi) je utvrđen kod voćnih sokova (155.012 t) i smrznutog voća (24.602 t). Spomenute prerađevine od voća učestvuju sa 93% u ukupnoj proizvodnji analiziranih prerađevina Srbije. Proizvodnja prerađevina od voća u posmatranom periodu se povećava po prosečnoj godišnjoj stopi promene od 14,82%.

Ključne reči: *površine voćnjaka, proizvodnja voća, poluprerađevine od voća, gotovi proizvodi od voća*

3 Dr Mirjana Lukač Bulatović, docent, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Trg Dositeja Obradovića 8, Novi Sad, Srbija, Telefon: +381 21 485 33 31, E-mail: mirjanalukac@gmail.com, Dr Zoran Rajić, vanredni profesor, Univerzitet u Beogradu, Poljoprivredni fakultet, Nemanjina 6, Zemun, Telefon: +381 63 108 59 15, E-mail: zorajic@agrif.bg.ac.rs, Jelena Đoković, asistent, Univerzitet u Beogradu, Poljoprivredni fakultet, Nemanjina 6, Zemun, Telefon: +381 11 261 53 15/lok. 406, E-mail: jdjokovic@agrif.bg.ac.rs

Review Article

Economics of Agriculture 1/2013
UDC: 502.131.1:631(497.113Vrbas)

SUSTAINABLE AGRICULTURE AS A BASIS FOR SUSTAINABLE ENVIRONMENTAL DEVELOPMENT OF RURAL MUNICIPALITY VRBAS

Milutin Mrkša[1], Tamara Gajić[2]

Sumarry

Agriculture is the main occupation of the rural population and as such forms the basis of development and progress, not only in rural areas, but also the community as a whole. Like any business, and agriculture has a number of negative environmental impacts, especially on agricultural land which is also the basis of existence and condition of the agricultural population. This paper will be presented to the basic conditions of life and professions in rural parts of the municipality of Vrbas and their relationship and impact on the environment. It will be proposed specific measures to reduce the impact of agriculture on the environment and sustainable improvement in the same context of sustainable development. It also will provide guidelines for development and improvement of settlements in order to improve the environment which would improve the living conditions of indigenous peoples.

Key words: *sustainable agriculture, environment, sustainable rural development.*

JEL: *Q56*

Introduction

Agriculture is the economic activity, including plant and animal production, and therefore can basically say that the two main branches of agricultural and livestock farming, which together with forestry and fishing belong to the so called primary economic sector. Agricultural production is the process of production plant and animal products, fish farming, bees and other forms of cultivation and production taking place on agricultural land (Kusters, 1996). Under agricultural land means land used agricultural production (land, gardens, orchards, vineyards, pastures, meadows, marshes, ponds and swamps) and the corresponding land planning document is intended for agricultural production.

Sustainable development has become a fundamental principle of development policy in a growing number of sectors and organizations from local to state level, the private sector

1 Milutin M. Mrkša, Ph.D., „Right at the first chance", Provincial Secretariat for Science and Technological Development AP Vojvodina, Faculty of Sciences, Novi Sad, E-mail: mmrksa@gmail.com

2 Tamara Gajić, Ph.D., Higher School for Professional Studies, Novi Sad, E-mail: gajic_tamara@yahoo.com

through the shareholder (the practice) to the state organization of the economy. There is much discussion about the development of indicators to determine policy development and evaluation of the level of progress. More in our communities, the term includes the development of economic progress, which is not complete or accurate. Economic progress is just a part of development.

The concept of sustainable rural development based on efficient use of resources, leading to increasing social cohesion in rural areas. This concept has a special role as traditionally the most common farming activity of rural population, but at the same time as the most important factor in rural economy. Insisting on sustainable agriculture is based on commitment to the agricultural population made using existence needs using chemical and technical instruments that have a minimal impact on the environment, to the Agricultural Land Relations homey, which will acquire the strengthening of economic conditions, raising the socio-cultural level in terms of preserved environment (Paraušić et al., 2008).

General characteristics of the municipality of Vrbas

Vrbas is crossing the central and southern Backa along the route of the Great Backa canal, which forms the backbone of a hydro system Danube-Tisa-Danube Canal. While as the centre of the Vrbas municipality has a central position in relation to the back, other settlements are more inclined towards its southern part. In addition to the Vrbas, which is also the centre of the municipality, the municipality of Vrbas consists of the following settlements: Bačko Dobo Polje, Zmajevon, Kucura, Ravno Selo and Savino Selo (Group of authors, 1998).

Vrbas municipality covers an area of two geomorphic units: the loess plateau and loess terrace. These units, although relief is clearly defined as distinct morphological categories have many common features. Height difference between them is not the same everywhere. Most notably in the border area to the tower, where the loess plateau dominating the loess terrace within height of 17 m. Southeast of the Vrbas River that border is less pronounced because the transition from one form to another in the form of gentle slopes. The total dissection of the relief is 24m and ranges from 80 m to 104 m above sea level. Meadow calcareous chernozem soil is most common in the area of the municipality of Vrbas (Group of authors,1998). This is the most common types of soil on loess terrace. The average thickness of the humus horizon of this soil type is 65-70 cm. Meadow calcareous black soil has good structure, water-physical and chemical properties, in particular, is rich in nitrogen, phosphorus and potassium, and an agricultural land of high productive value. Chernozem on loess plateau, meadow black soil is relatively deep humus horizon, very favourable and stable structure loamy texture, is well supplied with plant nutrients in available form, water is good physical and thermal properties. Good physical and chemical properties of the deeper layers of the basic characteristics of production for which it is classified as a land of high productive capacity (Lješevi et al., 2011). Carbonate chernozem - extends also to the loess terrace and the loess plateau. On the loess terrace carbonate chernozem is present in several locations, while the loess plateaus of southern parts of the project. The average thickness of the humus horizon is 40-70 cm. Colour is brown calcareous chernozem-brown on the loess plateau, while the loess terrace brownish-black. Solonchak a type of salty soil. It is a type of brine created during salinization. In the

municipality there is a small territory solonchak. This salty soil can be successfully unsalted lowering of groundwater levels (Lješević, et al., 2008).

Clima has no pronounced specificity compared to other parts of Vojvodina, and has features continental steppe climate. Annual average air temperature is around 11 ° C and annual average rainfall is 560 mm. The value of insolation is about 2003 h per year, while the cloudiness is about 60% per year (Popović et al., 2011). For much of the territory is most frequent north-westerly wind in the summer and spring, while the intensity somewhat weaker southeast wind-wind, which is most frequent in autumn and winter.

The most important hydrographical facility in the territory of the Grand Backa Canal, but no less important and other channels hydro system Danube-Tisa-Danube Canal. Digging of the canal has greatly contributed to the creation of the Vrbas as a strong industrial centre, because the channel was designed primarily for transportation. However, the major waterway channel has today become a major environmental problem Vrbas, because he used the same industry, and still used for wastewater discharge. In addition to DTD hydro system, through the municipality, river flows Jegricka, which is partly protected as a nature park category III. The importance of groundwater, except for water, is reflected in the existence of three thermal spring waters that are both energy and health resort potential.

Flora and fauna are directly related to the geomorphological, soil, climate, hydrological and anthropogenic factors, so that in the community, depending on the type of land, more land - drier and lower, wetter (marsh), and develop adequate wildlife. Forests to a significant extent do not exist, except for some trees near the banks of the canal Jegricka, mostly poplar, black locust and pine. With the roads are chaparral and shrub, while at the site Carnok, a significant number of protected species. The most numerous faunistic groups are over 100 bird species, then fish with more than 20 species, while in the hunting and the domains may encounter deer, rabbit, pheasant, quail and others.

The main activities and living conditions in rural municipalities

Agriculture is the process of intensive relations of man and the environment, where there are more different influences. Intensive farming is related to the destruction of natural vegetation and changes the biological cycle of circulation of matter and the water regime of a certain territory (Katić et al., 2008). If the model in the world today around 1.5 billion hectares of land, this is the history of humanity has gone through so much farming land, which is still not processed. Once the land is now cultivated steppe, forest and natural savannah zone. The farmer who handles some land is not only a direct impact on the field dealt with, but does it in a much broader environment, particularly at the present time the present reclamation, chemicals and machinery in agriculture. The first man was a hunter and collector of modern man cannot imagine my life without agriculture because it provides the basis of his diet.

Unfortunately, humankind throughout its history has not taught us that the rational use of land resources. To this day vast areas of fertile land are subject to degradation, and on the other side of a kidnap has facilities for processing. The first enemy of agriculture - erosion

threatens more than half of the ploughed land. Annual losses reached millions of acres of land, and thousands of acres are subject to secondary salinization due to inadequate irrigation. In particular, the major impact of farming on land cover and hydrological processes leading to sharp changes in the function of the biosphere. The importance of agriculture grows with the increasing number of people on Earth (Breheny, 1994). Its impact on the environment is reflected in the following: destruction of natural vegetation over large areas and replacement of a small number of crops species, the conversion of natural bio-geo-coenosis agro-coenosis, converting fertile and productive ecosystems in a few highly productive farming systems, land reclamation, destruction of natural habitats of animals, land degradation cover in terms of its irrational use: water and wind erosion, soil depletion, salinization, pollution of water-logging and excess pesticides and fertilizers; changes of natural radiation and water balance of vast territories, leading to climate change, changes of the hydrological regime of the territory; accelerate surface erosion; consumption groundwater and lowering their levels, increase groundwater levels in irrigation, to increase sedimentation in river basins and their estuaries, pollution of surface and groundwater resources agrochemical, coating, and organic wastes, pollution of the atmosphere: fertilizing and spraying pesticides, raising large amounts of dust the infield. The spatial impact of agriculture on the appearance of the planet and environment as a whole is especially true as a result of this kind of human activity.

Livestock is closely connected with agriculture, but in certain parts of the world functions as a self-employed (nomadic pastoral farming). Adverse impacts of livestock on the environment occur only in cases of intensification when not provided adequate natural resources and the burden of pastures. The following are the impacts of livestock on the environment: the destruction of vegetation over large expanses, and ecosystem changes, degradation of natural grassland vegetation, pollution of surface and ground water of livestock waste. This is particularly important when it comes to large livestock farms, destruction of vegetation and soil erosion in areas of intensive livestock meeting (pens, wells and persecutions), clearing and burning of forests and conversion to pasture. Pasture farming creates a unique way of life and distinctive environment of farmers, creating the appearance of the end of nomadic in particular in areas with sparse pasture, which has a seasonal character. It is not just a specific natural environment of nomads, but also their social environment.

Housing in the countryside is more similar housing in the city, but can still talk about a number of peculiarities. Primarily rural residential buildings are mostly for family housing (Davidson et al., 1977). Modern living in the countryside has many advantages over living in the city. The main advantage is exactly the environment healthier environment. The choice of sites for construction of rural residential buildings is much better, because the most space on which the building is much larger. More and more are being built spacious home in the conformal villages with water supply, sewage, floor heating. Faults that follow an abrupt development in the countryside as a result of unplanned construction of villages, the appearance of bad taste, excessive competition in the construction of large buildings unnecessary, tasteless buildings that do not correspond to a given area and the traditional style of architecture of this region. There is also a problem and lack of sewage systems and water brought in, so that any septic tank overflows and pollute the soil.

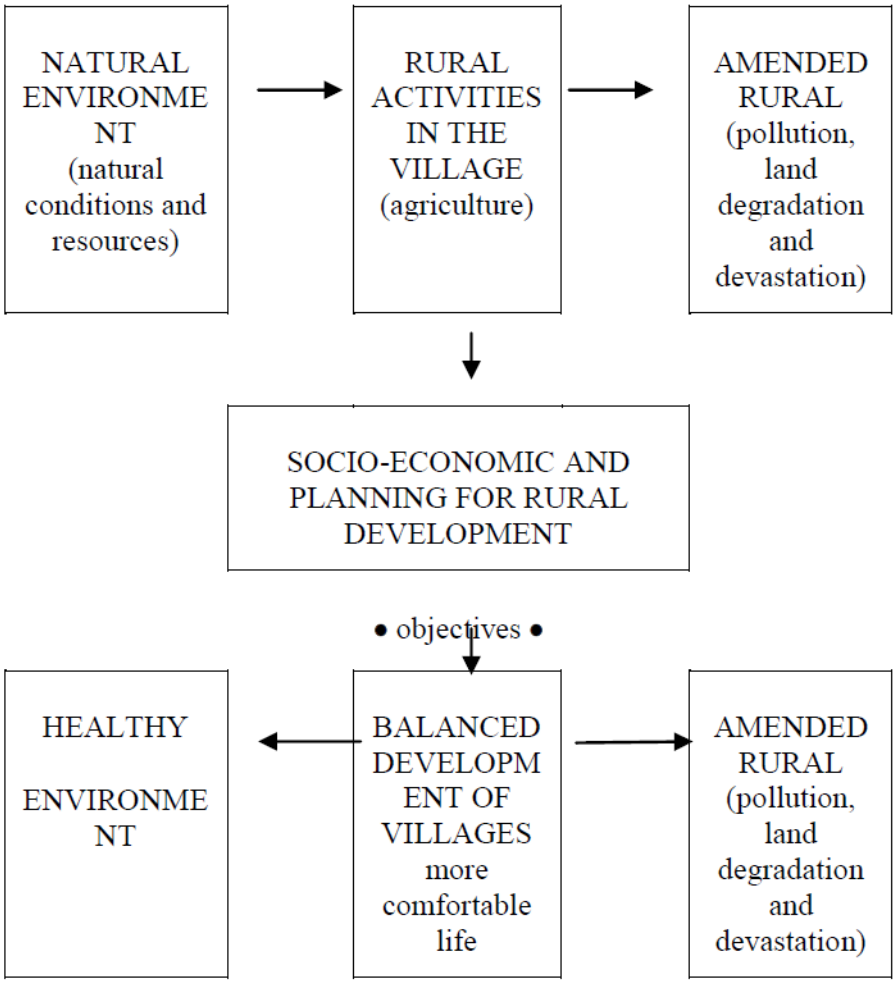
Rural residential building is characterized by much larger hall of the city's housing, and the greater the kitchen, dining room and living room. Larger hall is necessary because it postpones work clothes and shoes, there are disposed the materials to be used in later work. Clothing and footwear as well as materials that bring the outside in a residential building are dirty, so it is necessary to temporarily leave the hall. Some apartment buildings have a covered terrace where you just leave the dirty stuff, especially muddy shoes. In the traditional architecture of the hall are often open to the courtyard in the form of eaves or porch (Vićentijević et al., 2011). Larger kitchens in rural buildings are necessary because they cook food for the cattle, sometimes only keep young hatched chicks (which is not good for broadcasting of ammonia and odors). In the village is an established habit of eating in the kitchen, even though many households today have a special room for it. Large living rooms are needed in rural areas and because of the rural households in the winter conditions in their work (weaving, spinning, sewing, preparing tools for the summer season, etc.). In rural residential storage buildings are larger than those in urban dwellings, often because the food left in them is not only domestic but also some types of animal feed for the cattle, and if there is no basement, and alcoholic and soft drinks in the village which has significantly higher than in urban areas. Basement of the apartment buildings in the village much neater, because they hold open food (potatoes, cabbage, fruits, vegetables, etc.). Bedrooms are the same or similar as in the city, but it is an established habit of using only one, possibly two, while others are left for guests (guest rooms). The village houses are often used attic room or attic. It is commonly used for storage of materials that dry (dry meat, legumes, onions) then the necessary construction materials in the attic too dry (lumber, beams, etc.), then wool, and sometimes other materials, parts and tools that the prepared and dried.

Hygiene in rural buildings is even more important because these areas are exposed to intense biological pollution from the yard (barns, manure, pen), because the insects transmit harmful microorganisms in the house. It is therefore necessary to put on the windows network (insect) for protection against insects. Entrance hall and kitchen water must be monitored at least once a day in summer and autumn months, and twice. Disinfection and rodent control is much more common than in urban homes, and sometimes it has to perform once a month. When designing the farmhouse should strive to reduce square footage kitchens, to changed habits of the kitchen used to living room.

Sustainable agriculture - an ecological basis for sustainable rural development

Based on the foregoing it can be concluded that the management of space on the premises of sustainability (in this case the development of sustainable agriculture) first possible where all the following (environmental, economic and social) conditions. Research opportunities for development of sustainable agriculture must be based on geo system approach that includes consideration of reversible relations of agricultural activity and geographical area (regions) in which it operates.

From uncontrolled to planned Rural Development (Lješević, Mrkša, Milanovic, 2011)



Source: Lješević, Mrkša, Milanovic, 2011.

Research Methodology environmental components of sustainable development implies, first check the current agro ecological zoning of the territory, since it is the result of long periods of practice, and the agricultural population is characterized by a resistance to innovation. In this regard, it is important to study the impact that the current way of farming left in the environment. The main one is exposed to agricultural land, which because of inadequate operation gets degraded. At first it can appear depressions spots (phytogenic result of erosion), and it later changed because of physical (mechanical) and chemical characteristics of being exposed to erosion (denudation). It is therefore necessary to study the intensity of soil erosion as a function of processing method, and the properties of the terrain (slope, soil characteristics, precipitation, temperature, water regime of the territory, population density, etc.). For this in particular are empirical and

hydraulic methods. Inadequate treatment can lead to the activation of landslides, and the feasibility study of potential landslides also necessary. Inadequate farming (particularly excessive use of agro-chemical substances) may lead to contamination of soil, water and air which is why the body of the method which explores the impact of the current methods of cultivation necessary to include chemical, physical, physic-chemical and biological methods.

The economic component of sustainable agriculture - qualitative changes in farming based on the foundations of sustainable and significant economic consequences. Traditional agriculture cannot be considered sustainable, because it is agriculture which is characterized by low productivity and significant pressure on the main resource - land. Such agriculture cannot meet even the social needs of rural populations and as such cannot stop the negative processes related to rural settlements (population decrease due to emigration, aging rural population, changes in the structure of cadastral land in rural areas, land degradation, etc.). Economic consequences of traditional agriculture can be expressed through the differences, which can be given in monetary units, the actual yield, as a result of such business and the potential yield that could be achieved optimal way of farming. Also, this type of business leads to soil degradation (erosion and soil pollution), which in turn leads to a decrease in their productivity and, in extreme cases, to the exclusion of agricultural purposes. Because of this, and to develop sustainable agriculture, it is necessary to take appropriate measures, such as, inter alia, the protection of soil erosion processes, which in turn has a price and become subject to economic analysis.

Analysis of economic implications of the sustainable agriculture can be conducted in light of theories of development thresholds and cost-benefit analysis. In this sense, a lower threshold of development (constraints that lead to increased costs of doing business) may be considered that all investments are made in a given area, but not exceeding a predetermined threshold of profitability. Threshold of development (which eliminates the restriction of a new way of doing business in a particular area) is primarily considered to be all that takes ecological, as well as causing excessive erosion or landslides activate, and accidental pollution of basic environmental media (soil, water and air) , the destruction of indigenous flora and fauna. Also, the thresholds of development are considered and all the investments that exceed the threshold of profitability, that is no excuse to increase profits from a new way of doing business.

Cost-benefit analysis involves preparation of balance where on one side of the data structure of costs (losses and expenses), and the second structure obtained (yield). Traditional agriculture is characterized by a negative balance, causing the population and decides to leave agriculture. Conversely, sustainable agriculture has to have a positive balance. The volume of investment (cost) is determined by the "capacity areas", or optimal (not maximum) throughput. Determination of balance is achieved by introducing an input - output matrices, which show the direct effects of individual measures, the introduction of the sustainability of individual items by the positive balance, and thus on the environment (those elements that can be quantified - to express monetary units).

The social component of sustainable agriculture - Sustainable development as a paradigm that underlies the modern economy, among them agriculture, must be equal to the ecological and economic aspects of sustainability and looks at the man with all his inherent properties, in other words not to neglect any social, psychological, cultural, intellectual, spiritual specifics of the human person. In economic activities, or general management area (on the principles of sustainability) man can be seen as: driver man or management entity, one consumer, one as an indicator of standard of having to use the environment. Viewed in the context of the development of sustainable agriculture first paragraph of this three-type separation can be a man as a farmer in the broadest sense (planners, managers, direct agricultural producers, inventors, etc..) - Simpler work force, which is the most important social geographic potential for development of sustainable agriculture . Even a rough idea of scale attempt at determination of agricultural producers in the preceding sentence leads us to the necessity of studying the demographic structure of the labour force in agriculture, but also its spatial distribution, abundance, population density (general, rural and agricultural), natural and mechanical demographic trends and forecasts. The second paragraph of this division is the subject of discussion around the economic aspects of sustainable development and the inherent right to market the new business model that sets the centre of the market needs (consumer), while the third paragraph of the best shows reversible relationship farming - a landscape in which it operates.

Conclusion

Rural planning must be followed or the consequent socio-economic planning of the village. Need harmony of these two forms of planning stems from the fact that only a developed society, improved farming technology can provide efficient and Rural Development. It should also be borne in mind that a healthy environment today is more expensive and only economically and technically developed societies can “produce” a healthy environment. True natural environment in terms of the initial product of natural processes and cannot be produced whatever the technological level of a society. However, already degraded environment, a large scale case, it can be repaired only if the company is technically and economically developed.

Fundamentals of measures to improve the environmental quality of rural territory in the municipality of Vrbas which must be implemented in the regulation of the village are: reclamation of the territory, water, waste, greening, street paving and sidewalk construction. Sanitary drainage reclamation means rain water, draining wetland territories, especially torrential water regulation. To improve water supply in rural areas should preferably rely on the construction of a single water supply, and if it is not possible to build such wells for which protection is provided hygienic water. Drainage must be provided for the first mass use of social facilities (schools, hospital, local community centre, etc.), and then later to a farm and residential buildings. To improve sanitary conditions, it is necessary to organize the collection, exporting, storage and use of various wastes. For this purpose should be to implement the

following measures: the construction of rational waste collection centres, greater use of composting organic waste, construction of rational landfill, establishing proper hygiene cattle graveyards, use of organic waste for energy purposes, a reorientation of agricultural production to healthy food.

Literature

1. Breheny, M. (1994): *Defining Sustainable Local Development***,** Discusion Paper, No 23. Department of Geography, Universiti of Reading, UK.
2. Davidson, J., Wiberley, G. (1977): *Plannimg an the Rural Development*. Urban and Regional Planning Series. Vol. 18. Pergamon press, Oxsford.
3. Group of authors (1998): *Opština Vrbas*, institut za geografiju, PMF, Novi Sad.
4. Katić, B., Cvijanović, D., Cicea, C. (2008): *Organska proizvodnja u funkciji zaštite životne sredine u Srbiji - stanje i regulativa*, Ekonomika poljoprivrede, vol. LV, no. 3, p. 267-276, Beograd.
5. Kusters, N. (1996): *Eco agro tourism,* The International Conference on natural areas and tourism. Gruppo Planner, Las Palmas.
6. Lješević, A. M. (2003): *Životna sredina sela i nenastanjenih područja*, Geografski fakultet, Beograd.
7. Lješević, A., M., Markićević, M. (2009): *Geografske premise održivog razvoja poljoprivrede*, Glasnik Srpskog geografskog društva, Sveska LXXXIX Br. 2, str. 127-134, Beograd.
8. Lješević, A. M., Mrkša, M. M., Milanović, M. M. (2011): *Ekološki aspekti planiranja ruralnog razvoja*, Glasnik Srpskog geografskog društva, Sveska XSI br. 1, str. 33-50, Beograd.
9. Paraušić, V., Cvijanović, D., Hamović, V. (2008): *Organska proizvodnja Republici Srbiji – analiza stanje i pravci razvoja*, Ekonomika poljoprivrede, vol. LV, no. 4, p. 355-364, Beograd.
10. Popović, V., Katić, B., Savić, M. (2011): *Ruralni razvoj u Srbiji i lokalne zajednice*, Ekonomika poljoprivrede, vol. LVIII, no. 1, p. 33-44, Beograd.
11. *Strategija ruralnog razvoja Srbije* (2009): Ministarstvo poljoprivrede, vodoprivrede i šumarstva, Beograd.
12. Vićentijević, D., Aćimović, LJ., Stevanović, S. (2011): *Uticaj tehnološkog razvoja na održivi razvoj poljoprivrede i zaštitu životne sredine*, Ekonomika poljoprivrede, vol. LVIII, no. 2, p. 191-203, Beograd.

ODRŽIVA POLJOPRIVREDA KAO EKOLOŠKA OSNOVA ODRŽIVOG RURALNOG RAZVOJA OPŠTINE VRBAS

Milutin Mrkša[3], Tamara Gajić[4]

Rezime

Poljoprivreda predstavlja osnovno zanimanje ruralnog stanovništva i kao takva predstavlja osnovu razvoja i napretka,ne samo ruralnih područja, već i lokalnih zajednica u celini. Kao i svaka druga delatnost i poljoprivreda ima niz negativnih uticaja na životnu sredinu, pre svega na poljoprivredno zemljište koje ujedno predstavlja osnov i uslov egistencije poljoprivrednog stanovništva. U ovom radu će biti predstavljani osnovni uslovi života i zanimanja u ruralnim delovima opštine Vrbas, kao i njihov odnos i uticaj na životnu sredinu. Takođe će biti predložene određene mere smanjenja uticaja poljoprivrede na životnu sredinu i održivo unapređenje iste u kontekstu održivog razvoja. Isto tako biće date smernice razvoja i unapređenja naseljenih mesta u cilju unapređenja životne sredine čime bi se poljoboljšali uslovi života domicilnog stanovništva.

***Ključne reči**: održiva poljoprivreda, životna sredina, održivi ruralni razvoj.*

3 Dr Milutin M. Mrkša, „Right at the first chance", Pokrajnski sekretarijat za nauku i tehnološki razvoj AP Vojvodine, Prirodno – matematički fakultet, Novi Sad, E-mail: mmrksa@gmail.com

4 Dr Tamara Gajić, Visoka Poslovna Škola Strukovnih Studija, Novi Sad, E-mail: gajic_tamara@yahoo.com

Review Article

Economics of Agriculture 1/2013
UDC: 368.5

INSURANCE IN AGRICULTURE

Milan Počuča[1], Zdravko Petrović[2], Dragan Mrkšić[3]

Summary

Damage in agricultural production can be crucial for the economy of a state, especially in countries where agricultural production prevails in the gross national income, as it is the case with Serbia. However, it is equally important that our agricultural producers manage incomes and expenditures in an efficient manner and optimize profit per surface unit, which is the basis of their business. Insurance plays an important part in the protection of the income statement of every agricultural producer as insurance costs are at the level of 1.5% to 2% on average of the production value, i.e. they are very low and saving on insurance could lead to the loss of the total yield and consequently total profit. However, agricultural insurance in Serbia is not developed enough. The state's attempt to boost insurance development amounts to insurance subsidies, which, in the period of the implementation of this regulation, i.e. since 2006, has raised awareness of the need of such a type of protection of agricultural producers.

Key words: *agriculture, insurance, subsidies*

JEL: *K13, Q14*

Introduction

People are not prone to taking risk and prefer certainty than uncertain consumption levels; essentially they prefer more certain outcomes[4]. This does not mean that risk should be avoided at all costs, but only that it should be considered when taking decisions[5]. From the point of view of an agricultural producer, insurance represents a method of the transfer of risk from themselves to an insurance company, in exchange for a premium in a certain amount. Historically, agricultural insurance has evolved from insurance of a town and against fire. In time, the scope of insurance coverage expanded risk-wise and the agricultural insurance premium at the global level eventually reached 18.5 billion

1 Associate Profesor, Business Academy, Faculty of Law, Novi Sad, Serbia, E-mail: pocucabmilan@gmail.com

2 Full Profesor, University Siegmund Freud, Wien, Austria, E-mail: zdravko petrovic@ikom.line

3 Full Profesor, Faculty of Tehnical Science, University of Novi Sad, Serbia, E-mail: draganmrksic@yahoo.com

4 Samuelson, P. A., Nordhaus, V. D. (2009): *Ekonomija,* Mate, Belgrade, pg. 209.

5 Njegomir, V. (2011): *Poljoprivredna proizvodnja i rizici*, Osiguranje Zagreb, no. 6, pg. 59.

dollars in 2008.[6] Insurance of agricultural crops and animals in Serbia is mostly used by professional agricultural producers and agricultural companies. Unfortunately, a very high percentage of small agricultural producers, especially those working on land of small surface, are not insured, so their income largely depends on the whims of nature. It is believed that there are almost two million people in Serbia living on agriculture and that there are 450,000 registered agricultural estates, only several percent of which are insured, according to assessments. Insurers emphasise that big agricultural companies are insured every year, but not always and not all of the same risks. Only estimates are used when it comes to small companies which show that crops and animals are insured by only five to ten percent of small farms. Given the importance of agriculture as an economic sector of society, it is of great importance to fairly perform classification of obligations between the parties, but the actions of dealing insurers to insured consumers that may have a significant impact on the decision regarding the purchase of products or insurance. [7] The European Union has adopted Directive 2005/29/EC of the European Parliament and the Council, which regulates the behaviour mentioned above. In agriculture insurance, brokers have an important role in insurance given the distribution of the settlements, and a limited number of branches of insurers (mainly in major towns in Serbia). It is important to note that, unlike other brokers, an insurance broker must primarily be able to make risk analysis and the concept of insurance for the insured taking into account the risks to which it is exposed.[8] Perhaps the situation in terms of more accurate data will be known after a detailed census of agriculture, which was conducted in 2012. The subject of research is dual. In the first part of the paper, the analyses refer to types of insurance in agriculture, their characteristics and presence in practice of insurance companies in the Republic of Serbia. In addition, normative framework and the system of government subsidies are presented the purpose of which is to influence upon wider presence of insurance in agriculture. The initial premise of the research is that the presence of insurance of agriculture is in disproportion in relation to the economic importance of agriculture as economic activity in Serbia. The hypothesis is that further development of insurance in agriculture of Serbia is not possible without the support of the State through the system of subsidies, that the decree-level regulations have improved the existing conditions, but they have not made producers interested to a higher degree in the institution of insurance. The research has mainly theoretical character. The methods that were used are characteristic of economic and legal sciences. The methods of descriptive statistics were used for verification of the part of the hypothesis about erratic and insufficient filing of applications for subsidies (on the data of the ministry responsible for agriculture about filed applications and paid subsidies for the period from 2006 to 2012).

6 See: *Sigma*, 1/2009, Swiss Re, Zurich, 2009.

7 More precise in - Slavnić, J. (2006): *Nekorektna trgovačka praksa i oblast osiguranja,* Pravni život, Beograd, no. 11/2006, pg. 515.

8 On the work of agents and the legal relationship between an agent and insurer, more in - Ivanjko, Š. (2012): *Pravni odnos između posrednika u osiguranju i društva za osiguranje,* Pravni život, Beograd, no. 11, pg. 401-414. Also in - Musić, F. (2003): *Pasivna prodaja polisa osiguranja,* Svijet osiguranja, Zagreb, no. 1, pg.63.

In practice of insurance companies in Serbia, we will face several types of insurance in agriculture. These are: crop insurance, animal insurance, insurance against risks of drought and crop insurance against excess rainfall. We will point out the features of these insurances.

Crop insurance

Crop insurance premium accounts for only 2.04% of the total of the concluded non-life insurance in our country in 2011. Given the much higher share of agriculture in total social product of Serbia[9], it is obvious that the coverage of insurance in this sector is significantly lower than the actual needs and opportunities. We shall set forth the crop insurance based on the General Conditions for crop insurance.[10] Since there are many special conditions in addition to General Conditions, we remind to the relevant principle for the specific conditions to be directly applied, but general conditions are applied on anything not regulated by them, where special ones must be in compliance with the General Conditions. The subject in this sector of insurance can be all crops, including stubble, sub-crops, cover crops, perennial crops, ornamental plants; fruit, vine and forest seedlings; vegetable seedlings and other crops; young forest crops to six years of age; plaiting willow, reed, poplar.[11] The rule is that the above crops which were already damaged by risks against which the insurance is done cannot be insured. Accordingly, if it is determined after the conclusion of the contract that the insured crop or fruit was damaged from risks covered by this insurance before the conclusion of the contract, the insurer has the right to request cancellation of the contract. There are basic and additional risks in the sector of crop insurance. The basic risks are hail, fire and lightning, and the additional risks in all crops are storms, floods and spring frost, while it being autumn frost in seed corn. In this sector the general rule that the insurance also covers the additional risks is applied as well, if the supplementary insurance is agreed and an additional premium is paid. It is determined that the insurance against additional risks can be concluded for crops of social sector, and if a so-called collective insurance is concluded

9 Total non-life insurance premium in 2011 amounted to 47,321,290,000.00 RSD. A total of 3.710.890 non-life insurances has been concluded. When it comes to crop insurance, 11.548 insurances has been concluded in that year, and the premium amounted to 968,926,000.00 or just 2.04%. When it comes to the damage, a total of 4.244 crop damage was reported in 2011, of which 1.179 were rejected. On behalf of the remaining damage a total of 673.4 million RSD was calculated. See the results of operations of insurance companies in 2011 on the website of the National Bank of Serbia.

10 *Opšti uslovi za osiguranje useva i plodova*, DDOR Novi Sad a.d., Novi Sad, 1996. In addition to general conditions there are special conditions such as Special conditions for crop insurance against storm, for insurance against flood, against spring frost, Special conditions for corn insurance against the loss of seed quality due to autumn frost, for crop insurance against the quality loss, for crop insurance in greenhouses, for insurance of trees, fruit trees and grapevines – young plantations until entering into race, for crop insurance after harvesting, or picking, for fruits insurance against the loss of quantity and quality, for insurance of table grapes against the loss of quantity and quality, etc.

11 On the agriculture insurance, see more in – Mrkšić, D., Petrović, Z. (2004): *Pravo osiguranja,* Fakultet za poslovno pravo, Beograd, pg. 192-199.

then crops of individual farmers can also be covered. Here the notion of collective means an insurance covering at least 50% of area with a specific crop or at least 30 households with all areas with a certain crop in the territory of a settlement. Also, a rule that insurance against additional risks can be concluded only if insurance against basic risks is previously concluded is applied, except if the insured crop, or plant, is protected by web against hail. In order to make a selection, the areas which will be covered by insurance that is particularly undesirable in this insurance sector (e.g. based on years of observation, lots that are more or less very rarely affected by the influence of certain risk can be accurately spotted) it is provided that the insured is obliged to insure all areas with crops and fruits of the same kind. However, if he still does not do so, insurance indemnity will be paid in proportion between the insured and the actual area under these crops and fruits. Analogously, when the insurance contract is concluded by the number of trees or vines, the insurance indemnity is paid in proportion between the insured and the actual number of trees and vines. In accordance with the general principle set out in the Law of Obligations that the policyholder shall report the circumstances relevant to the assessment of risk, or that he shall notify the insurer of the risk changes, if during the period of insurance there is a change in the structure of the insured areas, the policyholder is obliged to, without delay, inform the insurer. There are some specifics in this insurance sector in the procedure of determining the process damage. Given the stage in which there was a damage of insured crops or fruits, there are two types of assessment – single and repeated assessments. It is the rule that damage assessment carried out at a time has the character of a final assessment, provided that it is carried out in cases where the damage occurs at the stage of maturation or immediately before maturation. The so-called repeated assessment is carried out in cases where the damage occurs before the maturation stage and it is not possible to immediately determine its ultimate severity. When conducting a repeated assessment, the rule is that the previous estimate has a character of a pre-estimate or an inquest, and the final examination is the final assessment. There are often damage assessments done by expertise in this insurance sector, where the rule is that each party shall appoint in writing its expert within five days from the date of the assessment, and in cases where the insured or his representative was not present at the assessment, in the course of three days from the date of assessment communication. Therefore, the damage assessment shall not be conducted by expertise immediately, nor does it replace the assessment process conducted by the insurer, but it is conducted subsequently, and when practically there is no compliance of the insurer and the insured of the results of the assessment conducted by the insurer.

It is important to point out that according to the general conditions for crop insurance we set out, the value of insured crops or fruits is calculated in principle so that the expected return is calculated at market or protection rates determined by the competent state authorities, and for the agreed production the prices that are agreed with the production organiser are applied. The rule is also for crops whose prices are determined at the market or the protection price is not provided, a calculation is done at prices that are agreed and registered in the policy. Respecting the principle of equivalence, in terms we set out, a possibility that the policyholder may request a reduction of the insurance amount is provided if the actual value of the insured crop or fruit of the same kind is less than the amount insured.

According to the above principle, since it reduces the insurance amount, and with it the upper limit of liability of insurer, the premium amount is also reduced as a key obligation of the policyholder, for the period from the date of written request to the insurer for reduction of the insurance amount, until the expiration of insurance period. Conversely, the policyholder has the right to increase the insurance amount, if during the period of insurance the actual value of insured crops and fruits increases, provided that the insured event did not already occur. Of course, the insurance premium then also increases because the insurance amount increases. Consistent with the principle that the premium is paid only for a risk to be borne, the rule is provided that in addition to the concluded insurance, if some of the insured crops is not sown or planted, and therefore the insurer did not bear any risk, the policyholder is not required to pay the premium for these crops.

The principle of the premium indivisibility has been established with crop insurance, which is reflected in the rule that if the crop or fruit is simultaneously insured against several risks, and during the insurance there is a realisation of any of the risks insured, the insurer keeps the entire premium for all risks. Given the dynamics of the relationship between the insurer and the policyholder and frequent changes within the period covered by insurance, it is provided that the insurer has the right to, during the insurance period, perform a so-called risk audit, i.e. an overview of the condition of insured crop, which he performs together with the policyholder. It is interesting that even in the case of crop insurance a self-insured retention can be agreed. Therefore, if it is agreed that the insured shall bear a portion of the damage, which is called the agreed self-insured retention, if the insured event occurs, the damages indemnity will be paid not to include that portion of the damage that was in the amount of the agreed self-insured retention. In other words, even with crop insurance one of the most important insurance categories is used – the franchise.

With the crop insurance, it is also provided that the insurer reimburses the costs of insurance which are caused by the attempt of the insured to remove the immediate threat of occurrence of the insured event, and an attempt to limit its harmful consequences. The condition for this is that the insurer agreed or arranged with the insured for the certain measures to be taken. In the sector of crop insurance, it is essential to explain some elements that are significant in practice.[12] It is important to emphasise that the tariffing in this sector is made by culture sensitivity classes. Thus, all cultures are classified, with respect to sensitivity to risk, in different classes (e.g. against the risk of hail in 10 sensitivity classes, against the risk of storms in 10 sensitivity classes, against the risk of floods in 3 sensitivity classes, against the risk of spring frost in 4 sensitivity classes, etc.).

On the other hand, classification of areas is done in classes of risks depending on the vulnerability and exposure to risk. So some areas and territorial units are classified – against the risk of hail; against the risk of storm; against the risk of flood; against the risk of spring frost in 10 sensitivity classes. Classification of territorial units in risk classes is made based on their exposure to certain risks, or on the basis of the so-called technical results

12 Presentation based on - *Tarifa premije za osiguranje useva i plodova*, Osiguranje useva i plodova, DDOR Novi Sad, Novi Sad, 1990, pg. 50–53.

achieved in insurance of crops and fruits against certain risks. As a basis for classification the technical result (the ratio of paid damages and technical premium) is taken, achieved in the last ten years ending with the year in which the classification is done (the so-called revalued cumulative technical result of territorial unit).

As we have already noted, the franchise also finds its application in this sector of insurance. Hence, a so-called integrated franchise of 5% is already implemented in premium rates (there are exceptions). Policy excess is determined as a percentage of the amount of damages, by reduction of insurance premium for as much as percent the agreed franchise amounts (maximum 50%). However, the policy excess can be arranged in a certain percentage of the damaged crop insurance amount (e.g. insurance premium is reduced by 15% if the franchise of 10% is agreed, and so on).

In order to encourage the conclusion of insurance in this industry, discounts are given for group insurance of agricultural crops in the private sector, for concluded contracts on long-term insurance, for insurance of other crop in the same area after the insurance of first crop.[13]

Animal insurance

In a totally concluded premium of non-life insurances in Serbia in 2011, the animal insurance covers only 0.56%, which is considerably less than the share of livestock in total GDP and of course far from the real needs for animal insurance.[14]

The significance of animal insurance in modern animal husbandry is also confirmed by the theoretical position we cite. According to this position the insurance, as an institution of economic protection, has a significant role in livestock production, given that it organises funds raise for insurance funds and performs compensation of damage caused within the covered risks and insurance amounts, thus representing the factor of safety in production, especially since the subject of insurance are living beings, then it encourages implementation of preventive and repressive measures, and in the case of insurance with included health care it contributes its scope and quality. On the same view, this type of insurance also encourages cooperative forms of production and increase of livestock.[15]

Animal insurance is regulated mainly by General and Special conditions under which we will analyse this type of insurance. As in other cases where there are General conditions and

13 See in: Bubić, J., Hajnrih, J. (2012): The analyses business performances of agricultural enterprises in Vojvodina during the current crisis, Economics of Agriculture, Vol. 59, no. 2/2012, pg. 177-183.

14 In 2011, only 1.487 insurances were concluded, and the written premium was 269,000,000.00 RSD. As for the damage, the situation with animals is as follows: 3.131 damages were reported (more than double the number of policies because several animals were insured by a single policy), 472 damages were rejected. Total of 167.14 million RSD was calculated on behalf of recognised damages.

15 Katrinka, Z. (1996): *Osiguranje životinja,* Priručnik za praksu osiguranja i reosiguranja, DDOR Novi Sad, Novi Sad, pg. 316.

Special conditions, Special conditions are primarily applied, but the General conditions are applied too, when relations are not regulated by the Special conditions, and Special conditions must be in accordance with the General conditions.

In accordance with the General conditions, the subject of this insurance can be healthy domestic animals such as: ungulates – cows and bulls, sheep, pigs, provided they meet the age requirements. Thereby the subject of insurance cannot be diseased animals or animals suspected of being diseased; exhausted, stunted, blind and animals in poor condition; animals kept in poor hygienic conditions as well as other animal species, except for those the insurance under special conditions was provided for. The insured is obliged to pay compensation for damages resulting from the death of animal that is insured or an accident; involuntary slaughter due to illness or an accident (so-called involuntary slaughter of necessity); involuntary slaughter for economic reasons. In doing so, the insurer is not obliged to compensate for the damage resulting from the involuntary slaughter for economic reasons if the diseases were caused by prolonged, excessive and unreasonable exploitation of animals or because the animals were not treated on time or even at all. It is important to emphasise that the risks of treatment may be covered by insurance, provided they are specifically contracted, which must be stated in the policy or in a separate supplementary contract.

We also state what is considered an accident in terms of the Conditions we state. It is every sudden, independent of the will of the insured event, which acts from the outside and suddenly on the insured animal (such as fire, lightning, flood, storm, etc.) and has as a consequence its disease, treatment, involuntary slaughter, involuntary kill or death.

With animal insurance, the institute of waiting period is also used which means the period within which the insurer is not obliged to pay damages, even though the insurance contract is concluded. Thus, for example, it can be agreed that the insurer will be required to pay damages due to death, involuntary slaughter of an insured animal, but only after the expiration of 14 days from the time of contract signing.

The place of insurance is important, since the insurance coverage is given until the insured animals are in a location designated on the insurance policy. However, the animals are also insured during their time on land owned by the insured, at nearby fairs, as well as during oestrus or during transportation to that place or from it.

The insurance will cease to exist after the alienation of the insured animal is done, at the time in which the insured ceases to keep the animal. However, if the ownership of the insured animals, on any basis other than sales is transferred to a third party, then the contract continues to exist, but between the insurer and legal successor of the insured, all under the condition that the premium is paid. There is also a possibility to introduce another animal as an insurance subject rather than an alienated animal, provided that it meets all the insurance requirements.

Under the Conditions we explain, it is regulated that in the case when an insured animal dies, gets slaughtered or killed before the start of the liability of the insured or it is found that the policyholder has incorrectly reported the age of the insured animal (or its age is

over the limit taken by the insurer in the insurance of certain animals) during the signing of contract, the insurance contract becomes null and the paid premium is then returned to the policyholder. However, if the insured animal is dead, slaughtered or killed after the start of effect of insurance contract for the insurer (after the expiration of the waiting period), then the insurer is entitled to the entire premium amount for the agreed insurance period.

In accordance with the principle that only the premium corresponding to the seriousness of the risk may be charged or retained, it is a rule that if the insured animal is dead, slaughtered or killed after the start of the insurer's liability from the risks not covered by the insurance, then the policyholder gets the premium amount back for unused duration of insurance time. In this insurance sector too, the insured is required to take provided, contractual and all other measures to prevent the occurrence of insured event, or when the insured event occurs, he is required to do everything in his power to limit its harmful consequences. The insurer is, of course, required to compensate the insured for the costs of losses, as well as other damage caused by reasonable attempt to eliminate an imminent danger of occurrence of the insured event. It is also a rule that were the insured fails to fulfil his obligation to prevent the occurrence of the insured event, or to prevent limitations of its harmful consequences, then the obligation of the insured will decrease by as much as a greater damage was caused because of this failure.

It is crucial to look at the way in which the amount of insurance is determined. The basic rule under the Conditions we explain is that the animals are insured to an amount that is agreed with the insured, therefore an amount of insurance is determined by mutual agreement. In doing so, the amount of insurance can be at highest the actual value of the animal at the time of conclusion of the contract, and for the young and fattening animals the value it will achieve by the end of the fattening period, or until the end of insurance period. In doing so, it is determined that the actual value of the animal is a product of its weight and market price on the date of conclusion of the contract, or on the day of damage calculation (there is a possibility of a different contract). Animals which are kept in packs, and have an equal value, can be insured to an average insurance amount, which is required primarily for reasons of convenience or expediency.

In order not to make a selection of risks, or the selection of animals that are insured, and especially abuse, it is a rule that if the insured has more animals of the same species, he is required to insure all the animals of the same species he owns, regardless of ownership, provided they are capable of being insured. Only by special consent of the insurer can just one part of one animal species be insured. In doing so, the uninsured animals are also introduced in an insurance documentation, with a description of each individual elements of their identification which, as a rule, accompany a special marking of insured animals.

Given the nature of the contractual relationships, the right of the insurer was also established in this type of insurance to make the control of the insured animals, damage occurred and all other relevant facts, which are subsumed under the so-called right to a risk audit. In compliance with the basic contractual obligations, the obligation of the policyholder who intends to undertake an action during the insurance period which will increase or decrease

a risk is to immediately notify the insurer before taking such actions. Due to the nature of the contractual relationships there is an obligation of the insured to immediately notify the insurer on occurred adverse event, and no later than three days after learning about its occurrence. In this insurance sector there is a full implementation of rules of a lower premium for the next period of insurance (bonus) and an increase in premium for the next period in the form of allowances (malus). Decrease or increase in premium for the following year is determined primarily on the basis of actual technical result (the ration of paid indemnity from insurance and technical premium expressed in obtained percentage). In this insurance sector the technical result is expressed cumulatively, for the period of last five years of insurance.

Technical result is determined by the types and categories of animals as follows:

a) for some insured who have more animals in insurance;
b) for some areas (according to organisational forms, settlements, etc.);
c) for some property sectors (social and private sector).

Thus, based on the obtained technical result the reduction or increase in premium is determined for the next period of insurance, with the application of the so-called correction factor to the basic premium rate (e.g. if the technical result was achieved up to 30%, a discount up to 50% is granted with the application of correction factor 0.5, if the achieved technical result is over 180%, the increase in premium of 100% is done with the application of correction factor 0.2, etc.).

Allowances and discounts find their full application in this insurance sector too. In this way the special allowance for the exclusion of the provisions of the waiting period is charged (period after the conclusion of the insurance contract in which the insurer's obligation has not started). In this insurance sector discounts on premium which are approved by the insurer to the insured find their application too, if the insurance contract was concluded to a certain number of years (for insurance of 5-9 years a discount is 5%, for insurance of 10 and more years a discount is 10%). Also, certain discounts are approved if the insured of the private sector insure all their animals. To determine the amount of the premium, it is also very important to which risks group the insured animals belong. The risks group is, otherwise, defined as the set of animals in which an equal effect of noxious factors is noted and manifested for a long time, as well as those regarding the risks making a unique risk. Thus, in the risk group I, which therefore has a lower premium rate, those animals are assigned that are found in places with excellent organisation and production technology, where prevention is fully represented, and in the fifth risk group, which has a much higher premium rate, those animals that are in places where the conditions of housing, accommodation and food are less satisfying.[16]

The general rule in this insurance sector is that the premium rate, allowances and discounts are determined for the insurance period of one year, with premiums calculated in a certain percentage of the amount insured. These insurances may be concluded for a period of less than one year, but then for a certain period of time a particular process is calculated in relation to the annual premium.

16 See in - *Animal insurance premium tariff* of DDOR Novi Sad a.d., Novi Sad, 1990.

Insurance against the risk of drought

The agricultural production is increasingly influenced by climate change, and our country was affected by severe droughts over the last decade, having devastating consequences on crops and fruits. Drought is one of the largest agricultural risks which can reduce yield over 50%. That is why some insurance companies launched a new product that provides financial compensation to farmers for the loss of yield due to the occurrence of this adverse climate event – insurance against the risk of drought.[17]

The following can be insured against the risk of drought: mercantile and seed corn, mercantile and seed soy and mercantile sugar beets. Drought means the reduction of rainfall in relation to the authoritative long-term precipitation in the periods in which the crops need for the water is greatest (for corn and sugar beets – during May, June, July and August, for soy – during June, July and August) and which results in a reduction of the yield of the insured crop.

Defining drought in insurance conditions has a basis in many years of meteorological reports of the Republic Hydro-meteorological Institute and is a reduction of yield based on rainfall reduction in the reference time period in relation to long-term average. Thus, the insured risk is a drought, which includes the reduction of authoritative rainfall compared to authoritative long-term rainfall average. Amounts of authoritative precipitation and authoritative long-term average depend on the type of insurance subject that can be insured.[18]

The following crops are not considered the subject of insurance: crops which are streaked (planted) on plots that do not have their identification, which are streaked (planted) on plots that are according to drought risk zones geographically not located within the administrative municipalities. The insurance does not cover damage or yield reductions caused by: any other reason other than the insured event; the effects of disease, pests or poor germination; non-compliance of production technology, i.e. application of optimal agro-technical measures for a given area and a given culture (seeding dates, seeding depth, dressing, etc.) or their improper implementation; the effect of high temperatures, uneven distribution of rainfall during the growing season, lack of deep moisture, inadequate humidity and any atmospheric and other influence that is not a drought risk.

Crop insurance against excess rainfall

Farmers need protection from increasingly present climatic changes that have disastrous consequences. Excessive precipitation is one of the biggest risks that cause great damage to farmers. This insurance is a new type of insurance on our market, which provides a financial protection to farmers due to excessive precipitation. This type of insurance covers the most important crops: wheat, barley, oats, rye, canola, soy, corn, sugar beets

17 See in - *Special conditions of insurance against the risk of drought,* DELTA GENERALI osiguranje a.d., Belgrade.

18 See in – Stojanović, Ž., Gligorijević, M., Rakonjac Antić, T. (2012): The role of the marketing mix in the improvement of agricultural insurance, Ekonomics of Agriculture, Vol. 59, no. 4, p. 769-781.

and sunflower.[19] Excessive precipitation is extremely high rainfall due to which, in a short period of time, during two adjacent calendar decade (in May and June, when this risk is the most prominent) water drift is created on plots which destroy the insured crop, regardless of their proximity to canal, river or lake.

Unlike insurance against flood, in this case damage caused by water leakage from river channels, canals or lakes is not included. Data on rainfall amount is determined for each risk zone of excessive rainfall determined on the basis of climatologic stations of the Republic Hydro-meteorological Service and they represent clear evidence, submitted by the RHMS in an official form to the international institutions. This type of insurance can be concluded from the time of crop emergence to May 1st of the current year.

Insurance subsidies in agriculture

A special problem in agricultural insurance are the catastrophic damage caused by natural forces, such as hail, floods, droughts, floods or can be caused by pests or epidemiology diseases. In such situations, when market mechanisms are being scheduled, a need for state intervention arises in the insurance market. It is achieved through subsidies. Subsidies range from 15% to 75% of insurance premium.[20]

In the Republic of Serbia, the premium payment of crop insurance, as well as animal insurance is facilitated by the subventions given by the Ministry of Agriculture, Trade, Forestry and Water Management[21]. However, the reason for subsidising insurance premium in Serbia is not so much due to the negative effects of natural forces, as much as it is due to complete impoverishment of farmers. The Government of the Republic of Serbia has adopted the Regulation on conditions and way of use of funds for reimbursement of insurance of animals, crops, fruits, nursery gardens and young perennial plants in 2012. The Regulation stipulates conditions and manner of use of funds for reimbursement for insurance of animals and areas under crops reported in 2012.

The right to use the funds for reimbursement of insurance of animals and areas under crops reported in 2012 is given to an individual - the holder of a farm that has been:

1. registered in the Register of Agricultural Holdings, and
2. in an active status.

The holder of a farm has the right to use the funds for reimbursement of insurance in the amount of 40% of the insurance premium net without tax included for non-life insurance premium, if he has insured:

19 See in - *Special conditions of insurance against the risk of drought*, DELTA GENERALI osiguranje a.d., Belgrade.

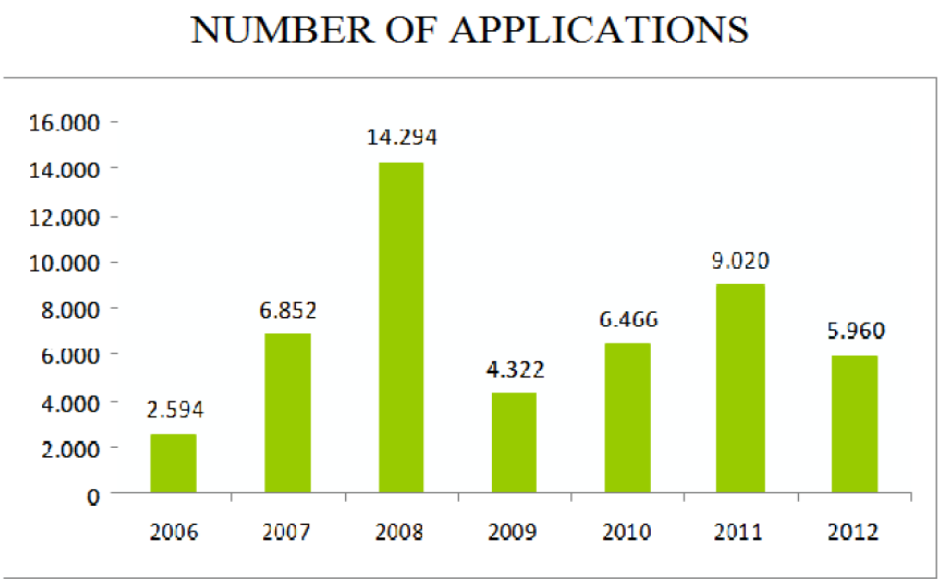
20 See in – Njegomir, V., op. cit., pg. 63.

21 *Uredba o uslovima i načinu korišćenja sredstava za regresiranje osiguranja životinja, useva, plodova, rasadnika i mladih višegodišnjih zasada u 2012. Godini,* Službeni glasnik Republike Srbije, br. 38/12.

1. animals against the risk prescribed by conditions of insurance companies,
2. crops and fruits against the risk of yield reduction,
3. nursery gardens and young perennial plants before entering into race, against the risks prescribed by the insurance companies.

If, on the basis of the Regulation on stimulating agricultural production through credit support by subsidising a part of the interest in 2012, the insurance premium was paid by the Ministry of Agriculture, Trade, Forestry and Water Management, that policy cannot be the basis for the realisation of incentives. Insurance of sustainable and balanced development means a universal principle of approach to financial services, commonly referred to as micro-finance. Within micro-finance, micro-insurance has developed over time, which allows financial compensation in case of damage. Micro-insurance was named not because of the magnitude of the risk, institution or delivery channel, but for the fact this type of insurance is adjusted to the needs of people with lower income.[22] Providing insurance coverage in agricultural production which is based on the principles of micro-insurance can be long-term sustainable. Distribution must be achieved through already established networks, such as agricultural cooperatives, in order to minimise transaction costs, and the bid is achieved on a collective basis.[23]

Table 1. Number of filed applications[24]

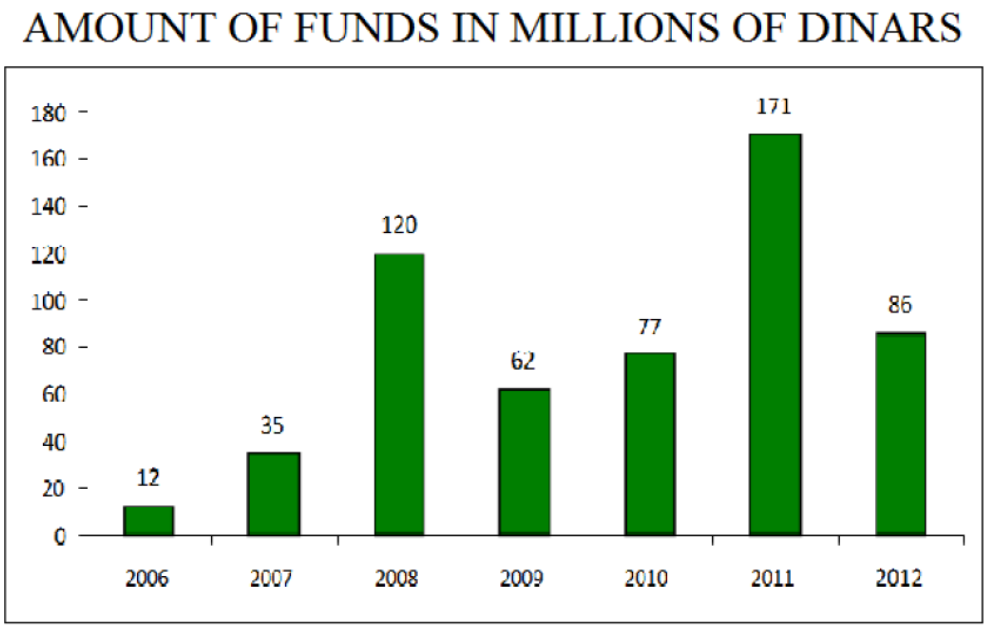


22 See in - Churchill, C. (2008): *What is Insurance for the Poor?,* in Churchill, C. (ed) *Protecting the Poor: A Microinsurance, coprendium* (2008), International Labor Organization, Geneve.

23 Njegomir, V., op. cit., pg. 66.

24 Source: Official data of the Ministry responsible for agriculture, presented in the report: Mahmutović, S. (2012): *Podrška osiguranju u poljoprivredi*, Drugi poljoprivredni forum „Hrana za Evropu", Ekonomski institut Beograd, Subotica.

Table 2. Amount of funds in millions of dollars[25]



There is an unevenness of filing of applications and amounts of funds granted for subsidies in insurance of agriculture by years. The data indicate a relatively small presence of applications for subsidising in insurance of agriculture, probably due to the lack of information among agricultural producers about unquestionable advantages of insurance.

Conclusion

Insurance plays an important role in protecting the income statement of each farmer. Yet, in spite of that, the insurance in agriculture in Serbia is underdeveloped. The attempt of the state to influence the development of insurance represents subsidising of insurance, that has, in the period of application of the Decree on conditions and manner of using the funds for compensating the insurance of animals, crops, fruits, nursery-gardens and young perennial plantations since 2006 until now, first of all, managed to strengthen awareness of the need for this kind of protection of farmers, but it has not significantly influenced an increase in the number of agricultural insurances.

Insurance of crops and animals in Serbia is mostly used by professional farmers and agricultural companies. Unfortunately, a large percentage of small farmers, especially those who deal with smaller areas of land, are not insured, and thus their income are very much dependent on the whims of nature.

25 Source: Official data of the Ministry responsible for agriculture, as in Table no. 1. Tables listed by: Mahmutović, S. (2012): *Podrška osiguranju u poljoprivredi*, Second Agricultural Forum "Hrana za Evropu", Belgrade Economics Institute, Subotica.

The Decree is a good example of state intervention for increase of the range of insurance in agriculture, but it is only a transitional solution, because producers have no developed awareness about advantages of insurance and have not got accustomed to seek for such services. Insurance organisations, on the other hand, have no economic motive to render insurance services to a small number of users of insurance in agriculture and they are therefore not developing this sector of insurance. In such conditions the existing state could be only improved by introducing compulsory insurance in agriculture.

References

1. Bubić, J., Hajnrih J. (2012)*: The analyses business performances of agricultural enterprises in Vojvodina during the current crisis,* Economics of Agriculture, vol. 59, no. 2, IAE Belgrade, Serbia.
2. Churchill, C. (2008): *What is Insurance for the Poor?,* in Churchill, C. (ed.) Protecting the Poor: A Micro insurance, coprendium, International Labor Organization, Geneve.
3. Ivanjko, Š. (2012): *Pravni odnos između posrednika u osiguranju i društva za osiguranje (The legal relationship between insurance brokers and insurance companies),* Pravni život (Legal Life), Belgrade, no. 11.
4. Musić, F. (2003): *Pasivna prodaja polisa osiguranja (Passive sales of insurance policies),* Svijet osiguranja (Insurance World), Zagreb, no. 1.
5. Katrinka, Z. (1996): O*siguranje životinja (Animal insurance),* Priručnik za praksu osiguranja i reosiguranja (*Handbook for the practice of insurance and reinsurance*), DDOR Novi Sad.
6. Mahmutović, S. (2012): *Podrška osiguranju u poljoprivredi (Support agriculture insurance in agriculture)*, Second Agricultural Forum „Hrana za Evropu" (Food for Europe), Belgrade Economics Institute, Subotica.
7. Mrkšić, D., Petrović, Z. (2004): *Pravo osiguranja (Insurance Law),* Faculty of Business Law, Belgrade.
8. Njegomir, V. (2011): *Poljoprivredna proizvodnja i rizici (Agricultural production and risks)*, Osiguranje (Insurance), Zagreb, no. 6.
9. Slavnić, J. (2006): *Nekorektna trgovačka praksa i oblast osiguranja (Unfair trade practice and the insurance sector)*, Pravni život (Legal Life), Belgrade, no. 11.
10. Samuelson, P. A., Nordhaus, V. D. (2009): *Ekonomija (Economics),* Mate, Belgrade.
11. *Sigma* (2009), 1/2009, Swiss Re, Zurich.
12. Stojanović, Ž., Gligorijević, M., Rakonjac Antić, T. (2012): *The role of the marketing mix in the improvement of agricultural insurance*, Economics of Agriculture, vol. 59, no. 4, IAE Belgrade.

OSIGURANJE U POLJOPRIVREDI

Milan Počuča[26], Zdravko Petrović[27], Dragan Mrkšić[28]

Sažetak

Šteta u poljoprivrednoj proizvodnji može biti od presudne važnosti za privredu jedne države, posebno u zemljama u kojim poljoprivredna proizvodnja preovladava u bruto nacionalnom dohotku, kao što je to slučaj sa Srbijom. Međutim, podjednako je važno da poljoprivredni proizvođači u našoj državi upravljaju prihodima i rashodima na efikasan način i optimizuju profit po jedinici površine, što je i osnova njihovog poslovanja. Osiguranje igra važnu ulogu u zaštiti bilansa uspeha svakog poljoprivrednog proizvođača, a s obzirom da su troškovi osiguranja na nivou od 1,5% do 2% u proseku na proizvodnu vrednost, odnosno oni su veoma niski i štednja na osiguranju može da dovede do gubitaka ukupnog prinosa, a time i ukupnog profita. Uprkos tome, poljoprivredno osiguranje u Srbiji nije dovoljno razvijeno. Pokušaj države da podstakne razvoj osiguranja osiguravajućim subvencijama , u periodu sprovođenja ove uredbe odnosno od 2006. godine, je podiglo svest o potrebi ovog tipa zaštite poljoprivrednih proizvođača.

***Ključne reči**: poljoprivreda, osiguranje, subvencije.*

26 Vanredni profesor, Poslovna akademija, Pravni fakultet, Novi Sad, Srbija,
E-mail: pocucabmilan@gmail.com

27 Redovni profesor, Univerzitet Siegmund Freud, Beč, Austrija,
E-mail: zdravko petrovic@ikom.line

28 Redovni profesor, Fakultet tehničkih nauka, Univerzitet u Novom Sadu, Srbija,
E-mail: draganmrksic@yahoo.com

Review Article

Economics of Agriculture 1/2013
UDC: 338.48-4(26):338.439.62(282.243.7.043)

DANUBE TOURIST SHIPS AS AN OPPORTUNITY FOR EXPORT OF AGRICULTURAL AND FOOD PRODUCTS

Dragan Tešanović[1], Nikola Vuksanović[2], Bojana Kalenjuk[3], Milorad Vukić[4], Snježana Gagić[5]

Summary

The Danube is the most important European river that forms part of the trans-European navigation system Rheine – Main - Danube, which facilitates an intensive development of various forms of tourism. Currently we are experiencing the intense development of nautical tourism. Number of cruise ships and tourists is constantly increasing. The highest level of consumption while cruising is achieved on the ship itself. Countries that have not adapted well and developed the infrastructure needed for providing the material goods for the ships needs experience reduced tourist revenues. They mostly come from souvenirs and visits to cultural and historic resources. Supplies of fuel, water, food, drinks and other necessities are obtained in countries that have recognized the demand and quickly adapted its offer. Of all countries along the Danube, ours is the only one where no procuring is taking place. The purpose of this paper is to study the structure, market forms and quantities of vegetables, fruit and other foods and food products, which are yearly spent on ships analysed. This paper will point out the places and countries they are presently purchasing. The study involved six cruise ships of Grand Circle Corporation and the consumption they had during the 2011. The obtained data is systematized and presented in appropriate tables and graphs.

Key words: *tourism, export, groceries of vegetable origin, Danube.*

JEL: *L83, Q13, O13*

1 Dragan Tešanović, Ph.D., Full Professor, University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad, Serbia, Trg Dositeja Obradovića 3, E-mail: tesanovic.dragan@gmail.com

2 Nikola Vuksanović, M.Sc., Teaching Assistant, Alfa University, College of professional studies in management and business communication, Department of Hospitality, Sremski Karlovci, E-mail: vuksanovicnikola@yahoo.com

3 Bojana Kalenjuk, M.Sc., Teaching Assistant, University of Novi Sad, Faculty of Science, Department of Geography, Tourism and Hotel Management, Novi Sad, Serbia, Trg Dositeja Obradovića 3, E-mail: bojanakalenjuk@yahoo.com

4 Milorad Vukić, Ph.D., University of Belgrade, The College of Hotel Management, Belgrade

5 Snježana Gagić, M.Sc., Teaching Assistant, Alfa University, College of professional studies in management and business communication, Department of Hospitality, Sremski Karlovci, E-mail: gagicsnjezana@yahoo.com

Introduction

Danube is one of the largest tourism resources of Serbia, which is located at the very top of the current supply of European tourism in nautical tourism, which has an increasing growth rate. It is predicted that by 2020, ship cruises, respectively, the 'cruise business' will be one of the leading forms of tourism on the planet (Katić et al., 2011). This suggests that the Danube, as traffic is an important factor of economic development (Vitez, Raičević, 2008) is the future of domestic tourism, because of it being the connection Serbia, via Budapest and Vienna, has with the highly developed countries of Western Europe (Katić et al., 2011). A large number of cruise ships are going through our country. At the same time, the longest section of Danube course is through Serbia and yet, not one of business entities from Serbia deals in food supply to the ships (Tešanović et al., 2010a; Tešanović et al., 2010b), or any other goods. This is where the need for research and writing of this paper emerges.

It is well known that there is an interaction between tourism, agriculture and food industry (Hrabovski - Tomić, 2010) and that the expenditures for food and drink in the tourism industry make up for one third of total tourist spending in global tourist traffic (Cerović, Mueller, 2003). Nautical tourism in Serbia could become a significant segment of national export expansion strategy, by supplying cruise ships with agricultural food products (Hrabovski - Tomić, 2010). This paper aims to investigate the type and amount of foods of agricultural origin, which are consumed on the river tourist ships that sail through Serbia, and also to investigate the locations in the countries that are current supply source for the cruisers. Analysis and research will determine which of these foods are also produced in Serbia, and which could be further developed in order to be sold on the waterway, as do other countries and suppliers.

The selected analysis is of consumption of fruits, vegetables, grains and herbs and their products, due to the fact that these groups of food are consumed in highest quantities, in ship kitchens and other locations respectively. One reason is that this form of tourism practiced mostly by population of 55 to 70 years of age (Tešanović et al., 2010b), and their diet is dominated by vegetables, fruits, grains and other similar foods, by structure and amount. Another reason is that Serbia produces plenty of vegetables and fruit which are of the specific desirable quality that already represents a great potential. It can, with appropriate investments and export support, become an even more important source of income (Cioffi, dell' Aquila, 2004; Nikolić, Ševarlić, 2009; Munitlak, Ivanović et al., 2009). This can significantly contribute to better positioning and increase competitiveness of our country (Đenadić, 2010; Kalenjuk et al., 2012).

Literature review

The importance of the Danube in export

The Danube is the most important European river, which is contributed by the fact that it is an integral part of the trans-European navigation system - the Rheine-Main-Danube Canal (Mihić et al., 2011), the waterway which, with its length of 3505 km, connects the Atlantic and the Mediterranean, thus connecting West and East Europe. Its over 2888 km long is the second largest European river (after the Volga 3692 km long). The Danube flows from the

Black Forest Mountains in Germany and passes through ten countries, including: Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Romania, Moldova and Ukraine, and flows into the Black Sea in Romanian territory (Katić et al., 2011). Since the Danube in direct contact with the World Sea, it means that it's available to tourist vessels from around the world (Katić et al., 2011). The authors report that Danube Region is an area characterized by the greatest economic development in Serbia (Jovanović, 2009), including the fruitful region of Vojvodina, comparable to a granary that supplies the Danube region with agricultural foods (Đerčan et al., 2010).

Fruit, vegetables, grains and herbs in the country

The production of fruit, vegetables, grains and spices is an important traditional economic activity in R. Serbia, with all the prerequisites for the production of organic products, the demand for which is growing in the international market (Vlahović et al., 2010), and for the production of healthy and safe foods (Đenadić, 2010). Good growing conditions, uncontaminated arable land and water are significant advantages of Republic of Serbia (Vlahović, Štrbac, 2007). Agricultural food products in the world market are subjected to strict standards in order to protect the health of humans, animals and plants, following a number of international agreements.

The popularity of consumption of fruits and vegetables is increasing in the world yearly. The authors state that the consumption of berry fruits particularly stands out because of colored substances they contain, which are natural antioxidants, and green vegetables rich in folic acid, as well as those species that have anticancer properties (Štrbac, 2009).

The requirements for export to the European market

Requirements relating to the production and marketing of fruits and vegetables in the EU provide a high level of consumer, product and environmental protection. For export of fruits and vegetables to the EU to become a promising prospect, requires compliance to a number of demands this market demands (ie., continual supply of established quantities of merchandize of specified quality, planting of healthy seedlings, controlling the use of pesticides, pertaining to the European standards of packaging and transport, well-organized logistics and marketing, distribution centers with modern technology for quality products selection, and others (Štrbac, 2009, Goetz, Grethe, 2009). Fruits and vegetables produced in R. Serbia are of good quality, of full and aromatic flavor, which is particularly felt in the fresh state. The EU legislation and business environment are of particular importance for potential exporters of vegetables and fruits from our country (Štrbac, 2009).

However, these standards are often used as a cover for the imposition of non-tariff barriers intended to preserve the economic interests of companies in developed countries, often at the expense of exports from underdeveloped and developing countries. Relevant economic literature is predominantly devoted to the role of WTO negotiation rounds at the international level, neglecting the role of other forms of regulation that could have a strong impact on the volume and structure of foreign trade in agricultural food products

(Nikolić, Ševarlić, 2009). In our country, it is necessary to connect manufacturers in specialized professional associations in order to increase production and export (Vlahović et al., 2010), which would include the introduction of appropriate economic policies (Hrabovski - Tomić, 2010). Another major consequence of the openness of the European vegetables market is the exceptional offer of a rich assortment of products, which makes product placement more difficult, but in a way, motivates producers to try out new sale strategies (Đurovka et al., 2006).

Place and methods

The study was conducted on tourist boats at Grand Circle Corporation, which operates since 1958, with over 1.5 million tourists so far. Grand Circle Small Ship Cruises is part of the company, present in Europe for 12 years already, with 10 ships, three of which in France, six on the Rhine-Main-Danube Canal waterway, and one on the Elbe River. The study involved six ships on the river Rhine-Main-Danube Canal, namely: Ms River Adagio, Ms River Aria, Ms River Harmony, Ms River Melody, Ms River Rhapsody, and Ms River Concerto, with a capacity of 140 passengers. For research purposes, the internal documentation of boats operating from 2011 was used, displaying the structure and the amount of consumption of fresh vegetables, fruits, grains, spices and their products by type for each ship accordingly. Selected results are arranged in tables and graphs and presented in this paper. This paper also uses the methods of analysis, synthesis, description and abstraction.

Results and discussion

Procedures for procurement and delivery of food to the ships

Requisitions for the ship kitchen are the responsibility of the chef and they are done seven or fourteen days in advance. During a requisition, four companies are available for purchasing food, which allows the chef to order same products at different prices. The chef must comply with a previously determined 'master list', which is a pre-calculation of every menu and meal for 40 people. The state of food in warehouses and cold storage is also checked in order to plan for minimal stock of supplies, due to limited storage space.

Ships procure groceries from the following companies:

- HMS (frozen, fresh, durable and semi-durable products, every 14 to 16 days) from Netherlands - Germany - Austria and Hungary;
- Nordis (delivery of fresh fruit and vegetables, every seven to eight days) from Netherlands - Germany;
- Drissen (delivery of meat and fish every seven to eight days) from Netherlands - Germany;
- Penz (delivery of vegetables every seven to eight days) between southern Germany and Austria - Hungary).

Given that the acquisition is not made anywhere in our country, and given that the Danube has the longest course through Serbia - thus the ships spend the longest time within our borders - the last acquisition beforehand is performed at the Serbian - Hungarian border, near Budapest, and after in Ruse, Bulgaria.

Consumption of fresh vegetables, grains, herbs, fruits and their products

On the basis of insight into internal documentation of the Grand Circle Corporation tourist ships company, which sails along the Rhine-Main-Danube Canal, the data on the spending for the procurement of fruits, vegetables, grains and herbs in 2011 was obtained. Table 1 shows the types of fresh vegetables, grains and herbs that ships procured during the voyage.

Table 1. Consumption of fresh vegetables, grains and spices

Number	Name of foods that are purchased	UM	Consumption by ships						
			Ms River Adagio	Ms River Aria	Ms River Concerto	Ms River Harmony	Ms River Rhapsody	Ms River Melody	Total
1	Bell pepper green	kg	240.8	385.98	332.1	330.1	345.2	330.4	1964.98
2	Bell pepper red	kg	582.34	444.23	374.84	420.2	575.1	234.22	2630.93
3	Bell pepper yellow	kg	480.4	406.2	364.3	385.1	570	207.5	2413.4
4	Broccoli	kg	688.1	694.4	521.7	597.7	576.3	489.4	3567.6
5	Cabbage red	kg	243.82	291.4	317.7	360	378	395.8	2086.72
6	Cabbage white	kg	581.12	647.78	446.32	462.26	565.18	485.1	2725.44
7	Carrots large	kg	1733.4	2087	1023.7	1377.5	1504.5	1563.3	9289.4
8	Carrots small & Foliage	kg	333	173	375	301	420	378	1980
9	Celery root	kg	377.82	368.9	265	283.2	238	240.3	1773.22
10	Champignons white	kg	926	948	594	585	701	485	4239
11	Cucumbers	piece	1415.9	1859.84	1088.14	1712	1986	2313.48	8701.36
12	Eggplant	kg	363.08	371.4	217.7	240.6	370.3	278.2	1841.28
13	Garlic	kg	93.36	163	129.5	99	115	109.5	709.36
14	Leek	kg	520.8	697.3	638.1	532	740	421.2	3549.4
15	Lettuce Butterhead (400 gr/piece)	piece	1028	1240	826	912	936	835	3549.4
16	Lettuce Iceberg (500 gr/piece)	piece	1057.3	1154.6	855.76	726.2	514	950	5777
17	Lettuce Lollo Bionda (350gr/ piece)	piece	1000	1104	867	912	448	1168	5499
18	Lettuce Lollo Rosso (350gr/ piece)	piece	1116	1042	820	972	588	1188	5726
19	Onions large	kg	1986	2775	2075	2135	2397	2753	14121

Number	Name of foods that are purchased	UM	Consumption by ships						
			Ms River Adagio	Ms River Aria	Ms River Concerto	Ms River Harmony	Ms River Rhapsody	Ms River Melody	Total
20	Onions red	kg	152.5	127.5	75	128.28	91	176.1	75098
21	Onions Spring	piece	382	529	436	283	544	496	2670
22	Potatoes Nicola	kg	5730	7170	4200	3390	3655	3770	27915
23	Potatoes large	kg	640	540	880	2220	3200	2780	10260
24	Radish white	kg	275.6	454	343	373	379	434	1983
25	Tomatoes	kg	1700.1	1856.2	1543	1737	2043.1	2178.1	3280
26	Tomatoes cherry	kg	220.25	175.5	219.85	153.75	138	108.25	1015.6
27	Zucchini green	kg	648.82	565.6	447.4	509.5	653.7	521.3	3346.32
28	Cauliflower	kg	688	603	663	448	512	471	3385

Source: Internal documentation of Grand Circle Corporation, 2011.

Cruisers purchased about 70 types of fresh vegetables for their kitchen units. The table above presents the kinds that are purchased in large quantities. Other types of vegetables that are purchased and consumed in small quantities are: Alfalfa sprouts, Asparagus - white, Baby corn, Black salsify, Celery sticks, Fennel - fresh, Pumpkin - large, Radish - large – red, Shallots, Snow peas, Soybean sprouts, Sweet corn, Tomatoes - big, Chervil - fresh, Dill - fresh, Ginger, Lemon balm, Lemon grass, Marjoram -fresh, Parsley - curled, Rosemary - fresh, Sage - fresh, Tarragon - fresh, Thyme - fresh, Beetroot red - boiled, Cabbage - Chinese, Cabbage - green, Lettuce - Belgium Endive/ Chicory, Lettuce - Frisee, Lettuce - Oak leaf, Lettuce Radicchio, Lettuce Romaine, Lettuce Ruccola, Lettuce Field, Potatoes - sweet and Turnip – Kohlrabi.

The largest share of produced foods in Republic of Serbia in 2009 was taken by potato with 35% (Vlahović et al., 2011). In our study, as shown in table no. 1, potato consumption was the highest. In the list of requisitions we predominantly find two types of potatoes: Nicola (27.915 kg) and Large Potatoes (10.260 kg).

Onion is a widely used vegetable appreciated for its specific flavour, and abundance of minerals and vitamins (Vlahović et al., 2011). The onion consumption in the season of 2011 was 14.121kg.

Table no. 2 gives examples of types and quantities of fruit consumption.

Table 2. Consumption of fresh fruit

Number	Name of foods that are purchased	UM	Consumption by ships						
			Ms River Adagio	Ms River Aria	Ms River Concerto	Ms River Harmony	Ms River Melody	Ms River Rhapsody	Total
1	Apples red Elstar	kg	489.06	599.08	432.78	178.58	748	482	2769.5
2	Apples red Jonagold	kg	530.18	484.32	275.7	880.02	509.8	562.7	3242.72
3	Bananas green	kg	487.68	36.2	325.54	484	596.14	90.14	1579.7
4	Bananas medium ripe	kg	1739.62	1593.38	1035.3	1172.94	801.88	1452.26	7795.38
6	Grapefruit red	piece	1631	1434	1440	1201	2314	2001	10021
7	Grapes blue	kg	193.9	255.97	216.5	166.86	276.5	193.3	1303.03
8	Honeymelon	kg	1617.18	1491.72	794.16	1192.44	944.3	1314.8	7354.6
9	Kiwi	piece	2990	4281	3354	3248	3237.08	3376	20486
10	Lemon	kg	503.36	675.64	560.33	497.26	586.63	591.25	3414.47
11	Lime	piece	1854	1689	1263	988.7	1326	879	7999.7
12	Mango	piece	185	355	230	132	164	167	1233
13	Melon Cantaloupe	kg	1406.79	1059.5	522.03	515.26	368.2	1034.5	4538.08
14	Pears	kg	572.3	707	490.5	484.5	504.19	540	3298.49
15	Pineapple	piece	1625	1791	1092	1040	1602	1443	8593
16	Plums red	kg	31.5	150	111.4	73	138	97	600.9
17	Strawberries	kg	149.3	161.5	192.5	174	171	155	1003.3
18	Tangerines	kg	180	342.9	100	260	242.1	416	1541
19	Watermelon	kg	3299.12	2843.28	2009.98	1551.62	1780.2	2096.9	13581.1
20	Oranges	kg	1334.62	1322.7	1082.3	1247.7	1143.7	966.4	7097.42

Source: Internal documentation of Grand Circle Corporation, 2011.

The ships are supplied with 29 types of fresh fruit, and in addition to the species listed in the table, there are some that are consumed in larger quantities: avocado, blackberries, blueberries, cherries, papaya, passion fruit, raspberries, white grapes, physalis and starfruit. The watermelon production in Serbia has increased its significance in relation to other vegetable plants in the last few years. The reason for the increase in this area is lower price of cultivation and large yield of field crops. By area, the most important regions for growing watermelons in Serbia are Bačka, Srem and Mačva.

Table no. 3 presents the consumption of products made from vegetables, grains and herbs.

Table 3. Consumption of products from vegetables, grains and spices

Number	Name of foods that are purchased	UM	Consumption by ships						
			Ms River Adagio	Ms River Aria	Ms River Concerto	Ms River Harmony	Ms River Rhapsody	Ms River Melody	Total
Wheat products									
1	Flour wheat 405	kg	988	1407	708	1250	1073	960	6386
Other Products									
2	Rolled Oats small	kg	140	237	186	122	197	200	1082
3	Sugar white fine	kg	1135	1721	1312	1319	1250	1325	8062
Pasta and related products									
4	Noodles bavette	kg	192	164.5	136	119	138	136.5	886
5	Noodles penna rigat	kg	129	125	113	144	164	175	850
6	Noodles spaghetti	kg	239.9	434.4	88	151	120	104	1137.3
Pasteurized vegetables									
7	Beetroot stripes	kg	480.25	522.75	272	471.75	437.75	374	2358.5
8	Celery stripes	kg	212.75	191.25	216.75	289.05	246.5	229.5	1385.8
9	Kidney beans	lit	328.6	229.4	255.1	267	310	285.2	1675.3
Dried vegetables									
10	Paprika sweet	kg	14	36	11	12	7	9.7	89
11	Beans black dry	kg	15	32	60	60	70	132	369
12	Beans white dry	kg	70	23	17	22	35	57	224
Canned vegetables									
13	Gherkins pickled	lit	367.4	311.6	315.2	387.8	438.6	504.4	2325
14	Mixed pickles	lit	243.25	199.75	212.5	272	161.5	195.5	1284.5
15	Sauerkraut	kg	224.4	285.6	230.35	302	295.8	326.4	1664.55
Frozen vegetables									
16	French fries“	kg	639.5	650	645	720	690	800	4144.5
17	Cauliflower	kg	10	25	75	87.5	105	190	492.5
18	Green peas	kg	181	172	108	110	140	210	921
19	Haricot beans fine	kg	230	245	157.5	182.5	185	360	1360
20	Sweet corn	kg	180	152.5	120	100	157.5	190	900
Vegetable sauce, ketchup and related products									
21	Ketchup	kg	460	420	346	454	430	412	2522
22	Tomatopaste	lit	178.25	123.25	144.5	110	127.5	97.75	781.25

Source: Internal documentation of Grand Circle Corporation, 2011.

About 73 items among vegetable products in the table are significant due to larger amounts spent on their procurement, some of which are: Flour wheat - whole, Semolina, Pearl barley - medium, Polenta, Couscous, Lentils - red, Rice - basmati, Rice - round corn, Milk rice, Rice parboiled - long corn, Rice risotto, Potato puree powder, Noodles farfalle, Noodles farfalle - three colours, Noodles lasagna, Noodles eliche, Noodles tagliatelle - verde, Noodles tagliatelle - yellow, Tomatoes - sun dried, White beans - big, Capers, Onions - pickled, Almond potato croquettes, Asparagus - green, Asparagus - white, Gnocchi, Balkan mix vegetables, Broccoli,

Carrots sliced, Chestnuts, Green beans - cut, Kohlrabi stripes, Mushrooms - mixed, Soup mix vegetable, Wax beans, Sugar icing, Oil vegetable, Tomatoes - peeled, Olives black - stone less, Olives green - stone less, Green peas - dry peeled, Hash browns, Pommes Macaire, Potato croquettes, Potato dumpling dough, Potato wedges, Black salsify, Romanesco, Vegetable mix Brunoise, White beans in tomato sauce, Brussels sprouts and Spinach leaves.

Fine white sugar has the highest level of consumption in quantities of 8062 kg, wheat flour type 405 in 6386 kg and, French fries 4144.5 kg.

Authors who have studied the analysis of the supply of our markets, through insight into the range of products in supermarkets, noted that domestic manufacturers are dominant in the supply of beetroot, peppers and cucumbers. Domestic manufacturers are exclusively present in the offer of mixed salads. Foreign manufacturers dominate the offer of green beans, peppers and mushrooms. The carrots, sweet corn and beans are offered only by foreign producers. The biggest offer is of cucumbers, peppers, beets and mushrooms, and the smallest of beans, green beans, sweet corn and carrots which depends, above all, on consumer habits and preferences (Vlahović et al., 2008).

What supports a variety of these products is the production of miniature vegetables (with the average weight of 10-30 grams), which became a trend ten years ago in Europe (Đurovka et al., 2006). Table 4 presents the consumption of fruit.

Table 4. Consumption fruit products

Number	Name of foods that are purchased	UM	Consumption by ships						
			Ms River Adagio	Ms River Aria	Ms River Concerto	Ms River Harmony	Ms River Rhapsody	Ms River Melody	Total
Compote									
1	Apple compote	lit	127.5	263.5	68	148	170	182.9	959.9
2	Apricots 1/2 fruit	lit	227.9	340.8	278.75	501.2	465.75	289.3	2103.7
3	Apricots 1/2 fruit	lit	321.36	255.68	284.4	200.25	203.47	312.85	1578.01
4	Pears 1/2 fruit	lit	572.3	707	490.5	484.5	504.19	540	3298.49
Pasteurized fruit puree									
5	Puree Apple	lit	8.5	8.5	80.75	106.1	68	85	356.85
Dried fruit									
6	Apricots dry stoneless	kg	107.3	162.5	87.5	123.5	114.5	134.5	729.8
7	Plums dry stoneless	kg	234.5	227.5	255	228	266	207	1418
8	Dry raisins	kg	131	153	73	184.7	96.5	100	738.2
Frozen fruit									
9	Apple segments	kg	180	550	200	207	510	285	1932
10	Blueberries	kg	110	81.5	83	97.5	60	97.5	529.5
11	Plumes	kg	130	107.5	105	160	160	95	757.5
12	Raspberries	kg	115.5	112.5	115	122.5	121.5	92.5	679.5
13	Sour cherries	kg	143	148	117.5	245	237.5	173	1064
14	Strawberries	kg	99	147	117.5	187.5	139	123	813
Jam									
15	Jam Cranberry	kg	130	175	157	170	220	158	1010

Source: Internal documentation of Grand Circle Corporation, 2011.

About 73 items among fruit products in the table are significant due to larger amounts spent on their procurement, some of which are: Apple rings - dried, Apple cubes, Blackberries, Cranberries, Mixed berries, Red currants, Jam apricot, Jam cherry, Jam orange, Jam raspberry, Jam strawberry, Fruit cocktails, Grapefruit segments, Mandarin segments and Pineapple - sliced.

Plums have the highest level of consumption, in the quantity of 1418 kg, pears (1/2 fruit) participate with a share of 3298.4 kg and apricots (1/2 fruit) are consumed in the amount of 2103.7 kg.

The possibilities of supplying the ships with domestic, imported or processed products

By the analysis of products in demand, or consumed on tourist ships, it was calculated which part of these is produced, processed or imported as a finished product in our country. It was started from the fact that other countries which supply the cruise ships import similar types of products, as is the case with the Mediterranean fruit and vegetables and herbs that are not from the European region.

Figure 1 shows the relation of fresh fruits, vegetables, grains and herbs that are procured by the ships and those which they can obtain from domestic production or imports.

Figure 1. Relationship between production and import of fresh fruits and vegetables, grains and herbs

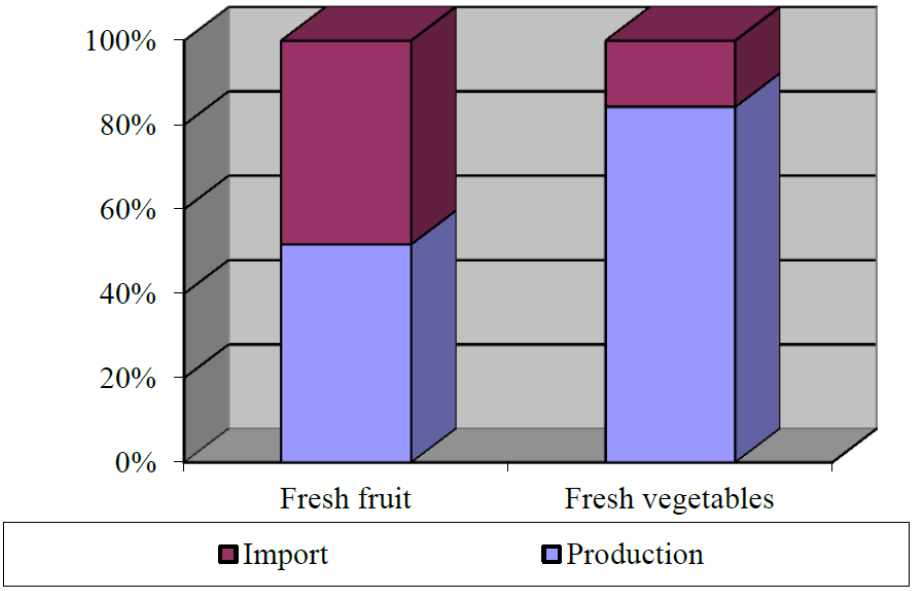
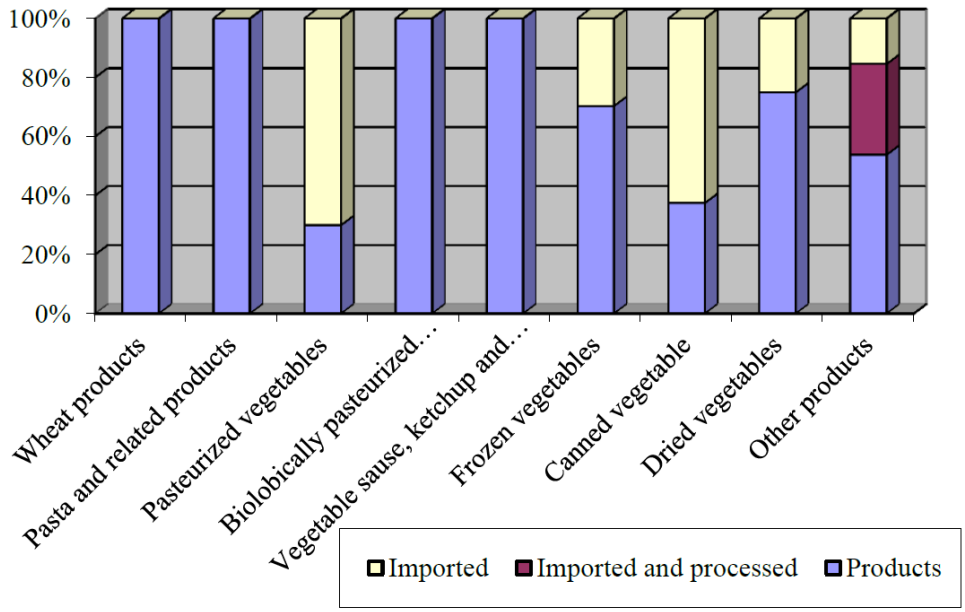


Figure 1 shows the consistency between the products that are produced in Serbia and the imported fresh fruit products. It is necessary to take into account the types and technology of vegetable production and the packaging, which must be suitable for

the placement at the EU market. ISO and HACCP and other European standards of quality of fruits, vegetables and other foods must be respect and strictly enforced. The results of research confirm that the domestic production of fresh vegetables, grains and herbs can satisfy 80% of demand of river cruise liners. Vegetables that Serbia imports consist of: Chinese cabbage, Black salsify and Celery sticks. Figure 2 and 3 show the relationship of domestic products, products which we import and process, and those imported as finished products.

The analysis of vegetable products displayed by figure 2 reveals that the Serbian market can meet the demand for cereal products, pasta and related products, biologically pasteurized vegetables and vegetable sauces, ketchup and related products. By analysing Figure 2, it is noticed that most products of frozen and dried vegetables are produced in Serbia, and a small percentage of those products is imported. A larger number of vegetable products which belong to the group of pasteurized vegetables are found to be imported into the market (Sun Dried Tomatoes, Capers, Pickled Onions, Black Olives – stone less and Green Olives – stone less) while gherkins pickled, sauerkraut and mixed salad can satisfy market. In the other groups of products, half of them are being produced in the country, one-third is imported and processed, and only 10% are pure imports (Couscous and red lentils), which allows our producers to sell most of their products.

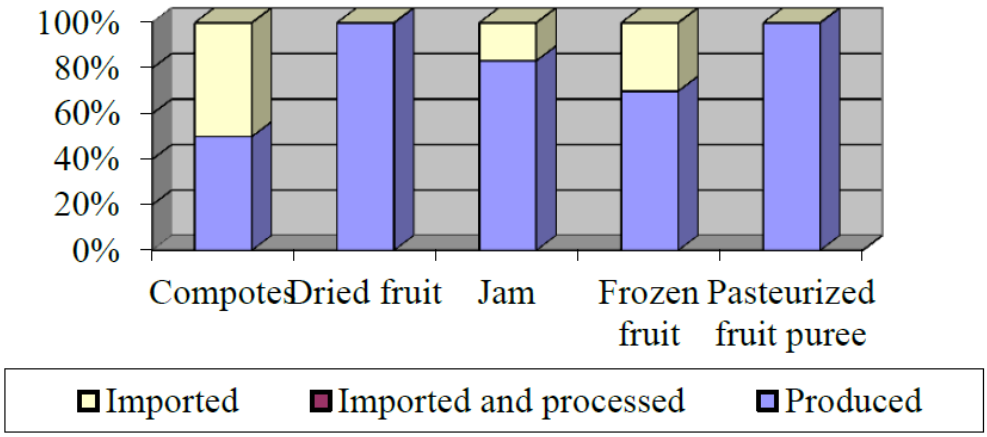
Figure 2. Ratio of production, processing and export of finished goods from vegetables, grains and herbs



Our country produces nearly all types of dried fruit and pasteurized fruit porridge that can meet the demand of tourist boats. As for other products, frozen fruits and jams, an assortment of demand can be satisfied with the present offer. 50% of market need for

compotes is satisfied by imports (fruit cocktail, grapefruit segments, mandarin segments and sliced pineapples) and 50% are compotes that are available in our market (apple compote, apricots (1/2 fruit) and pears (1/2 fruit)).

Figure 3. The ratio of production, processing and export of finished fruit products



One of the preconditions for exports is greater activity of all holders of agricultural policy in order to improve the position of our country in the international market. Lack of marketing concepts of our economic entities, government assistance and agricultural protectionism in developed countries is a limiting factor in improving the export of agricultural food (Vlahović et al., 2008), including its placement on the tourist ships.

Conclusion

While exploring the need for fruits and vegetables and other foods of agricultural origin on the Danube tourist cruisers analysed, studying of domestic and foreign literature, and using scientific methodology appropriate in the case studies in this work, this research has reached the following conclusions:

1) Marine tourism on the Danube is one of the more promising selective forms of tourism whose potentials Serbia is not using to the full extent. This conclusion requires a quick adjustment in the direction of growing demands for infrastructure and ports that offer full comfort for incoming ships, as well as the study of their needs for fuel, water, foods and other supplies. Bearing in mind that Serbia has the longest Danube flow through its territory, this creates the possibility for keeping people the longest amount of time and providing the longest and highest level of consumption.
2) Keeping in mind that this form of tourism is mostly practiced by population aged 55-70, and that their diet is dominated by vegetables, fruit, grains and other foods from plant sources, consumption of these foods, by structure and quantity, is the highest.

3) The consumption of fresh vegetables is dominated by two types of potatoes; 'Nicola Potatoes' (with 27,915 kg), and 'Potatoes - large' (with 10,260 kg). The emphasis is also on the onion ('Onions large') with consumption of 14.121 kg. As for the other product, sugar stand out with the highest consumption ('Sugar - white fine'), which is spent at the rate of 8062 kg, flour type 405 ('405 Wheat Flour') - 6386 kg spent, and French fries, by the amount of 4144, 5 kg. Concerning the consumption of fresh fruit, notable are: Watermelons, with a share of 13.581 kg, semi ripe bananas ('medium ripe bananas'), 7795.38 kg spent, and melons ('Honey Melon') with 7354.6 kg. Dried plums dominate in the production of fruit products ('plums - stoneless dry') in the quantity of 1418 kg, canned pear ('pears - 1/2 fruit') with the portion of 3298.4 kg, and stewed apricots ('apricots 1 / 2 fruit') which is spent in the quantity of 2103.7 kg.

4) Of the total of required types of food Serbia produces 50% of fresh fruit, as well as 50% imported. It should be noted that citrus fruit and some products are also imported by other Danube countries and sold to the cruise ships at supply points. Over 84% of fresh vegetables is produced in Serbia and only 16% of all is imported. Of the total required amount of vegetables, Serbia has a 100% production of following vegetable products: cereal products, pasta and related products, biological pasteurized vegetables and vegetable sauces, ketchup and related products. As for the dried and frozen vegetables, Serbia alone produced about 70% of the required products, and about 30% must be imported. Further on, the required amount of pasteurized vegetables that Serbia itself meets are 30% and 70% are imports. Over 52% of other vegetable products are produced in Serbia, 33% is imported and produced here, and 15% has to be fully imported. In the given graph 3, Serbia has a 100% production of dried fruit and pasteurized pulp of fruit. Of the total required amount, Serbia produces 82% of jams and only 18% has to be imported. Serbia also keeps the home production of frozen fruit at 70%, while 30% is imported. The production of compotes is in a proportional relation between home production and imports.

5) The pre - requirement for export of agricultural foods is the knowledge of internal quality standards of certain companies dealing with this type of tourism, which are aligned with ISO standards, with a particular focus on standards that dealt with the safety of food and drinks like HACCP, and some others. Forms and method of packaging, size of individual packages, as well as excellent safe packaging and design, adapted to the ship's consumption, are significant prerequisites for success.

6) To achieve success in increasing revenue from nautical tourism on the Danube, it is necessary to take a series of measures, including the association of producers and retailers in the form of clusters or other associations, in order to ensure sufficient quantity, quality and range of continuous delivery, superb packaging and design, and relevant promotional activities.

7) There is a great need for more coordinated activity of bearers of tourism development in Serbia and better agricultural policy, in the struggle to achieve support for the development of significant infrastructure facilities for the development of this form of tourism. Developing and implementing the standards of product quality as well as developing

a strong marketing concept of undertakings would enable us to stand opposed and shoulder to shoulder to other developed countries which practice tourist and agricultural protectionism as a limiting factor to promoting exports of fruit and vegetables from Serbia, and hence its placement on cruise ships.

Acknowledgements

The authors are grateful to the Ministry of Science and Technological Development of Republic of Serbia, for sponsoring part of the study in project III-046005.

References

1. Cioffi, A., Dell' Aquila, C. (2004): *The effects of trade policies for fresh fruit and vegetables of the European Union*, Food Policy, no. 29, p. 169–185.
2. Đenadić, M. (2010): *Healthy food as a factor of Serbian tourism competitiveness,* Economics of Agriculture, vol. 57, no. 4, p. 681-690.
3. Đerčan, B., Bubalo-Živković, M., Lukić, T. (2010): *Poljoprivreda kao faktor ekonomskog razvoja pograničnog regiona Srema na primeru sela Vašica*, Zbornik radova Departmana za geografiju, turizam i hotelijerstvo, no. 39, p. 19-35.
4. Đorović, M., Stevanović, S., Lazić, V. (2008): *Serbia in the international market vegetables,* Industry, vol. 36, no. 3, p. 107-126.
5. Đurovka, M., Bajkin, A., Marković, V., Mišković, A., Ponjičan, O. (2006): *Mini vegetables as a new trend in production and processing,* Journal of processing and energy in agriculture/PTEP, vol. 10, no. 3-4, p. 74-76.
6. Goetz, L., Grethe, H. (2009): *The EU entry price system for fresh fruits and vegetables – Paper tiger or powerful market barrier?,* Original Research Article, Food Policy, Vol. 34, Issue 1, February 2009, p. 81-93.
7. Hrabovski Tomić, E. (2010): *Agri business and food processing industry in the function of tourism industry's development,* Economics of Agriculture, vol. 57, no. 3, p. 487-497.
8. Internal documentation of Grand Circle Corporation, 2011.
9. Ivanovic, O., Golusin, M., Dodic, S., Dodic, J. (2009): *Perspectives of sustainable development in countries of Southeastern Europe,* Renewable and Sustainable Energy Review, vol. 13, no. 8, p. 2179–2200.
10. Jovanović, S. (2009): *The importance of Corridor VII of the Serbian economy,* Tehnika - Saobraćaj, vol. 56, no. 6, p. 17-20.
11. Kalenjuk, B., Đerčan, B., Tešanović, D. (2012): *Gastronomski turizam kao faktor regionalnog razvoja,* Ekonomika, no. 3/2012, p. 136-146.
12. Katić, A., Muhi, B., Stanković, J., Kovačević, J. (2011): *Nautički turizam kao faktor konkurentnosti turizma Vojvodine,* Industrija, vol. 39, no. 2, p. 237-261.
13. Meler, M., Cerović, Z. (2003): *Food marketing in the function of tourist product development,* British Food Journal, vol. 105, no. 3, p. 175-192.

14. Mihić, S., Golusin, M., Mihajlović, M. (2011): *Policy and promotion of sustainable inland waterway transport in Europe – Danube River Review Article*, Renewable and Sustainable Energy Reviews, Vol. 15, Issue 4, May 2011, p. 1801-1809.
15. Nikolić, M., Ševarlić, M. (2009): *Korporacijski standardi i njihova uloga u međunarodnom prometu hrane,* Ekonomika, vol. 55, no. 1-2, p. 158-176.
16. Štrbac, M. (2009): *Zahtevi tržišta EU u oblasti proizvodnje i plasmana voća i povrća,* Ekonomika poljoprivrede, vol. 56, no. 2, p. 275-283.
17. Tešanović, D., Kalenjuk, B., Vuksanović, N. (2010a): *Svečani obroci-značajan segment turističkog proizvoda na rečnim brodovima,* Turističko poslovanje, no. 5/2010, Visoka turistička škola strukovnih studija, Beograd, p. 251 - 262.
18. Tešanović, D., Kalenjuk, B., Vuksanović, N. (2010b): *Menadžment i struktura gastronomske ponude na turističkim rečnim brodovima,* Četvrti biletarni međunarodni kongres, Hotelplan 2009 - hotelijerstvo i turizam, Hotellink 13-14, Visoka hotelijerska škola, Beograd, p. 749-758.
19. Vitez, M., Raičević, V. (2008): *Saobraćaj unutrašnjim vodenim putevima - potencijal za razvoj Srbije,* Pravo - teorija i praksa, vol. 25, no. 3-4, p. 10-19.
20. Vlahović, B., Tomić, D., Andrić, N. (2011): *Potrošnja povrća u Srbiji - komparativni pristup,* Zbornik Referata, 45. Savetovanje Agronoma Srbije.
21. Vlahović, B., Štrbac, M. (2007): *Osnovne karakteristike tržišta i marketinga proizvoda organske poljoprivrede,* Ekonomika poljoprivrede, vol. 54, no. 2, p. 131-147.
22. Vlahović, B., Puškarić, A., Červenski, J. (2010): *Obeležja proizvodnje povrća u Republici Srbiji,* Ratarstvo i povrtarstvo, vol. 47, no. 2, p. 461-466.
23. Vlahović, B., Rodić, V. i Popović, Z. (2008). *Istraživanje snabdevenosti tržišta pasterizovanim i mariniranim povrćem.* Ekonomika poljoprivrede, 55(1), 53-67.
24. Vlahović, B., Stevanović, S., Puškarić, A. (2008): *SWOT analiza izvoza povrća i prerađevina,* Ekonomika poljoprivrede, vol. 55, no. 2, p. 163-175.

TURISTIČKI BRODOVI DUNAVA ŠANSA ZA IZVOZ POLJOPRIVREDNO-PREHRAMBENIH PROIZVODA BILJNOG POREKLA

Dragan Tešanović[6], Nikola Vuksanović[7], Bojana Kalenjuk[8], Milorad Vukić[9], Snježana Gagić[10]

Rezime

Dunav predstavlja najznačajniju evropsku reku koja je sastavni deo transevropskog plovidbenog sistema Rajna – Majna - Dunav na kojoj se intenzivno razvijaju različiti oblici turizma. Najintezivniji razvoj doživljava nautički turizam. Broj turističkih brodova i turista se neprestano uvećava. Tokom krstarenja najveća potrošnja se ostvaruje na samom brodu. Zemlje koje nemaju prilgođenu infrastrukturu i nisu izučile potrebe za materijalnim dobrima potrebnih brodovima, imaju male turističke prihode. Oni uglavnom potiču od suvenira i poseta kulturno-istorijskim dobrima. Snabdevanje gorivom, vodom, namirnicama, pićem i ostalim potrošnim materijalom se obavlja u zemljama koje su prepoznale tražnju i brzo prilagodile ponudu. Od svih podunavskih zemalja brodovi ne vrše nabavku jedino u našoj zemlji. Zadatak ovog rada je da izvši istraživanje strukture, tržišnih oblika i količina povrća, voća i drugih namirnica biljnog porekla i njihovih proizvoda, koji se godišnje potroše na analiziranim brodovima. U radu će se ukazati na mesta i zemlje iz kojih se trenutno vrši nabavka. Istraživanje je izvršeno na šest turističkih brodova kompanije „Grand Circle Corporation" i njihovoj potrošnji iz 2011. godine. Dobijeni podaci su sistematizovani i prikazani u odgovarajućim tabelama i grafikonima.

Ključne reči: *turizam, izvoz, proizvodi biljnog porekla, Dunav.*

6 Prof. dr Dragan Tešanović, redovni profesor, Departman za geografiju, turizm i hotelijerstvo, Prirodno-Matematički Fakultet, Univerzitet u Novom Sadu, Srbija, Trg Dositeja Obradovića 3, E-mail: tesanovic.dragan@gmail.com

7 Nikola Vuksanović, M.Sc., asistent, Departman hotelijerstvo, Fakultet za menadžmet, Alfa univerzitet, Sremski Karlovci, Srbija, E-mail: vuksanovicnikola@yahoo.com

8 Bojana Kalenjuk, M.Sc., asistent, Departman za geografiju, turizm i hotelijerstvo, Prirodno-Matematički Fakultet, Univerzitet u Novom Sadu, Srbija, Trg Dositeja Obradovića 3, E-mail: bojanakalenjuk@yahoo.com

9 Prof. dr Milorad Vukić, Visoka hotelijerska škola, Univerzitet u Beogradu, Srbija

10 Snježana Gagić, M.Sc., asistent, Departman hotelijerstvo, Fakultet za menadžmet, Alfa univerzitet, Sremski Karlovci, Srbija, E-mail: gagicsnjezana@yahoo.com

Review Article

Economics of Agriculture 1/2013
UDC: 347.15/.17:338.48-44(1-22)

PHYSICAL PERSONS AS TOURIST SERVICE PROVIDERS IN AGRITOURISM

Janko Veselinović[1]

Summary

The goal of the paper is to analyse the normative regulation which creates the conditions under which physical persons offer tourist services in agritourism. The results of this work identify the Law on Tourism as a good legal framework for the inclusion of physical persons who are not registered as entrepreneurs in the performance of tourism activities in rural areas. The results also confirm that agritourism is one of the forms of economic activity which does not yield significant economic results in Serbia. The paper can lead to a conclusion that the creation of a normative framework for the inclusion of a widest range of service providers in agritourism opens a host of possibilities for the development of this kind of tourism, but also the parallel development of agriculture, cattle breeding and the overall development of rural areas. New legal frameworks create possibilities for physical persons to engage in providing services of accommodation and lodging, as well as catering homemade food and drink. Lawmakers offer this possibility to the unemployed and employed alike, but also to the retired persons and even older minors – persons over 16 years of age. These legal possibilities should also be followed by certain measures of national, provincial and local institutions. The methods used are those of analysis and comparison.

Key words*: physical persons, agritourism, normative regulation, tourist services*

JEL: *M43, O12*

Introduction

The field of agrarian development, along with agritourism is, generally, a neglected area, which has, through the years, led to the demise of the countryside. This, in turn, led to able-bodied population abandoning the villages, migrations into cities and devastation of villages. In the Autonomous Province of Vojvodina alone, there are tens of thousands of abandoned houses, especially in the villages, with desolate properties and land. Population structure, age-wise and qualification-wise is at a low level. In the past two years, the

1 Janko Veselinović, Ph.D., Assistant Professor, University in Novi Sad, Faculty of agriculture, Dositeja Obradovica 8, Phone: +381 21 485 35 00, E-mail: nauka@polj.uns.ac.rs

state has, on the other hand, normatively regulated this area through the normative regulation of agriculture, rural development and development of tourism. In a large number of EU countries, rural tourism was included into regional and rural development strategies, helping prevent migrations, creating new work places and contributing to the socio-economic advancement of less-developed and undeveloped areas. Nearly half the inhabitants of Vojvodina live in villages and the region has exceptional natural and anthropogenic resources for the development of all forms of rural tourism[2].

The economic nature of tourism has remained a basic fact even today, when the theoreticians increasingly question the social effects of this activity.

The *Law on Agriculture and Rural Development* and the *Law on Rural Development* were passed. A number of accompanying regulations were passed so as to ensure the implementation of these laws. On the other hand, Serbia can expect employment in the field of agritourism only if the passed laws are accompanied by the activity of all segments of population which can give a contribution. According to the statistic data, tourism today employs 260,000,000 people worldwide. Out of 100 employed people in France, 6 have tourism as their primary source of income, in Switzerland – 9, Spain – 11, Greece – 12, Austria – 15[3]. It is evident that some of these countries do not have a seaside and that employment in tourism is not related to summer holidays at the seaside. Switzerland and Austria pay significant attention to rural tourism, as do Slovenia and some other countries.

We often wonder why a village in Europe is so different from ours and what else should be done to come closer, at least for a step, to such life[4]. The economic nature of tourism has remained a basic fact even today, when the theoreticians increasingly question the social effects of this activity[5]. Perhaps one of the answers lies in strengthening the capacities of agritourism, which includes normative frameworks for such activities, as well. Apart from that, normative activities did not follow social relations. This refers to the regulation of a status position of subjects engaging in tourism, including their activity[6].

This paper presents legal frameworks for performing tourism-related business activities by physical persons in the countryside. Hence, we are trying to give the answer to the question of the easiest way to start agritourism business on the territory of the Republic of Serbia.

For performing tourism-related business activities in the field of agritourism, it is not necessary to found a company or enterprise. It is not even necessary to register the entrepreneurial firm. The new *Law on Tourism* allows for engaging in

2 Bela, M., (2010): Ruralni turizam kao faktor revitalizacije sela u Vojvodini-izazovi i pravci razvoja, Ekonomika poljoprivrede, vol. 57, br. 3.

3 Pejanović, R.,Vujović,S., (2008): Ruralni razvoj i agroturizam, Agroturizam, br. 37-38.

4 Tabaković, S. (2008): Ruralni razvoj i agroturizam, Agroturizam, br. 37-38

5 Gajić, T., Džigurski, A., Dragin, A. (2011): Analiza turističkog prometa u Srbiji i njihov uticaj na ekonomski razvoj, Ekonomika poljoprivrede, vol. 58, br. 2.

6 Veselinović, J. (2011): Pravni uslovi i forme obavljanja delatnosti u oblasti turizma u našem pravu, Agroekonomika, Faculty of Agriculture, Novi Sad.

agritourism and tourism in general to the physical persons, as well, provided they meet the required criteria.

Due to our villages having fallen behind and this situation being followed by the unfavourable demographic situation and extensive agriculture which yields lower incomes, the development of rural tourism would create conditions for a life in the countryside that would be more economically justified[7].

Physical person as a provider of hospitality services in a household

According to the *Law on Tourism*[8], a physical person can offer tourists hospitality services of accommodation, preparation and providing of meals in an own house, apartment or room, in premises with the capacity of up to 30 beds. This comes as an exception to the general rule that the business activity can be performed solely through the firm (entrepreneur), through a company or other business subject. In this case, the activity of providing hospitality services in the household can be performed by an employed or unemployed physical person, retired person, not excluding the possibility of the person being an older minor (older than 16 years of age), as the only condition is that the person is an owner of the premises with the accommodation capacities. This is certainly a very liberal regulation and also favourable to the increase of interest in offering hospitality services in a household.

Physical person offering hospitality services in a household is inscribed into the Tourist registry, kept by the Serbian Business Registry Agency.

The law[9] prescribes conditions under which services can be offered in the households. The first condition is that the physical person offering hospitality services in a household has to fulfil the medical prerequisites and undergo regular medical check-ups in accordance with the law that regulates health protection.

Houses, apartments and rooms rent by physical persons have to meet the required minimum of technical and sanitary-hygienic conditions and have to be categorised. One of the significant regulations says that physical persons can offer services of food preparation and catering only to those tourists to which they offer the services of accommodation.

Even though a physical person is not obliged to register as an entrepreneur, the *Law on Tourism*[10] has foreseen that the physical person offering hospitality services within a household and renting out a house, an apartment or a room, has to do so through a local tourist organisation, tourist agency, business subject or another legal person, registered to perform activities of business economy, based on the signed contract. The physical person is obliged to provide the competent authorities of the local self-government with the mentioned contract, for the purpose of registration.

7 Veselinović, J. (2011): Ugovori i sredstva plaćanja u turizmu, monografija, Faculty of Agriculture, Novi Sad

8 Law on Tourism, article 72.

9 Law on Tourism, articles 73-75.

10 Law on Tourism, article 74.

The competent organ of a unit of the local self-government keeps records of categorised houses, apartments and rooms as a part of the assigned task and is obliged to provide the *Tourism registry* with the written records of it (in paper and electronically) on a quarterly basis.

The physical person offering hospitality services in an own household is obliged to do as follows:

1) put out a category mark prescribed by the decision of a competent organ in a house, apartment or room (this obligation also refers to the physical persons offering hospitality services in a tourist household in the countryside);
2) maintain rooms and equipment, offering services according to the prescribed standards for the category of the house, apartment and room prescribed by the decision of a competent organ;
3) publicly put out the prices of services offered, as well as the fee of the residence taxes, adhering to those fees;
4) establish food norms if it provides catering services and adhere to the established norms;
5) keep a daily guest record.

These obligations also refer to the physical persons offering hospitality services in a rural tourist household.

The minister, with the approval of a minister competent of interior affairs, prescribes the form, content, place and manner of keeping guest records within a household and the rural tourist household.

Physical person as a provider of hospitality services in a countryside tourist household

Physical person offering hospitality services in a countryside tourist household is allowed to offer the services of accommodation, food and drink preparation and catering in the premises with up to 30 beds to an organised tourist group of up to 50 persons who do not use the accommodation services, only hospitality services of food and drink preparation and catering. *The Law on tourism*[11] prescribes the conditions for performing hospitality activities in a rural household.

The physical person offering tourist services in a rural tourist household is registered with the competent organ of the local self-government unit, which is obliged to file in a quarterly report to the Tourism registry led by the Serbian Business Agency Registry.

This concerns physical persons who offer hospitality services in the premises in the countryside. It can be assumed that the creation of conditions for physical persons to engage in the hospitality business, without registering as entrepreneurs, is foreseen with the development of rural tourism in mind. It is not required for the service provider to also be the owner of the premises. Hence, premises can be rented. In them, the physical person can, apart from the service of accommodation, cater the self-prepared food.

11 Law on Tourism, articles 76-79.

It is possible to offer hospitality services to an organised tourist group in a rural tourist household (food and drink preparation and catering) without the accommodation service. The group is not to be over 50 members. The lawmaker insists that the tourist group be organised. In this way, the effect is achieved that these premises do not have the character of open premises, as the services are offered to both the persons using the services of accommodation and food/drink preparation and catering, as well as the persons who come as an organised group to use only the hospitality services of food/drink preparation and catering.

A physical person in a rural tourist household can offer services of preparation and catering of self-prepared food and drink. It is thus presumed that the physical person engages in a related agricultural and/or cattle-breeding production, offering the products thus produced to the guests.

Physical person who deals in providing services in a rural tourist household must fulfil the health criteria and perform regular medical check-ups, in accordance with the law which regulates health protection.

Premises in which hospitality services are offered in a rural tourist household must fulfil the minimal technical and sanitary-hygienic conditions.

Physical person offering hospitality services in rural tourist household rents out the premises through a local tourist organisation, tourist agency, business subject or another legal person registered to perform business activities based on the contract. The physical person provides the competent organ of local self-government with this contract, for the purpose of registration.

The competent organ of a unit of the local self-government keeps records of rural tourist household as a part of the assigned task and is obliged to provide the *Tourism registry* with the written records of it (in paper and electronically) on a quarterly basis.

The physical person offering hospitality services in a countryside tourist household is obliged to:

1. put out a category mark prescribed by the decision of a competent organ in a rental house, apartment or room;
2. maintain the rooms and equipment, offering services according to the prescribed standards for the categories of houses, apartments and rooms defined by the decision of a competent organ;
3. publicly put out the prices of services offered, as well as the fee of the residence taxes, adhering to those fees;
4. establish food norms (if food-related services are offered) and adhere to those norms;
5. keep a daily guest record.

The competent minister, with the approval of a minister competent of interior affairs, prescribes the form, content, and manner of keeping guest records within a rural tourist household. The competent minister, with the approval of the minister competent for

health matters prescribes the minimum technical and sanitary-hygienic criteria that are to be fulfilled by the premises in which hospitality services in households and rural tourist households are offered.

The lawmakers recognise the distinction between offering services in households (own homes) and rural tourist households. The most significant difference lies in the very possibility to offer hospitality services of food preparation and catering independently from the accommodation of the organised groups of up to 50 tourists in a rural tourist household. Such possibility does not exist in the households themselves.

Apart from that, food and drink in a rural tourist household have to be made of predominantly own products. Due to these differences, it can be concluded that the domestic household services are possible in all tourist places (cities, countryside, spas, mountains, etc.), while the service in a rural tourist household is related to the countryside in which agricultural production, cattle-breeding, as well as fishing and beekeeping are possible. The term implies that the rural tourist household could be inscribed into the registry only if it is situated in countryside, that is, outside the urban settlement.

As the physical person offering hospitality services in a rural tourist household rents out objects through a local tourist organisation, tourist agency, business subject or another legal person registered to perform such business activities based on a contract, we enclose an example of such a contract.

Conclusion

The new *Law on Tourism* gives the possibility for the hospitality and other tourism-related activities to be performed through business companies and enterprises (firms), while the possibility is also given to the physical persons to perform, under legally established terms, some of the hospitality-related activities. Education, as a way to get acquainted with the legal possibility to start an the activity in the field of tourism is a prerequisite for the development of tourism in Serbia. In this way, a range of possibilities is opened for the development of this kind of tourism, but also a parallel development of agriculture, cattle-breeding and an overall development of rural areas. Normative conditions do not suffice if the help to this kind business economy is not aided by the state through incentive measures, but also by the provincial and local authorities.

References

1. Bela, M. (2010): *Ruralni turizam kao faktor revitalizacije sela u Vojvodini-izazovi i pravci razvoja*, Ekonomika poljoprivrede, vol. 57, br. 3.
2. Gajić, T., Džigurski, A., Dragin, A. (2011): *Analiza turističkog prometa u Srbiji i njihov uticaj na ekonomski razvoj*, Ekonomika poljoprivrede, vol. 58, br. 2.
3. Gorenc, V., Šmid, V. (1999): *Poslovno pravo u turizmu i ugostiteljstvu*, Školska knjiga Zagreb, p. 239-248.
4. *Law on agriculture and rural development* (2009), Official Gazette of the Republic of Serbia, n. 41/09.

5. *Law on Business Companies* (2011), Official Gazette of the Republic of Serbia, n. 36/11.
6. *Law on Game and Hunting* (2010), Official Gazette of the Republic of Serbia, n. 18/10.
7. *Law on Spas* (1992), Official Gazette of the Republic of Serbia, n. 80/92, 67/93
8. *Law on Tourism* (2010), Official Gazette of the Republic of Serbia, n. 36/2009 and 88/10.
9. *Ordinance on content of the Tourism registry* (2010), Official Gazette of the Republic of Serbia, n. 3/10.
10. *Ordinance on defining activities for whose performance tourist fees are payable, sorting the activities into groups, according to the degree of relatedness, means of payment of tourist fees and conditions under which tourist fees are relieved* (2010), Official Gazette of the Republic of Serbia, n. 20/10.
11. *Ordinance on form, content and manner of keeping guest registers in rural tourist households* (2009), Official Gazette of the Republic of Serbia, n. 96/09
12. *Ordinance on minimum technical and sanitary-hygienic conditions for providing hospitality services in households and rural tourist households* (2010), Official Gazette of the Republic of Serbia, n. 41/10.
13. *Ordinance on minimum technical and sanitary-hygienic conditions for setting and equipping hospitality premises* (2010), Official Gazette of the Republic of Serbia, n. 41/10.
14. *Ordinance on standards for categorisation of hospitality premises for accommodation* (2010), Official Gazette of the Republic of Serbia, n. 41/2010.
15. Pejanović, R., Vujović, S. (2008): *Ruralni razvoj i agroturizam*, Agroekonomika, Faculty of Agriculture, Novi Sad, Department of Agricultural Economics and Rural Development, Novi Sad, p. 5-15.
16. *Special Usages in Tourism* (2001), Official Gazette of the Republic of Serbia, n. 33/01.
17. Tabaković, S. (2008): *Unapređenje i razvoj sela u Srbiji prema viđenju Vlade Srbije – kritički osvrt*, Agroekonomika, Faculty of Agriculture, Novi Sad, Department of Agricultural Economics and Rural Development, Novi Sad, p. 98-104.
18. Veselinović, J. (2009): *Normativno regulisanje ruralnog razvoja kod nas i u uporednom pravu*, Agroekonomika, Faculty of Agriculture, Novi Sad, Department of Agricultural Economics and Rural Development, Novi Sad, p. 53-69.
19. Veselinović, J. (2011): *Pravni uslovi i forme obavljanja delatnosti u oblasti turizma u našem pravu*, Agroekonomika, Faculty of Agriculture Novi Sad, Department of Agricultural Economics and Rural Development, Novi Sad, p. -17-33.
20. Veselinović, J. (2011): *Privredno pravo*, University in Novi Sad, Faculty of Agriculture, Novi Sad, Novi Sad, p. 152-155.
21. Veselinović, J. (2011): *Ugovori i sredstva plaćanja u turizmu*, monograph, University in Novi Sad, Faculty of Agriculture, Novi Sad, p. 7.

FIZIČKA LICA KAO PRUŽAOCI TURISTIČKIH USLUGA U AGROTURIZMU

Janko Veselinović[12]

Rezime

Cilj rada je analiza normativne regulative koja stvara uslove za pružanje turističkih usluga u agroturizmu od strane fizičkih lica. Rezultati ovog rada govore o Zakonu o turizmu kao dobrom pravnom okviru za uključivanje fizičkih lica, koja nisu registrovana kao preduzetnici, u obavljanje turističke delatnosti na ruralnim područjima. Takođe, rezultati potvrđuju da agroturizam predstavlja jedan od vidova privređivanja koja u Srbiji ne daje značajnije ekonomske efekte. Iz rada se može izvesti zaključak da stvaranje normativnih okvira za uključivanje najšireg kruga davaoca usluga u agroturizmu otvara niz mogućnosti za razvoj ove vrste turizma, ali i uporednog razvoja poljoprivrede, stočarstva i ukupnog razvoja ruralnih područja. Novi zakonski okviri stvaraju mogućnost da se fizička lica bave pružanjem usluga smeštaja i pansiona, kao i usluživanjem domaće hrane i pića. Zakonodavac daje tu mogućnost kako nezaposlenima, tako i zaposlenima, penzionerima, pa čak i starijim maloletnicima – licima od preko 16 godina. Ove zakonske mogućnosti trebale bi da prate i određene mere državnih, pokrajinskih i lokalnih organa. Korišćen je metod analize i uporedni metod.

***Ključne reči**: fizička lica, agroturizam, normativno regulisanje, turističke usluge*

12 Doc. dr Janko Veselinović, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Dositeja Obradovica 8, Telefon: +381 21 485 35 00, E-mail: nauka@polj.uns.ac.rs

Prikaz monografije

SISTEMI ZA OBRADU RITSKIH ZEMLJIŠTA SA ASPEKTA POTROŠNJE GORIVA, INVESTICIJA PO HEKTARU I ODRŽIVIH EKO SISTEMA

Autori:
Prof. dr Savo Ivančević, Mr Dragan Mitrović

Izdavač:
Institut za ekonomiku poljoprivrede, Beograd, 2012

Urednik:
Prof. dr Drago Cvijanović, direktor

Monografijom autori ističu da je izbor sistema za obradu ritskih zemljišta od velike važnosti posmatrano sa agrotehničkog, ekonomskog i ekološkog stanovišta. Od velike važnosti naročito ukoliko se napomene da ritska zemljišta, nakon hodromorfnih zemljišta zauzimaju najveću površinu u AP Vojvodini. Značajno je napomenuti da se biljna proizvodnja na ovim tipovima zemljišta ne razlikuje od tehnike koja primenjuje na černozemu i njemu sličnim zemljištima. Neprilagođena agrotehnika u proizvodnji ratarskih kultura može usloviti pogoršanje fizičkih, hemijskih i bioloških osobina zemljišta, što dovodi do smanjenja ili kolebanja prinosa iz godine u godinu. Nepovoljnih posledica ovakvog načina obrade zemljišta je nastanak *plužnog* đona, tj. vodonepropusnog sloja, čime se ubrzava propadanje prolećnih useva, što uslovljava povećanje troškova obrade i veće investiranje u proces proizvodnje. Kroz sedam poglavlja monografije, autori imaju za cilj da prikažu načine za poboljšanje trenutnog načina za obradu ritskih zemljih, čime se vrši očuvanje eko-sistema, energetskih nivoa ulaganja, kao i poštovanje agrotehničkih zahteva i investicionih ulaganja.

Prvim poglavljem pružaju se uvodne informacije o antropogenizaciji zemljišta, tj. promenama koje se dešavaju u zemljištu, pod kojima zemljište gubi prirodan sklop i svojstva. Ove promene obuhvataju delove pedološkog profila, ornični sloj, duboke slojeve zemljišta. Cilj mera je menjanje karakteristika nisko plodnih zemljišta, čime se stvara pogodno stanište za razvoj biljnog pokrivača i ostvarivanja visokih prinosa. U tome pomaže upotreba mineralnih i organskih hraniva, čime se povećava količina humusa u zemljištu, stvara povoljan pH za mikrobiološku aktivnost; upotreba pesticida; mehanizacije; kao i pravilno navodnjavanje. Sve ove mere mogu izazvati i paradokse ukoliko se nepravilno balansiraju među sobom, te mogu naneti i štete u poljoprivrednoj delatnosti. Poseban akcenat stavljen je na iznalaženje pravilnog modela za upravljanjem zemljištem kao prirodnim resursom, tj. potrebama za racionalnim korišćenjem i stvaranjem mogućnosti za njegovu obnovu.

Drugim poglavljem autori su predstavili karakteristike zemljišnog pokrivača Vojvodine, zemljišne površine, koja su razvrstana u osam bonitetnih klasa, od kojih su prve četiri klase

bolja zemljišta. Prikazane su fizičko-mehanička svojstva dve najkrupnije sistematske jedinica - automorfnih i hidromorfnih zemljišta (gde spadaju ritska zemljišta). Hidromorfna zemljišta se odlikuju teškim mehaničkim sastavom, slabom vodopropustljivosti, što usled nakupljanja vode može usloviti smanjenje prinosa, jer smanjuju aeraciju i biološku aktivnost. Na osnovu toga, autori su naveli načine za njihovu popravku, kroz posmatranje ekonomski značajnih tipova hidromorfnih zemljišta.

Naredno poglavlje pruža uvid u kultivisanje zemljišta uzimanjem u obzir klimu- vremeske uslove u formiranju zemljišta, uvođenje plodoreda u proizvodnju na hidromorfnim zemljištima. U rešavanju problema stvaranja plužnog đona u zemljištu, pristupa se posmatranju veličine zemljišnih čestica u kojima se korenovi mogu nesmetano razvijati i hraniti biljku. Autori navode da proces degradacije zemljišta započinje promenom strukture, a pogoršanje kroz stvaranje pokorice, sabijanje zemljišta, slabu dreniranost, itd. Ističe se potreba da se pravilnom navodnjavanjem, đubrenjem, meliorativnom zahvatima, mikrobiološkom aktivnošću i pravilno odbranom agrotehnikom mogu otkloniti nedostaci ritskih zemljišta.

Četvrtim poglavljem predstavljeni su sistemi za obradu zeljišta: meliorativna obrada (krtična drenaža, podrivanje); sistemi redovne obrade kojim se ima u vidu osetljivost hidromorfnih zemljišta na na pritisak i gaženje u vlažnom stanju (plitka obrada, osnovna obrada) i kako se njima utiče na strukturu hidromorfnih zemljišta; sa aspekta uticaja različitih tipova poljoprivrednih mašina na stanje zemljišta.

Petim poglavnjem prestavljeni su energetski aspekti obrade zemljišta, kroz ukupno angažovanu energiju, energiju poljoprivrednih mašina i živog rada u zavisnosti od tehnologije proizvodnje. Konstatovano je da se u primarnoj poljoprivrednoj proizvodnji javljalju veliki energetski gubitci, ali da postoji prostor da se prilikom obrade zemljišta mogu ostvariti velike uštede u energiji, u zavisnosti od stanja zemljišta, primenjene tehnologije, mogonske, priključne mašine i eksploatacije agregata. Neophodno je pronaći način kojim bi se smanjio broj radnih operacija u toku proizvodnje uvođenjem novih sistema obrade i smanjenje energije u svakoj operaciji.

Kroz šesto i sedmo poglavlje prikazan je aspekt investicionog i agroekološog odabira sistema obrade zemljišta, gde je posebno interesantan investicioni aspekt obrade zeljišta na koji su autori ukazali, jer se i on mora uvažiti kod donošenja odluka o izboru sistema obrade zemljišta imajući u vidu nabavne vrednosti savremene poljoprivredne tehnike.

Monografija predstavlja sistematizovanu analizu trenutnog stanja u oblasti obrade hidromorfnih zemljišta, kojima se na pravi način naučnoj i stručnoj javnosti daje motiv za dalja usavršavanja u oblasti sistema za obradu zemljišta.

B.Sc., Marijana Jovanović, istraživač saradnik
Institut za ekonomiku poljoprivrede
Volgina 15, 11060 Beograd, Republika Srbija
E-mail: marijana_j@iep.bg.ac.rs

Prikaz monografije

MENADŽMENT U ORGANSKOJ BILJNOJ PROIZVODNJI

Autori:
Prof. dr Gorica Cvijanović, Doc. dr Gordana Dozet, Prof. dr Drago Cvijanović

Izdavač:
Institut za ekonomiku poljoprivrede, Beograd, 2013

Urednik:
Prof. dr Drago Cvijanović, direktor

Monografijom "Menadžment u organskoj biljnoj proizvodnji" je na sistematičan način predočen značaj održivog koncepta, gde centralno mesto pripada prirodnim resursima i poljoprivrednoj proizvodnji. Bez racionalnog korišćenja prirodnih resursa nema održivog razvoja poljoprivrede, tako da monografija predstavlja pravi doprinos širenju ekološke organske proizvodnje zasnovane na principima ekologije, ekonomije, zdravlja i ravnopravnosti.

Prvim poglavljem monografije dati su pojmovi ekolologije, ekosfere i ekosistema, sa posebnim osvrtom na sistem nastaje poljoprivrednim delovanjem – agroekosistem. Ekosistem kao osnovna jedinica u ekosferi predstavlja skup delovanja biotopa (nežive komponente) i biocenoze (žive komponente), skup koji je dinamičan i koji kao takav nije izolovan od drugih ekosistema, već se sa njima integriše u složene veće sisteme. Agroekosistem prestavlja prelazan položaj između prirodnih i veštačkih urbanih ekosistema, tesno povezan sa razvojem poljoprivrede i zavisan je od delovanja abiotičkih i biotičkih faktora, u kome su elementi (producenti organske materije, potrošači i reducenti) povezani lancem ishrane. Kao zaključak je navedeno da je usled narušavanja prirodne ravnoteže došlo do poremećaja ciklusa kruženja materije, toka energije i raznovrsnosti biodiverziteta. Iako je sukcesija ekosistema u agroekosisteme sa aspekta poljoprivrede opravdana u cilju očuvanja egzistencije ljudi; autori su istakli kao nepobitnu činjenicu da su prirodni resursi ograničeni i da se usled intenzivnog korišćenja mogu nepovratno istrošiti. Shodno tome centralno mesto zauzima koncept održivog razvoja – sinergija ekonomskog razvoja, očuvanja životne sredine i društvenog razvoja. Održivim iskorišćavanjem prirodnih resursa moguće je dugoročnije planiranje u poljoprivrednoj proizvodnji, uz očuvanje resursa i stvaranje profita.

Drugim poglavljem, autori su dali prikaz strukture svih resursa u prirodi, koji na različite načine nalaze svoje mesto u poljoprivrednoj upotrebi. Klasifikacijom resursi se dele na neobnovljive, obnovljive i potencijalno obnovljive resurse. Istaknuto je da je poslednjih godina u svetu povećana upotreba energije iz obnovljivih izvora – solarna energija, energija vetra, geotermalna energija i energija biomase. Energija dobijena iz biomase služi za racionalno

i potpuno korišćenje svih nus proizvoda dobijenih poljoprivrednom proizvodnjom, kao i u drugim granama industrije, čime se sprečava bespovratno gubljenje materije (bioproizvodi, biodizel, biogas, etanol) i čime se omogućava njihova šira upotreba. Prelazak na upotrebu energije iz drugih izvora, proizstiče iz činjenice da je dugogodišnjom intenzivnom upotrebom obnovljivih izvora energije (vode, vazduha, biodiverziteta i zemljišta) i primenom neadekvatnih agrotehničkih mera došlo degradacije, sa posebnim akcentom na resurs zemljišta (erozija zemljišta, zaslanjivanje zemljišta, kontaminacija zemljišta teškim metalima). Kao posledica dolazi do isključivanja poljoprivrednog zemljišta iz poljoprivredne proizvodnje. U poglavlju je istaknuta važnost resursa zemljišta kao preduslova za razvoj ekološke poljoprivrede, gde se sa konvencionalnog načina poljoprivredne proizvodnje prelazi na održivu poljoprivredu, tj. na organsko ratarenje, gde se upotreba sintetičkih neorganskih materija zamenjuje upotrebom materija organskog porekla, čime se sprečava degradacija zemljišta.

Trećim poglavljem dati su principi organskog ratarenja, u kome se agroekosistem posmatra kao sistem gde su zastupljene sve tri vrste organizama i ekološki procesi: kruženje materije i protok energije. Prikazane su agrotehničke mere i sistemi gajenja biljaka, gde se centralno mesto daje plodoredu, uz poštovanje plodosmene (vremenskog smenjivanja useva) i poljosmene (prostorne smene useva) zarad povećanja plodnosti zemljišta i proizvodnje dovoljnih količina hrane. Predočava se i značaj upotrebe različitih kategorija organskih đubriva, naročito komposta, zelenišnog đubriva, žetvenih ostataka i biogenih đubriva, uz manju uoptrebu mineralnih đubriva. Prikazane su mere zaštite bilja u organskoj proizvodnji, kojima se uz redovne mere nege smanjuje zagađenje zemljišta.

Četvrtim poglavljem data je metodologija gajenja povrtarskih useva primenom organske tehnologije; značaj primene plodoreda, setve/sadnje, mera nege zaštite (upotreba eko-preparata). Poglavljem je dat prikaz karateristika najvažnijih povrtarsih vrsta gajenih primenom principa organske proizvodnje (mrkva, krompir, crni luk, beli luk, grašak, boranija, pasulj, paradajz, paprika, krastavac), kao i uticaj ovakvog načina gajenja na kvalitet dobijenih kultura.

Petim poglavljem predstavljen je značaj semenarstva kao specifičnog segmenta agroindustrijskog kompleksa, u kojoj je krajnji produkt dobijanje kvalitetnog semena, kao osnove biljne poljoprivredne proizvodnje. Prikazane su specifičnosti organskog semenarstva, pravna regulativa i trenutno stanje tržišta semena sa organskom oznakom.

Šestim poglavljem je predstavljen značaj mikroorganizama u organskoj biljnoj proizvodnji, počev od uloge u transformaciji organske materije i obezbeđenju biljaka hranljivim materijama. Takođe je predstavljen značaj mikroorganizama u bioremedijaciji zemljišta, voda, vazduha, tačnije uloga mikroorganizama u metabolisanju toksičnih jedinjenja. Predstavljen je značaj pojedinih grupa mikroorganizama u organskoj proizvodnji, tj. korišćenje biođubriva koji su stimulatori biljnog porasta u procesu biofertilizacije. Prikazane su pozitivne karakteristike mikroorganizama ispoljene u primeni biopesticida i organskim đubrivima.

Poslednjim, sedmim poglavljem dat je uvid u proces sertifikacije prema zakonskom regulativma koje važe u našoj zemlji, uz naglašavanje značaja ovog procesa u proizvodnji

i kasnijoj distibuciji semena sa organskim predznakom. Predstavljeno je trenutno tržište organskim proizvodima, kako u svetu, tako i kod nas, kao i prostornu raširenost ovog vida u Republici Srbiji. Zaključeno je da na teritoriji naše zemlje postoje realni potencijali za povećanje površina pod ovim vidom proizvodnje, što bi u mnogome potpomoglo konkurentnost domaće poljoprivrede.

Kroz prikazana poglavlja, može se zaključiti da monografija objedinjuje sve segmente koji uvode u proces organskog ratarenja, ističe sve prednosti, ali i iznosi sve realne probleme prilikom prelaska na ovakav način proizvodnje i kao takva predstavlja svojevrstan doprinos naučnoj i stručnoj javnosti.

B.Sc., Marijana Jovanović, istraživač saradnik
Institut za ekonomiku poljoprivrede
Volgina 15, 11060 Beograd
Republika Srbija
E-mail: marijana_j@iep.bg.ac.rs

INSTRUCTIONS TO AUTHORS

The **ECONOMICS OF AGRICULTURE** (Ekonomika poljoprivrede) is an international scientific journal, published quarterly by BSAAE (Balkan Scientific Association of Agricultural Economists) in cooperation with Institute of Agricultural Economics (IAE) Belgrade and Academy of Economic Studies, in which are published original scientific papers, review articles, pre-announcements, book reviews, short communications and research reports. Review articles and book reviews are accepted after a previous consultation/invitation from either a journal Editor, or the book review Editor, in accordance with the journal submission criteria.

The journal ECONOMICS OF AGRICULTURE accepts only manuscripts submitted electronically on English language, as e-mail attachment to the following e-mail address: epoljoprivrede@gmail.com

The articles have to be submitted in duplicate, providing one copy without information about author(s), in order not to violate double-blind review process. In the second copy of the article must be specified all information about author(s) necessary for further correspondence.

Submission of articles to the ECONOMICS OF AGRICULTURE implies that their content (research carried on) has not been published previously in English, or in any other language. Also, submitted papers should not be under consideration for publication elsewhere, and their publication has to be approved by all authors with signed declaration. Publisher reserves right to verify originality of submitted article, by its checking with specialized plagiarism detection software.

Review process

The articles submitted to the journal ECONOMICS OF AGRICULTURE (Ekonomika poljoprivrede) will be double blind reviewed and must have two positive reviews consistent to the generally accepted scientific standards. The reviewer independently and autonomously evaluates the manuscript and could give a positive review, suggests some finishing touches, or gives a negative review. In case that the review reports are antagonistic (one is favourable and the second is not), the final decision belongs to the Editor-in-Chief.

Manuscript returned to the author(s) for revision does not guarantee the publication acceptance after paper correction. The final decision for publication will be made after the second review of the revised manuscript

If the paper is evaluated positively and accepted for publication, each author has to sign the warranty and transfer of copyright to the journal ECONOMICS OF AGRICULTURE.

TECHNICAL PREPARATION RULES

Article has to be prepared electronically, in **Microsoft Office Word for Windows**, font **Times New Roman,** size **11, in English language,** alignment **Justified**, all text has to be write as **Line Spacing Single**, spacing **between the paragraphs 6 pt, no Indentation**.

Paper format: *Width* 170 mm x *Height* 240 mm, **Margins**: top/bottom 20 mm, left/right 18 mm.

Article size: maximum 30.000 characters (without spaces). Depending on papers' quality, can be accepted longer and shorter articles.

Title of the Article: cantered**,** size **12, bold,** all **CAPITAL letters** in two lines at the most.

Subtitles: size **11, bold,** cantered, only first letter capital, spacing between subtitles and text above **12 pt**, spacing between subtitle and text below **6 pt.**

Authors' names: **12 pt** below the article's title, **Bold**, *Italic*, **size 11,** full name and surname, only first letter capital (e.g. ***Marko Markovic***). In footnote must be specified: academic/scientific vocation, organization/institution, full address, telephone number and e-mail address. All **footnotes** in format: Times New Roman, size **10**, Line Spacing Single.

Summary: 12 pt below the author's name**,** *Italic*, size **11,** maximum 150 words. It is desirable that Summary contains all essential paper elements, such as goal, used methods, important results and general conclusions.

Key words (bold): **6 pt** below the Summary, size **11**, **bold,** *Italic*. Specify maximally 5 key words.

JEL classification: 6 pt below keywords, size **11**, *Italic,* (http://www.aeaweb.org/jel/jel_class_system.php).

Table/graph/figure/scheme are entered within text and numerated. **Title** of table/graph/figure/scheme must be with spacing of **6 pt** (below/above), size **11**, alignment Justified. **Text** within table size **10**, table's **header** size **10, bold**, cantered. **Source** of table/graph/figure/scheme must be with spacing of **6 pt** below table/graph/figure/scheme, size **10**, *Italic*, alignment Justified.

Authors from Serbia are sending title of article, summary, key words and data on authors also in Serbian language, positioned below literature. Summary is maximally 2.000 characters (without spaces).

Literature must be at the end of article (for authors from Serbia before summary in Serbian), in alphabetical order, according to the author's surname.

Internet addresses must contain full link (for example): available at: *** http://www.iep.bg.ac.rs/index.php?option=com_content&view=article&id=211%3Aodrziva-polj-dunavski-region&catid=5%3Anaucni-skupovi&Itemid=36&lang=sr

REFERENCES OF USED LITERATURE (EXAMPLES)

a) Journals and other periodical publications

Author, A., Author, B. and Author, C. (2012). *Title of article*. Title of the journal, Publisher, *Volume* (number), pages, location.

b) Books, brochures, chapters of a book

Author, A., Author, B. and Author C. (2012). *Title of book* (edition number - ISBN). Editor, location.

c) Reports from scientific meetings

Author, A., Author, B. and Author C. (2012). *Title of report*. Title of publication from the meeting on which the report was announced, time and location of the meeting, Editor, number of pages.

d) Master's thesis/doctoral thesis

Author, A. (2012). Title of *master's thesis/doctoral thesis*. Unpublished master article/ unpublished doctoral dissertation, Editor, location.

e) Organization or government body as an author

Statistical Office of the Republic of Serbia (2012). *Title of publication*. field/chapter in publication, location.

f**)** If cited literature has been downloaded from **the publication by the internet**, after specification of literature in some of mentioned forms, in brackets must be specified also the full link the material was downloaded from.

All references should be in original (on language on which are published before). Also, should be included only references that are really used within manuscript preparation.

UPUTSTVA AUTORIMA

EKONOMIKA POLJOPRIVREDE je međunarodni naučni časopis, koji kvartalno publikuje NDAEB (Naučno društvo agrarnih ekonomista Balkana) u saradnji sa Institutom za ekonomiku poljoprivrede iz Beograd i Univerzitetom ekonomskih nauka iz Bukurešta, a u kome se publikuju originalni naučni radovi (dvaputa recenzirani), pregledni članci, prethodna saopštenja, prikazi knjiga, kratki osvrti i izveštaji istraživanja. Pregledni članci i prikazi knjiga se prihvataju nakon prethodne konsultacije/poziva od strane ili urednika časopisa, ili urednika prikaza knjige, usklađeni sa ktiterijumima podnošenja radova.

Časopis EKONOMIKA POLJOPRIVREDE prihvata samo radove na engleskom jeziku, podnešene E-mejlom (kao attachment) na adresu: epoljoprivrede@gmail.com

Radovi se dostavljaju u duplikatu, s tim da se na jednom primerku uklonjeni podaci o autorima, kako se ne bi narušio proces anonimnosti recenzije. U drugom primerku rada navode se sve informacije o autorima, neophodne za dalju korespodenciju.

Radovi koji se dostavljaju časopisu EKONOMIKA POLJOPRIVREDE moraju posedovati sadržaj istraživanja koja prethodno nisu publikovana na engleskom ili nekom drugom jeziku. Takođe, podnešeni radovi ne smeju biti u procesu razmatranja za publikovanje u nekom drugom časopisu, te njihova publikacija mora biti odobrena od strane svih autora potpisanom izjavom. Izdavač zadržava pravo provere originalnosti dostavljenog rada specijalizovanim softverom za otkrivanje plagijata.

Proces recenzije

Radovi podnešeni časopisu EKONOMIKA POLJOPRIVREDE podležu duploj anonimnoj (double-blind) recenziji i moraju imati obe pozitivne recenzije usaglašene sa opšteprihvaćenim naučnim standardima. Recenzent samostalno i anonimno ocenjuje rukopis, te može dati pozitivnu recenziju, predlog dorade rada, ili negativnu recenziju. U slučaju antagonističnih recenzija (jedna je pozitivna, a druga negativna), konačnu odluku donosi glavni i odgovorni urednik.

Rad vraćen autorima na ispravku ne garantuje njegovo objavljivanje po urađenim korekcijama. Konačna odluka o publikovanju će biti donešena nakon ponovljenog procesa recenzije rukopisa.

Ukoliko je rad pozitivno ocenjen i prihvaćen za publikovanje, svaki od autora mora potpisati garanciju originalnosti rada i odobrenje za prenos autorskih prava na časopis EKONOMIKA POLJOPRIVREDE.

PRAVILA TEHNIČKE PRIPREME

Rad pripremiti na računaru, program **Microsoft Office Word for Windows**, font **Times New Roman**, size **11,** na engleskom jeziku, ravnanje teksta **Justify.** Tekst rada pisati bez proreda (**Line Spacing Single**), sa razmakom od **6 pt između pasusa**, **bez uvlačenja prvog reda**.

Format papira: Veličina papira: *Width* 170 mm x *Height* 240 mm, **Margine**: gore/dole: 20 mm, levo/desno: 18 mm.

Obim rada: do 30.000 karaktera (bez razmaka), a u zavisnosti od kvaliteta rada, mogu biti prihvaćeni i duži i kraći radovi.

Naslov rada: centriran, size **12**, **bold, SVA SLOVA VELIKA,** najviše u dva reda.

Podnaslovi: size **11**, **bold**, **centrirano**, samo prvo slovo veliko, razmak podnaslova i teksta iznad 12 pt (**before 12 pt**), a razmak podnaslova i teksta ispod 6 pt (**after 6 pt**).

Imena autora: **12 pt** ispod naslova rada, **Bold,** *Italic*, size **11**, puno ime i prezime autora, samo prvo slovo veliko (npr. *Marko Marković*). U fusnoti navesti: titulu, organizaciju/instituciju, punu adresu, broj telefona i e-mail adresu. Sve **fusnote** u radu su formata: Times New Roman, size **10**, Line Spacing Single.

Sumarry: 12 pt ispod imena autora, *Italic,* size **11,** do 150 reči. Poželjno je da Abstrakt sadrži sve bitne činjenice rada: cilj rada, korišćene metode, najvažnije rezultate i osnovne zaključke.

Ključne reči (bold) 6 pt ispod Sažetka, size **11**, **bold,** *Italic*. Navesti najviše 5 ključnih reči.

JEL klasifikacija: **6 pt** ispod ključnih reči, size **11**, *Italic,* (http://www.aeaweb.org/jel/jel_class_system.php).

Tabele, grafikoni, slike, šeme unose se u sam tekst i numerišu se prema redosledu. **Naslov** tabela/grafikona/slika/šema pisati sa razmakom **6 pt** (iznad i ispod), size **11**, ravnanje Justified. **Tekst** tabele, size **10**, **zaglavlje** tabele, size **10**, **bold**. **Izvor** pisati sa razmakom **6 pt** ispod tabela/grafikona/slika/šema, size **10**, *Italic*, ravnanje Justified.

Domaći autori šalju naslov, rezime rada, ključne reči i podatke o sebi na srpskom jeziku, koji treba da stoje ispod literature, najviše 2.000 karaktera (bez razmaka).

Literatura se navodi na kraju rada (kod domaćih autora pre rezimea na srpskom jeziku), abecednim redom, prema prezimenu autora.

Kod **internet adresa** navodi se kompletan link, (na primer): available at: ******* http://www.iep.bg.ac.rs/index.php?option=com_content&view=article&id=211%3Aodrziva-polj-dunavski-region&catid=5%3Anaucni-skupovi&Itemid=36&lang=sr

PRIMERI NAVOĐENJA KORIŠĆENE LITERATURE

a) Časopisi i ostale periodične publikacije

Autor, A., Autor, B. i Autor, C. (2012). *Naslov članka*. Naslov časopisa*,* Izdavač, godina izlaženja (broj sveske), stranice, mesto publikovanja.

b) Knjige, brošure, poglavlja iz knjige

Autor, A., Autor, B. i Autor, C. (2012). *Naslov knjige* (ISBN). Izdavač, mesto publikovanja.

c) Referat sa naučnog skupa

Autor, A., Autor, B. i Autor C. (2012). *Naziv referata,* Naziv publikacije sa skupa na kom je referat saopšten, vreme i mesto održavanja skupa, Izdavač, stranice.

d) Magistarski (master) rad/doktorska disertacija

Autor, A. (2012). *Naziv magistarskog (master) rada/doktorske disertacije,* (neobjavljen magistarski (master) rad/doktorska disertacija), Izdavač, mesto izdavanja.

e) Organizacija ili državni organ kao autor

Republički zavod za statistiku (2012). *Naziv publikacije.* Oblast/poglavlje u publikaciji, mesto publikovanja.

f) Ukoliko je citirana literatura korišćena iz **internet publikacija**, posle imenovanja bibliografske jedinice u jednoj od napred navedenih formi, u zagradi se mora navesti kompletan link sa koga je materijal preuzet.

Reference treba navoditi u originalu (na jeziku na kome su objavljene) u obimu u kome su stvarno korišćene tokom pisanja rada.

Notes / Beleške:

Technical preparation, prepress and printing:
DIS PUBLIC D.O.O., Braće Jerković 111-25, Belgrade, phone/fax: 011/39-79-789

Number of copies:
300 copies

Published quarterly

Journal is registered in major scientific databases:

- EBSCO,
- AgEcon Search,
- Index Copernicus Journals Master List,
- Social Science Research Network (SSRN),
- ProQuest,
- Ulrich's Periodicals Directory,
- CABI.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

33 : 63(497.11)

ЕКОНОМИКА пољопривреде = Economics of Agriculture / editor-in-chief Drago Cvijanović. - God. 26, br. 5 (1979)= . - Београд : Научно друштво аграрних економиста Балкана : Институт за економику пољопривреде ; Букурешт : Академија економских наука, 1979- (Belgrade : Dis Public). - 24 cm

Tromesečno. - Je nastavak: Ekonomika proizvodnje hrane = ISSN 0352-3454
ISSN 0352-3462 = Ekonomika poljoprivrede (1979)
COBISS.SR-ID 27671

The Ministry of Education, Science and Technological Development of the Republic of Serbia provides financial support for publishing of the quarterly journal ECONOMICS OF AGRICULTURE