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**ECONOMICS OF AGRICULTURE**

## CONTENT

Dear readers,

This is a new number of the journal Economics of Agriculture with new editorial staff, new covers and new technical instructions. Here are represented 12 papers of domestic and foreign authors. A significance of analyzed themes multiplies with that a special accent has been put on agrarian economy, its competitiveness and possibility of sustainable development in turbulent and fast-changing environment.

Therefore, in presented papers' approach, was necessary to do some kind of pre-research, studying, to deal with available literature, to study the processes in this field which occur in European developed economies, as well as demeanour phases of economies in surrounding countries, which have terminated transition or have been in a final stage. There is a logical assumption that all the experiences can point out to paths, which Serbian agriculture is moving by, all the more so the transition in east-European countries is the same or at least similar, or that is the way it should be.

In order to improve the competitiveness of agricultural sector and to stimulate rural development is necessary to realize adequate measures and projects in the field of human resources improvement. The activities in this field include primarily better correlation between science and practice, over reorganized agricultural stations, extension services, registry offices, agricultural cooperatives and other farmers associations; development and implementation of new knowledge and skills of farmers through consulting, trainings, seminars, courses; support to young farmers in husbandry modernization. All the projects in this field have to base on adequate state support (financial, consultative, logistics) and coordinated activities of public and private sector.

The conducted research in enclosed papers show that, the improvement of agrarian performances, requires a constitution of market-oriented companies, which implies a lot of structural changes, directed toward business efficiency improvement and market requirements adjustment. Successful positioning at the market of agro-food products requires appropriate information on changes in the environment, primarily at the market, in order to decrease risk and uncertainty. The market risk cannot be eliminated, but, by the market research, it can be significantly perceived and reduced. There should adjust to the market needs by changes of production structure and adaptation of production by quantity, quality, continuity, control and competitiveness.

In such conditions, development of agriculture, more than ever, depends on the results of scientific researches and their practical application. Wide network of governmental institutes, offices and universities do the researches in the field of agriculture, and mostly are directed toward the production improvement. Economic research, at the husbandry level, market research, or analyses and evaluations of economic policy is poorly developed, so there should improve a profitability of agriculture and food industry, by supporting the adequate research and application of got results. Experiences in education and research systems of

post-socialist countries can help these countries in their economies' transition regarding knowledge, innovations and new technologies. However, despite of many researchers and successful education being inherited from the communism time, there will be hard to achieve, for the ex-Eastern Block countries, to transform these potential advantages into commercially successful innovations, if universities and research institutions would not cooperate closely with private sector, i.e. if does not realize restructuring of research system according to agro-food needs adjustment.

Serbia has a great potential in agricultural sector, which has not been completely used. Along with adequate agrarian policy, agriculture can provide significant contribution to the country's economic development. Due to its correlation and influence to other sectors, it is extremely significant for development of Serbia, regarding that it employs directly or indirectly, many people, participates significantly in foreign trade, provides food safety of inhabitants and contributes to rural development and ecological balance. The agriculture in Serbia faces many problems, which, among the others, are the result of limitations occurred in conditions of economic environment and agrarian policy carried out after the WW II till decline of the SFRY, difficulties appeared in past around-fifteen years and those in adjustment to the market economy. The agriculture in Serbia has been encumbered by consequences of centrally planned economy regarding ownership and land utilization. For development is inevitable the policy which can effect on productivity growth, by restructuring and investments, which furthermore implies clear proprietary rights and forming the efficient land, credits and inputs market, necessary for agricultural enterprises. Perhaps the time has come, taking into consideration comparative natural advantages of some regions in Serbia, to direct the state support toward those lines of agricultural production that can be profitable and competitive, so that to do the production specialization, support the organization and interest correlation, both horizontally and vertically, of all participants in agro-food production.

In time to come we expect more high-standards papers and improvement of the journal Economic of Agriculture, as well as more important quotation in domestic and international journals and at the meetings. At the same time, we hope that the journal will contribute to further networking of scientific-research work, through cooperation in the field of agrarian reality research in Serbia and abroad.

I use this opportunity to thank everyone who published his/her papersand to everyone who has supported continuous publication of the journal for 58 years. I also thank all editors who had edited the "Economics of Agriculture" journal in the past specially Professor Dr. Milan Milanovic who had edited the journal "Economics of Agriculture" in past ten years expertly, professionally, precisely and wisely.

Belgrade, March 2012.

Editor-in-chief

Professor Drago Cvijanović, Ph.D.

Original scientific paper
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# ANALYSES OF ORGANIZATION AND MILK PRODUCTION ECONOMICS ON FARMS IN MONTENEGRO

***Jasmina Ćetković[1], Aleksandra Despotović[2], Miroslav Cimbaljević[3]***

## Summary

*This document presents analyses of organization and milk production economics on farms in Montenegrin municipalities: Berane, Niksic and Pljevlja. In first part of this document are analyzed basic aspects of production organization on observed farms. In second part based on empirical research is given analyze of milk production economics on observed farms. By this analyze are determined total production costs per cattle on annual level, value of achieved production per cattle on annual level, as well as cost price of main products on observed farms. Based on previous values some of basic economic parameters are determined such as: ratio of economy on farms in observed areas, share in income per cattle on annual level in observed areas and size of profit per cattle on annual level in observed areas. At the end of this document are given conclusions of conducted research and given recommendation for improvement of current situation.*

***Key words:*** *milk production, organizational-economic aspects, production volume, economics, profitability.*

***JEL:*** *Q12, D13*

## Introduction to research

The subject of empirical research was family farms located in the north of Montenegro within the municipality, which are dominantly working with livestock production: Berane, Niksic and Pljevlja. Criteria that were taken in consideration for selection of farms which were subject of research are following:

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- Farms that are in charge of milk production and milk products;
- Producers produced milk intended for market delivers to processing capacity or perform processing of milk on farm;
- Milk cattle is in ATP controls;
- Producers are positioned on different distances from processing capacity;
- There is diversity in racial composition on farms;
- On farms is achieved income from agriculture.

Based on specified criteria it is taken a sample of 15 to 20 farms in every observed municipality. The relevant research was realized by surveys of management of processing capacity and farms management on family farms in specified municipality. The survey was open-ended and respondents were aware of the fact that the collected data will be used only for scientific research purposes.
In survey with management of processing capacity were collected data regarding volume of production, production conditions, assortments, cooperation with cooperative network and distribution and placement of finished products.

Survey with management was realized based on sample of family farms with owners of company, who are usually the farms managers. Questions were related on general conditions and characteristic of farms, i.e. specific farm.

In continuation of this document is reported part of findings, i.e. results, from published research.

## General characteristic of organization of milk production on observed farms

Milk production in livestock farm in Berane, as well as whole cattle production is realized on family farms. The most developed branch of livestock production in municipality Berane is the cattle. The milk production was followed in previous period by problems. Traditionally production method did not give enough space for application of new methods. Production was characterized by large number of individual farms, small number of cattle and homogenous food in unsatisfactory conditions. By innovation in last year's the production is intensive. Now because of incentives exists farms that serve as a quality example in the region. On farms that are engaged in production of milk in Berane, it is present half-intensive way of holding livestock. Farms are in private ownership. Number of cattle on farm varies from 2 to 10. Stables on the farm are built from firm material. Average production on farms is 4.550 kg of milk per head of livestock with standard lactation of 305 days. Equipment on the farms is at high level, such as: drinkers for watering cattle, modern systems for manure, sufficient floor space per cattle, necessary quantity of light, ventilation devices, other facilities for food storage, facilities for storage of milking apparatus, quality road infrastructure, etc. Food includes bulky portion (hay, grass, alfalfa) and concentrated portion. Bulky food is produced on private land and on leased land in the amount of 80% of total needs, 20% is purchased by market price, while concentrated food is purchased on the market. Data obtained during the research implies on differences between farms in process and organization of production, as well as financial results. The sample included 92 milk

cattle distributed on 17 farms. The average number of cattle in sample of 17 farms on this area is 5,4. In compare with average on level of Montenegro (4,2 cattle) number of cattle by farms is higher.

Municipality of Niksic is known as agriculture area with dominated by livestock production. Cattle and milk production are primary branches in livestock in this municipality. Since the Niksic is municipality with largest area in Montenegro with large number of agriculture areas, in this municipality is largest number of individual family farms with farms for milk production. In this municipality are raised the most productive cattle with milk production which is above the average farms on state level. Applying the innovation and new trends in zoo techniques are most pronounced in municipality Niksic. The result of innovation and renunciation from traditional lines of production results positively. Milk production on farms is family business. On farms that are engaged in production of milk in Nikšić, it is present intensive way of holding livestock. Number of cattle varies from 2 to 39. Farms are in private ownership. Stables on the farm are built from firm material. Farmers have solid base of fodder and enviable knowledge from zoo techniques. Average production on farms is 5.490 kg of milk per head of livestock with standard lactation of 305 days. Production process is followed by: good organization on farms, larger number of cattle per farm and production with cattle of high genetic potential. Equipment on the farms is at high level, actually farms have capacities for storage of raw milk, drinkers for watering cattle, modern systems for manure, cistern for manure transport, other facilities for food storage, sufficient floor space per cattle, necessary quantity of light, ventilation devices, facilities for storage of milking apparatus, quality road infrastructure, etc. Food includes bulky portion and concentrated portion. Meals consist hay, brewer's trope, barley, maize, cattle salts and mono-calcium phosphate. Bulky food is produced on private land and on leased land in the amount of 70% of total needs, 30% is purchased by market price, brewer's trope is purchased in Niksicka pivara while rest of the food is purchased on the market. By research are covered 16 farms from the municipality Niksic on which were represented 173 milk cattle. The average number of cattle in sample is 10,8.

Pljevlja is region with significant agriculture areas. By its characteristics that is area that has great potential for improving the current level of livestock production. Production of this area is characterized by diversity in method of keeping cattle, technology and conditions under which is production realized. By intensification of livestock production in last year appears farms on which is applied modern technology and production with cattle of high genetic potential. Half-intensive way of holding livestock is dominant in region of Pljevlja. It is characterized with cattle stay in the stables for 9 months, while other 3 months cattle spend on running and pasture. In the pasture period, cattle in lactation is added part of concentrated food. Variation of number of cattle on the sampled farms is between 2 and 16 lactic cattle. Average production on farms is 4.500 kg of milk per head of livestock with standard lactation of 305 days. Equipment on the farms is on average level and varies from traditional to modern. Farms have drinkers for watering cattle, systems for manure, sufficient floor space per cattle, necessary quantity of light, natural or artificial ventilation

devices, other facilities for food storage, facilities for storage of milking apparatus (only few of them), average road infrastructure, etc. The meals consist hay and concentrated portion. The meal is balanced and it is appropriate to production. Food includes bulky portion and concentrated portion. Bulky food is produced on private land, while maize and barley in grain are purchased by market prices. Research contains 13 farms from municipality Pljevlja and Vranjeske valley on which is represented 74 milk cattle. Average number of cattle in sample is 5,7. In compare with average on level in Montenegro, the number of cattle is larger.

## Calculation of total production costs, values of achieved production per cattle on annual level and cost price of basic product on observed farms

Total production costs by cattle[4] represent sum of food costs, costs of upbringing calves up to the age of 3 months and other direct costs[5]. In the table (Table1) is shown value of production costs per cattle on annual level in observed municipalities.

**Table 1.** Total production costs per cattle on annual level

| Cost categories | Municipality Berane (in €) | Municipality Nikšić (in €) | Municipality Pljevlja (in €) |
|---|---|---|---|
| Food costs | 690,05 | 806,37 | 887,23 |
| Other direct costs | 510,00 | 560,00 | 540,00 |
| Costs of upbringing calves | 268,60 | 268,60 | 268,60 |
| **TOTAL** | **1.468,65** | **1.634,97** | **1.695,83** |

*Source:* Calculation is prepared based on data obtained in research

On the farms, family members perform almost every activity in production process, so labor costs are not included in calculation of total production costs.

Values of achieved production on farms are determined by adding values of individual products in production process. Main products are milk/cheese[6], while secondary products are manure, extracted cows and calves. In the table (Table 2) are presented total quantity of all products, prices per unit of product and total value of production on annual level by municipalities where research was conducted.

4 Production costs are, because of the limited space, presented synthetically. Authors have detailed calculation of total production costs.

5 Other direct production costs are: small inventory costs, cost of supplies, cost of electricity, costs of depreciation/repair of herd, costs of veterinary services and other complementary costs.

6 Milk is main product for municipalities Berane and Nikšić, while main product for municipality Pljevlja is cheese.

**Table 2.** Value of achieved production per cattle on annual level[7]

| Product | Municipality Berane | | | Municipality Nikšić | | | Municipality Pljevlja | | |
|---|---|---|---|---|---|---|---|---|---|
| | Price (€/kg) | Quantity (kg) | Value (€) | Price (€/kg) | Quantity (kg) | Value (€) | Price (€/kg) | Quantity (kg) | Value (€) |
| Milk/ cheese | 0,33[8] | 4.550,00 | 1.501,50 | 0,33 | 5.490,00 | 1.811,70 | 3,30[9] | 450,00[10] | 1.485,00 |
| Calves | 3,00 | 140,00 | 420,00 | 3,00 | 140,00 | 420,00 | 3,00 | 140,00 | 420,00 |
| Extracted cows | 1,00 | 111,11 | 111,11 | 1,00 | 111,11 | 111,11 | 1,00 | 111,11 | 111,11 |
| Manure | 0,02 | 10.000,00 | 200,00 | 0,02 | 10.000,00 | 200,00 | 0,02 | 10.000,00 | 200,00 |
| TOTAL | | | **2.232,61** | | | **2.542,81** | | | **2.216,11** |

*Source:* Calculation is prepared based on data obtained in research

Since milk production is followed by secondary products, calculation of production cost of main product (milk, cheese) is done with so-called *"subtraction method"*. According this method, total production costs *(UT)* are reduced for value of secondary product *(VPs)*. Remained amount of costs is divided with total quantity of main product *(Q)*.

7 Calculation of value of achieved production is based on current prices.

8 In sales price is not included subvention which producers achieve on produced quantity of milk, since subvention are not fixed, nor certain.

9 The selling price of cheese from Pljevlja is determined as an average between selling price on bazaar and price for which buyers' purchasing cheese in Pljevlja. In Pljevlja there is no organized purchasing of cheese, which is one of the reasons of its relatively low price.

10 Average milk production of 4.500 kg for municipality Pljevlja is turned into cheese production because cheese is main product for this municipality (4.500 kg of milk = 450 kg of cheese).

Based on this calculation, we get cost price *(CK)* of main product, actually:

*Total production costs (UT) – Value of secondary product (VPs) = UT of main product*

*UT of main product : Q main product =* ***CK of main product***

In continuation of this work, applying this method, it is derived calculation of cost price of main product for observed areas.

**a) Calculation of cost price of main product (milk) for municipality Berane and Nikšić and cost price of main product (cheese) for municipality Pljevlja**

**Table 3.** Cost price of milk (per kg)

| Total production costs (€) | Value of secondary product (€) | Total costs of main product (€) | Total production costs (€) | Value of secondary product (€) | Total costs of main product (€) | Total production costs (€) | Value of secondary product (€) | Total costs of main product (€) |
|---|---|---|---|---|---|---|---|---|
| 1.468,65 | 731,11 | 737,54 | 1.634,97 | 731,11 | 903,86 | 1.695,83 | 731,11 | 964,72 |
| Total costs of main product (€) | Quantity of main product (kg) | Cost price of main product | Total costs of main product (€) | Quantity of main product (kg) | Cost price of main product | Total costs of main product (€) | Quantity of main product (kg) | Cost price of main product |
| 737,54 | 4.550,00 | 0,16 | 903,86 | 5.490,00 | 0,165 | 964,72 | 450,00 | 2,14 |

*Source:* Calculation is prepared based on data obtained in research

Based on this calculation, determined cost price of milk on family farms in Berane is 0, 16 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 0,17 € lower than selling price (0,33€).

Determined cost price of milk on family farms in municipality Nikšić is 0,165€. Cost price in this municipality in relation to the selling price (0, 33€) is different for 0,165€ per kg.

Cost price of cheese on family farms in municipality Pljevlja is 2,14 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 1,16 € lower than selling price.

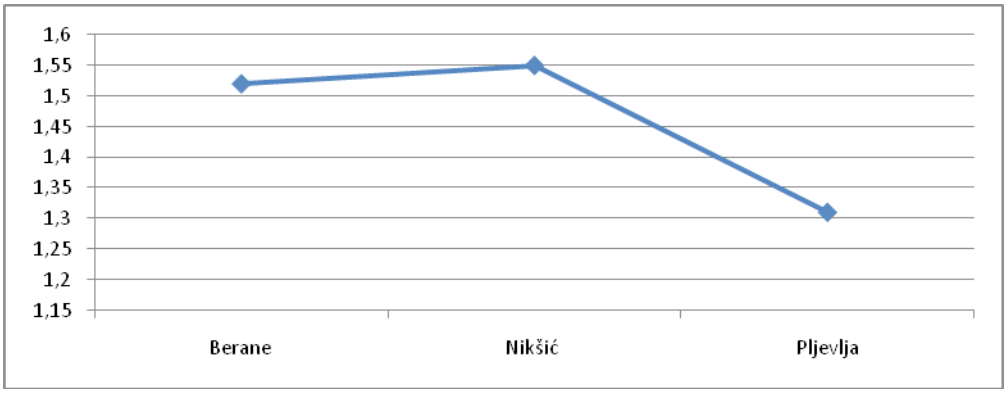
Based on this calculation, cost price of cheese on family farms in municipality Pljevlja is 1,76 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 1, 54 € lower than selling price.

Reasons for achieving positive difference between selling price and cost price of main product on farms in all municipalities should be found in following facts:

- Family farms produce or purchase significant quantities of bulky food at low prices (for example brewer's trope, food which is largely included in food on farms, it is purchased at reasonable prices);
- In farm activities are included members of household, so there is no need to allocate funds for labor from market, which significantly decreases cost price of product;
- Production process has several connected products, which also decreases cost price of main product.

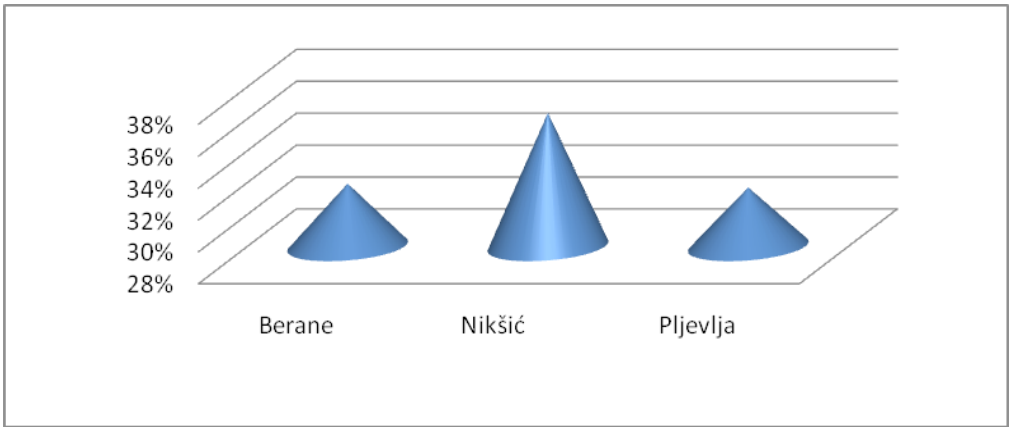
In the following part of the work, for better clarity and comparability of certain economic parameters, determined based on basis of empirical research, it is given their graphical representation.

**Graph 1.** Ratio of economy on farms in observed areas



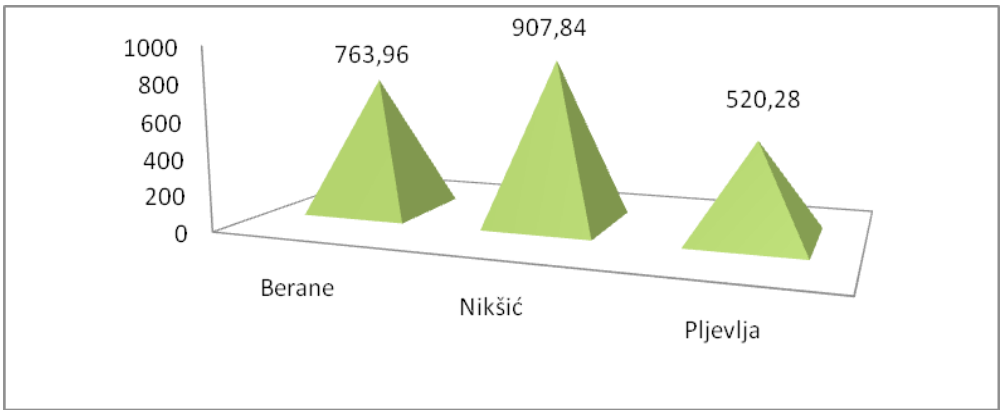

*Source:* Calculation is prepared based on data obtained in research

**Graph 2**. Share in income per cattle on annual level in observed areas




*Source:* Calculation is prepared based on data obtained in research

**Graph 3.** Profit per cattle on annual level in observed areas




*Source:* Calculation is prepared based on data obtained in research

## Concluding remarks

Research which were conducted on observed farms has directly or indirectly implies on following basic problems in organization and milk production economics on observed Montenegrin farms: insufficient volume of production, relatively high expenses of production (especially cost of food), low level of use of machinery in production process, unsatisfactory breed composition of cattle, bad infrastructure, low level of education of producers, problems with purchasing organization, etc.

Data presented in document shows that volume of production, which influence on business result of farms, is relatively low, i.e. compared with environment of cattle on observed Montenegrin farms produce up to 40% less milk, Inadequate breed composition can be in direct relation with low quantity of cattle production. Namely, by substitution of current cattle's with cattle's with high genetic potential can be significantly contribute on increasing of production volume of cattle's.

Furthermore, the relatively small number of cattle's by farm and insufficient availability of capacity in farms most directly influence on decrease of business of family farms in milk production. Due to the high fixed component of expenses in total expenses (as consequences of insufficient capacity utilization) and relatively small volume of production, significantly increase price of main product, by which is directly affected decreasing of efficiency and profitability on observed farms. High share of expenses for food in composition of price of product (implies on conclusion that obviously farms on observed areas are not followed by European trends in process of cattle feeding. Namely, detailed calculation of expenses for food shows that in composition of the meal are not included nutrients which have low market price, and in the same time are fulfilled with nutrients and replace concentrate part of meal in significant measure (which is provided by rules, for high market prices because farmers do not produce it on their areas).

Low level of machinery using, as a partly consequences of bad infrastructure in observed areas, do not present factor of increased production and decreased expenses of production.

Also, research shows that for insufficient lack of interest of farmers for education in this production, as well as for insufficient using of services of specialized institution of which is expected that in communication with producers, influence on increasing of level of efficiency and profitability of given production.

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# ANALIZA ORGANIZACIJE I EKONOMIKE PROIZVODNJE MLIJEKA NA FARMAMA U CRNOJ GORI

***Jasmina Ćetković[11], Aleksandra Despotović[12], Miroslav Cimbaljević[13]***

## Rezime

*U radu su prezentovani rezultati analize organizacije i ekonomike proizvodnje mlijeka na farmama u crnogorskim opštinama: Berane, Nikšić i Pljevlja. U prvom dijelu rada se analiziraju osnovni aspekti organizacije proizvodnje na posmatranim farmama. U drugom dijelu rada, na osnovu sprovedenog empirijskog istraživanja, data je analiza ekonomike proizvodnje mlijeka na posmatranim farmama. Ovom analizom su utvrđeni ukupni troškovi proizvodnje po grlu na godišnjem nivou, vrijednost ostvarene proizvodnje po grlu na godišnjem nivou, kao i cijena koštanja osnovnih proizvoda na posmatranim farmama. Na osnovu predhodnih veličina utvrđeni su neki od osnovnih ekonomskih parametara: koeficijenat ekonomičnosti farmi na posmatranim područjima, udio u prihodu po grlu na godišnjem nivou na posmatranim područjima i veličina dobiti po grlu na godišnjem nivou na posmatranim farmama. Na kraju rada saopšteni su zaključci obavljenog istraživanja i date preporuke za unapređenje postojećeg stanja.*

***Ključne riječi:*** *proizvodnja mlijeka, organizaciono-ekonomski aspekti, obim proizvodnje, ekonomičnost, rentabilnost.*

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# THE WORLD AND DOMESTIC MARKETS FOR TOBACCO AND TOBACCO PRODUCTS[1]

***Milutin Djorović[2], Simo Stevanović, Verica Lazić***

**Summary**

*This paper presents a regional comparative analysis of the major indicators of both the world and domestic markets of tobacco and tobacco products. Namely, for the last 21 years, for the observed sub-periods, the method of comparative analysis were used to study quantitative and structural differences in the production and trade of analyzed product groups, at both the world and at the level of continents and some countries. The leading manufacturers and flows of international trade and the leading exporters and importers of tobacco and tobacco products were defined, with special emphasis on the importance of Serbia, i.e. its position in the global market for these products.*

*Pursuant to the above, and importance of analyzed product groups for the domestic market, i.e. agriculture, agro-industry and the economy as a whole, this paper specially studies balances, structure, dynamics and regional orientation of foreign trade exchange in tobacco and tobacco products. In addition, the paper points to the needs, capabilities, measures and directions of further development of domestic production and export of products analyzed.*

**Key words***: tobacco, tobacco products, manufacture, market, trade, exports, imports, balance.*

**JEL:** *F19, E21*

## Introduction

As part of the agro-industrial commodity fund, tobacco and tobacco products represent a special group of products, which, in the population's consumption, are used as means for delighting in. their production and trade are characterized by a very rich assortment and a

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wide regional distribution. Apart from that, the production and trade of tobacco and tobacco products have a significant impact on the flows of the economic development in general, especially when it concerns those countries which are considered to major producers and exporters of these products. Due to this and also to more and more evident international economic and other integration processes, this research is aimed at the exploration of more important characteristics of the international, and especially the domestic market for tobacco and tobacco products, by means of the comparative analysis method. As extremely significant market indicators, the tendencies, i.e. the volume, dynamics and structure of the production and trade of the subject products have been researched, not only at the level of the world but at the level of continents and the individual country level as well. Together with a broader analysis of these phenomena in the domestic market, we have gained an insight into the place, importance and possibilities of Serbia in the international market for tobacco and tobacco products. Simultaneously, we have specially highlighted the characteristics of the domestic foreign-trade exchange of all the analyzed products.

The research has covered the time period from the year 1989 to the year 2010. The phenomena have most frequently been analyzed through the values of three-year or two-year averages. The sub-periods have been accorded in time with the emergence and impact of very complex historical, economic, political and other events in the country. The research results have both theoretical and practical value. First of all, they will be useful to the creators of the economic and agro-economic policy at the level of the state; however, in the same way, they will be useful to business decisions makers at the level of economic subjects, i.e. family holdings, as well as various institutions and establishments which, in an appropriate manner, deal with problems in agriculture, agro-industry and rural development on the whole.

As data sources, apart from the national ones, we have also used international statistical publications significant for the production and trade of food, beverage, tobacco and tobacco products. The Internet has been used to a great extent, as well as appropriate scientific and professional literature and, especially, the results of the research of the authors of this paper made so far. And ultimately, in compliance with the sources and characteristics of the data, in this work, we have applied quantitative and qualitative methods of market research.

## The production and trade of tobacco and tobacco products in the world

At the level of international economy, and within the range of agro-industrial products, tobacco and tobacco products take significant positions, not only in their production and trade but also in the population's consumption. The tendencies of the world production and trade of these products are very illustratively accounted by the Table 1.

**Table 1.** The volume, dynamics and structure of the production and trade of tobacco and tobacco products in the world

- In thousand tons –

| Product | ∅ 1989 – 1991 | ∅ 1998 – 2000 | ∅ 2008 – 2010 | Index ∅1998/00 ∅1989/91 | Index ∅1998/00 ∅1989/91 |
|---|---|---|---|---|---|
| | Production | | | | |
| Tobacco | 7,255 | 6,871 | 6,912 | 94.7 | 95.3 |
| Tobacco products | 5,332 | 5,509 | 4,031 | 103.3 | 75.6 |
| - cigarettes | 4,989 | 5,143 | 3,614 | 103.1 | 72.4 |
| - other products | 343 | 366 | 417 | 106.7 | 121.6 |
| | Export | | | | |
| Tobacco | 1,532 | 1,994 | 2,752 | 130.2 | 179.6 |
| Tobacco products | 783 | 1,244 | 1,361 | 158.9 | 173.8 |
| - cigarettes | 603 | 902 | 989 | 149.6 | 164.0 |
| - other products | 180 | 342 | 372 | 190.0 | 206.7 |
| | Import | | | | |
| Tobacco | 1,503 | 2,118 | 2,610 | 140.9 | 173.7 |
| Tobacco products | 605 | 1,020 | 1,311 | 168.6 | 216.7 |
| - cigarettes | 452 | 736 | 942 | 162.8 | 208.4 |
| - other products | 153 | 284 | 369 | 185.6 | 241.2 |

*Source:* the site www.fao.org and the calculation made by the authors.

*Tobacco.* In the observed time period, with relatively weaker oscillations, the world production of tobacco is characterized by a negative rate of growth of – 0.2%, and is at the level of around 7 million tons. In the second sub-period of time, compared with the first one, the production decreased by 5.3%, and in the third one, i.e. the last sub-period of time, by 4.7%. Observed from the regional point of view, Asia (64.5%) is the most important player in the world production of tobacco, being followed by America (23.0%). The share of the other continents is significantly more modest: Africa 7.8%, Europe 4.7% and Australia and Oceania 0.04%. Observed per country, within the 15 biggest producers, around 85% of the world production of tobacco is realized. The leader in the production of this product is China, with a 41.2% share. Apart from China, in the world production of tobacco, there is also a relatively big share of Brazil 12.9%, i.e. India 7.4% and the USA 5.0%. The share of the other countries belonging to the group of the fifteen biggest producers is significantly smaller and totals: Iran 2.8%, Argentina and Indonesia with 2.5% each, Malawi 2.4%, Pakistan 1.5%, Italy 1.4%, Turkey 1.3%, Zimbabwe, Thailand and Mozambique with 1.0% each and DR Korea 0.9%. The share of Serbia in the world production of tobacco is a modest one and only amounts around 0.1%.

Compared with the structure and share of individual countries in the total world production, the structure and order of the countries in the production of tobacco per

capita, and compared with the world average of 1.0 kg (Table 2), are significantly different. Namely, according to this, the leading positions in the production of the analyzed product are taken by Malawi, Macedonia, PDR Lao, Bulgaria, Zimbabwe, etc. In Serbia, around 1.4 kg of tobacco is produced per capita, what is by around 40% more than the world average.

Differently from production, the world trade of tobacco is characterized by a positive rate of growth of 2.8%, and is at the level of around 2.7 million tons, which accounts for around 40% of the production of the subject product. In the second sub-period of time, compared with the first one, the trade is increased by 30.2%, and in the third one even by 79.6%. The leading world, i.e. regional exporter of tobacco is America (41.0%), only to be followed by Asia (23.9%) and Europe (20.2%), whereas the share of Africa (14.9%) is significantly smaller, and especially Australian and Oceania's (0.04%) is almost symbolical. When we discuss the import of tobacco, the biggest portion of the world import of this product is absorbed by Europe (51.9%), then come Asia (23.9%), America (14.4%) and Africa (8.9%), whereas the share of Australia and Oceania is modest and totals around 1.0%.

Observed by country, the fifteen countries-biggest tobacco exporters realize around 78% of the world export of this product. With a 28.7% share in the world exports, Brazil is the leader in the world in tobacco exporting. The shares of the remaining fourteen countries are significantly smaller, namely: China 7.1%, India 6.9%, the USA 6.6%, Malawi 4.9%, Argentine and Turkey with 4.0% each, Greece 2.9%, Germany 2.7%, Zimbabwe and Belgium with 2.1% each, Bulgaria 2.0%, Indonesia 1.7%, France 1.0% and Canada 0.8%. Serbia's share in the world export of tobacco is very modest and totals 0.2%.

Simultaneously with export, around 68% of the total world import of tobacco is absorbed by the 15 biggest importers of this product. The leading importers are the Russian Federation (12.3%), the USA (8.9%) and Germany (8.4%), only to be followed by Holland 4.8%, China 4.3%, France 3.9%, Belgium 3.8%, Ukraine and the Philippines with 3.2% each, Poland 3.1%, Egypt 2.8%, Indonesia 2.6%, Japan 2.2% and South Korea and Great Britain with 2.1% each. In the world import of tobacco, Serbia has a 0.3% share.

*Tobacco products.* In the world, around 4 million tons of the most diversified products from tobacco are made. With a negative rate of growth of –1,3%, in the second sub-period of time compared with the first one, the total production of these products is increased by 3.3%, whereas in the third one, i.e. the last sub-period of time it fell by 24.4%. In the structure of the production, the predominant position is taken by cigarettes, with a 90% share, whereas the subgroup of other products only has a 10% share.

Differently from production, the total trade of the products made from tobacco has a positive rate of growth of 2.7% and is at the level of around 1.4 million tons, which accounts for around 35% of the total production of the subject group of products. As

well as it is the case with production, in the structure of the trade, the leading position is taken by cigarettes, with an around 70% share, whereas the subgroup of other products has an around 30% share.

*Cigarettes*. As well as it is the case with tobacco, with a falling tendency, the world production of cigarettes is at the level of around 3.6 million tons. With a negative rate of growth of –1.5%, in the second sub-period of time compared with the base one, the production of this basic tobacco product is increased by symbolical 3.1%, whereas in the third sub-period of time, i.e. the last sub-period of time, the same accounted for a decrease by significant 27.6%. With an around 42% share in the total world production, Europe is the leading regional cigarettes producer. Besides Europe, the great producers of this product are also America (29.2%) and Asia (25.2%), whereas the share of Africa (3.6%) and especially Australia and Oceania (0.1%) in the total world production of cigarettes is significantly smaller. Observed per country, the 15 biggest producers account for around 79% of the world production of this product. Namely, the leading producers of cigarettes are the USA (18.5%), the Russian Federation (13.1%) and Japan (9.0%), then to be followed by: Brazil 6.2%, Germany 5.8%, Ukraine 4.2%, Turkey 4.1%, South Korea and Great Britain with 3.5% each, Poland 3.0%, India 2.3%, Egypt 1.6%, Switzerland 1.5%, Spain 1.4% and France 1.2%. In the world production of cigarettes, Serbia has a share of around 0.6%.

The structure and order of the countries in the production of cigarettes per capita, and in comparison with the world average of 0.5 kg (Table 2), are significantly different if compared with the structure and order of the countries from the aspect of their share in the total world production of this product. Namely, the leading producers of cigarettes per capita are Switzerland, Cyprus, Croatia, Bulgaria, the Russian Federation, Ukraine, and so on. In comparison with the world average, Serbia has a bigger production of cigarettes per capita by high 480%.

Differently from production, the world trade of cigarettes is characterized by a positive rate of growth of 2.4% and is at the level of around 1 million tons, which accounts for over 27% of the total world production of this product. In the second sub-period of time, compared to the first one, the trade increased by around 50%, and in the third one by around 64%. With an almost 60% share in the total world export, Europe is the leading regional exporter of cigarettes. Back to back with Europe, there are significant exporters such as Asia (26.0%) and America (11.4%), whereas Africa's share (2.6%) and the share of Australia and Oceania (0.2%) are significantly more modest. Simultaneously with exporting, Europe (45.5%) and Asia (43.4%) are, at the same time, the biggest players in the total world import of cigarettes. Africa's share (5.6%) and America's share (5.0%) in the world import of this product are significantly smaller and almost equalized, whereas the share of Australia and Oceania is distinctly modest and only totals 0.5%.

**Table 2.** Comparative review of 15 biggest producers of tobacco and tobacco products per capita, in the world

- Ø 2008/2010, Level Index: the World = 100.0 –

| Country | Tobacco | | Country | Cigarettes | | Country | Other tobacco products | |
|---|---|---|---|---|---|---|---|---|
| | Kg | Index | | Kg | Index | | Kg | Index |
| The World | 1.0 | 100.0 | The World | 0.5 | 100.0 | The World | 0.1 | 100.0 |
| Malawi | 10.7 | 1,070 | Switzerland | 7 | 1,400 | Macedonia | 9.2 | 9,200 |
| Macedonia | 8.3 | 830 | Cyprus | 5.7 | 1,140 | Bulgaria | 6.9 | 6,900 |
| PDR Lao | 7.1 | 710 | Croatia | 3.5 | 700 | Croatia | 3.1 | 3,100 |
| Bulgaria | 5.8 | 580 | Bulgaria | 3.4 | 680 | Moldavia | 2.7 | 2,700 |
| Zimbabwe | 5.7 | 570 | Russ.Fed. | 3.4 | 680 | Tanzania | 1.1 | 1,100 |
| Brazil | 4.6 | 460 | Ukraine | 3.3 | 660 | Kirgizstan | 1.1 | 1,100 |
| Argentina | 4.3 | 430 | Denmark | 3.1 | 620 | Sweden | 0.9 | 900 |
| Zambia | 3.7 | 370 | Serbia | 2.9 | 580 | Algeria | 0.7 | 700 |
| Mozambique | 2.9 | 290 | Portugal | 2.8 | 560 | Egypt | 0.6 | 600 |
| Croatia | 2.8 | 280 | Poland | 2.8 | 560 | Montenegro | 0.6 | 600 |
| DPR Korea | 2.6 | 260 | Macedonia | 2.8 | 560 | Denmark | 0.6 | 600 |
| Iran | 2.6 | 260 | Uruguay | 2.7 | 540 | Syr.Ar.Rep. | 0.5 | 500 |
| Paraguay | 2.6 | 260 | S. Korea | 2.7 | 540 | Germany | 0.4 | 400 |
| Greece | 2.4 | 240 | Greece | 2.6 | 520 | Cyprus | 0.4 | 400 |
| Kirgizstan | 2.3 | 230 | Japan | 2.6 | 520 | Lebanon | 0.3 | 300 |
| Serbia | 1.4 | 140 | Serbia | 2.9 | 580 | Serbia | 0.3 | 300 |

*Source:* site www.fao.org and the calculation made by the authors.

Almost 77% of the world export of cigarettes is realized by the 15 countries-biggest exporters of this product. Germany (19.1%) has the biggest share in the world export, i.e. it is the world leader in the export of cigarettes. Apart from Germany, Holland 8.8%, Poland 8.6%, the USA 6.8% and Switzerland 5.8% have a high share in exporting as well, only to be followed by Indonesia and South Korea with 5.1% each, Austria 4.0%, Great Britain and Singapore with 2.1% each, Turkey 2.0%, Greece 1.9%, Japan and the Russian Federation with 1.8% each and China 1.6%. In the world export of cigarettes, Serbia has a modest 0.2% share.

Around 62% of the total world import of cigarettes is absorbed by the 15 countries-biggest importers of this product. The leading world importers of cigarettes are Spain (12.1%), Japan (10.0%) and Italy (6.9%), only to be followed by: France 4.9%, the United Arab Emirates 3.9%, Germany 3.2%, China 3.1%, Saudi Arabia 2.9%, Iran, the Czech Republic and Cambodia with 2.5% each, Iraq 2.4%, Singapore 1.6% and Azerbaijan and Belgium with 1.5% each. In the world import of cigarettes, Serbia has a 0.5% share.

*Other products made from tobacco.* This subgroup of products includes: cigars, tobacco for smoking, tobacco for chewing and tobacco for sniffing. The total world production of this subgroup of products is at the level of 417,000 tons, which makes around 10% of the total world products from tobacco. With an annual growth rate of 0.9%, in the second sub-period of time compared to the first one, the production increased by 6.7%, and in the third one by 21.6%. In comparison with the other groups and subgroups of products, the other products from tobacco are the only one subgroup which has a positive growth

rate for the duration of the whole observed time period and especially in the second sub-period of time. The leading regional producers, i.e. the biggest holders of a share in the world production of the other tobacco products are Europe (39.3%) and Africa (30.2%). A significantly smaller share in the subject production is held by Asia (18.0%) and America (12.5%), whereas the share of Australia and Oceania is distinctly modest and totals 0.09%. Observed per country, within the 15 biggest producers over 85% of the world production of the analyzed subgroup of products is produced. Namely, the biggest share in the world production of the so-called other tobacco products are held by Bulgaria and Brazil, with an 11.5% share each, Egypt 11.3% and Tanzania 11.1%. They are followed by: Bangladesh 8.4%, Germany 7.7%, Algeria 5.5%, Macedonia 4.2%, Croatia 3.1%, Syrian Arab Republic and Moldavia with 2.2% each, Ukraine and Sweden with 1.8% each, Iran 1.5% and Poland 1.3%. Serbia's share in the world production of other tobacco products is a very modest one and totals 0.4%.

In comparison with the structure and order of the shares of individual countries in the total world production, the structure and order of the countries in the production of other products from tobacco per capita against the world average of 0.1 kg (Table 2) are significantly different. According to this base, the leading positions in the world production of the so-called other tobacco products are held by Macedonia, Bulgaria, Croatia, Moldavia, Tanzania, Kirgizstan etc. Compared with the world average, Serbia realizes three times as big a production of tobacco products per capita.

Compared to production, the world trade of other tobacco products has a more dynamic rate of growth. With a 3.5% rate, the trade of this subgroup of products is at the level of 372 thousand tons. In the second sub-period of time as compared with the first one, the trade increased by 90%, and in the third one by 106.7%. With a 59.7% share, Europe is the biggest world exporter of the subject products, only to be followed by: Asia (20.7%), Africa (10.4%), America (7.8%), and finally Australia and Oceania (1.4%). Simultaneously with exporting, Europe (46.5%) and Asia (38.5%) are, at the same time, the biggest regional importers of other tobacco products. America (8.8%) in the third import place, and is followed by Africa (5.5%) and Australia and Oceania (0.7%).

Almost 90% of the world export of the so-called tobacco products is realized by the 15 countries-biggest exporters of this subgroup of products. The leading exporters are France (14.5%), Holland (12.1%) and Belgium (8.6%), only to be followed by: India 7.8%, Germany 7.5%, the Russian Federation 7.0%, Malaysia 5.6%, South Africa 4.8%, Poland and the USA with 4.6% each, Brazil 3.0%, Great Britain 2.7%, China and Luxembourg with 2.4% each and Turkey 2.2%. Serbia's share in the world export of other tobacco products is modest and totals 0.3%.

Simultaneously with exporting, over 65% of the total world import of the so-called tobacco products is absorbed by the 15 countries-biggest importers of this subgroup of products. The leading importer is Germany (13.0%), only to be followed by: the Russian Federation 5.1%, Turkey 4.9%, Saudi Arabia 4.6%, Jordan 4.3%, Holland 4.1%, Yemen, Ukraine, Japan and Poland with 3.5% each, Spain and Belgium with

3.3% each, the United Arab Emirates and Iran with 3.0% each and France 2.7%. In the world import of other tobacco products, Serbia has a 0.4% share.

The manifested regional distribution in the production and trade of the analyzed products, not only according to the volume but also according to the structure, is the resultant of numerous natural, social and economic factors. However, the following are said to be the most important factors: land, climate, the volume and structure of the production of tobacco; the number, structure and purchase power of the population; the level of a country's economic development; the development of agriculture, agro-industry and especially the tobacco processing industry; the level of scientific, technical and technological achievements; the volume of tangible investments in the production of the subject products and the measures of a country's economic, i.e. state policy.

Serbia's share in the world production and trade of the analyzed products is a modest one. Depending on the product, it has a share ranging from 0.1% to 0.6% in production, and in exporting it is from 0.2% to 0.3%, and in importing it ranges between 0.3% and 0.5%.

A relatively modest presence of tobacco and tobacco products in the international trade, compared with their volume of production, is, first of all, the resultant of specific characteristics in the consumption of these products, a broad distribution of their production and intentions on the side of all countries, especially those undeveloped and those developing, to satisfy their domestic needs for the subject products primarily by means of their own production.

## The production and trade of tobacco and tobacco products in the domestic market

In Serbia, there are favourable, however not sufficiently used up, both natural and other resources for the achievement of a significantly bigger, more stable, more quality and structurally more adequate, i.e. better-adapted-to-the-market production of tobacco and tobacco products. The tendencies, i.e. the volume, dynamics and structure of the domestic production and trade of these products are very illustratively accounted by the Table 3.

**Table 3.** The volume, dynamics and structure of the production and trade of tobacco and tobacco products in Serbia[1] (in 000 t)

| Product | Ø 1989 - 1991 | Ø 1998 - 2000 | Ø 2008 - 2010 | Index | |
|---|---|---|---|---|---|
| | | | | Ø 1998/00 / Ø 1989/91 | Ø 2008/10 / Ø 1989/91 |
| Production | | | | | |
| Tobacco | 9 | 12 | 10 | 133.3 | 111.1 |
| Tobacco products | 18 | 14 | 23 | 77.8 | 127.8 |
| - cigarettes | 15 | 12 | 21 | 80.0 | 140.0 |
| - other tobacco products[2)] | 3 | 2 | 2 | 66.7 | 66.7 |
| Sale and purchase | | | | | |
| Tobacco | 6.5 | 5.6 | 7.1 | 86.2 | 109.2 |

*Source:* site: www.webrzs.stat.gov.rs; internal materials of the Republican Agency for Statistics of Serbia, Belgrade, and the calculation of made by the authors.
1) Production in the Republic of Serbia, without figures for Kosovo and Metohija.

*Tobacco.* With a modest growth rate of 0.5%, the production of tobacco in Serbia is at the level of around 10,000 tons. With noticeable oscillations, the production in the second sub-period of time compared with the first one increased by 33.3%, and in the third one by merely 11.1%. At the same time, for the reason of complex social and economic circumstances in the country, the sale and purchase of tobacco almost stagnated. Namely, in the second sub-period of time in comparison with the first one, the sale and purchase of this product decreased by 13.8%, whereas in the third sub-period of time there was a slight increase of 9.2% and is at the level of around 7,000 tons, which make around 70% of its production. At the same time, the trend of the sale and purchase of tobacco was growing at an average annual growth rate of only 0.4%.

*Tobacco products.* This analysis includes two basic subgroups, namely: cigarettes and the so-called other tobacco products. The common volume of the production of these both groups in Serbia is at the level of around 23,000 tons, while cigarettes have an absolutely predominant position with a 91.3% share, whereas the remaining 8.7% accounts for other tobacco products.

*Cigarettes* as the leading tobacco product reach the production level of around 21,000 tons. With an average annual growth rate of 1.7%, the production in the second sub-period of time comparing with the base one shrank by 20%, whereas in the third one, i.e. the last sub-period of time, it increased by 40%.

*Other tobacco products*, a special subgroup, cover a greater number of products (cigarettes, tobacco for the pipe and chewing, and homogenized and reconstituted tobacco), with very modest total production of about 2,000 tons. With a negative rate of growth of –2,0%, the production of this subgroup in the second and third sub-period of time stagnates and is at a lower level compared with the base i.e. the first sub-period of time for significant 33.3%.

The demonstrated tendencies in the production and trade of tobacco and tobacco products are a resultant of a direct and indirect impact of numerous causes and circumstances, both those from the 1990's and those from the most recent time period. As specially important causes, the following ones are stated: the aggressive collapse of the SFR Yugoslavia, the war in the environment and in the country, sanctions introduced by the international community, the NATO aggression in the year 1999, the interrupted process of social reproduction, the economic recession, a fall in agriculture, i.e. agro-industry and, especially in the second sub-period of time, a fall in the production of cigarettes, the inefficient process of transition, insufficient investments in the development of agriculture and especially in the production of tobacco, the inadequate fiscal policy, the lack of an adequate integral program for the development of the production and processing of tobacco, the inadequate organization and insufficient material and technical equipment of family holdings, a low level of work productivity, an inadequate organization of purchase, an inefficient application of international standards, traditionalism in production and slowness in the changing of the production structure, i.e. assortment, specificities in consumption and low purchase power of the consumer, unstable social-political relations and so forth.

The removing of the current causes of unfavourable trends of the observed phenomena will significantly contribute not only to a faster development of the domestic production, market, trade and foreign-trade exchange of the analyzed products but also the domestic agriculture, i.e. agro-industry, family holdings and rural areas in the country on the whole.

## Serbia in the foreign-trade exchange of tobacco and tobacco products

The stated causes of unfavourable trends in the domestic production and trade of tobacco and tobacco products also had an important impact on the current state of affairs in the foreign-trade exchange of not only these products but overall agriculture, i.e. agro-industry and economy on the whole. The data in Table 4 very clearly and reliably account for the characteristics of the subject exchange.

In the observed time period from 2003 to 2010, with a tendency of increasing deficit, the balance of the domestic foreign-trade exchange of overall agriculture was permanently negative. In the last, i.e. second sub-period of time (Ø 2009/10) compared with the first one (Ø 2003/04), the deficit was increased by even around 23%, thus reaching a level of over 7 billion USD. For the reason of a markedly lower starting base, the export had a more dynamic increase than it was the case with the import. The export covers the import with only 55.3%. In the same sub-period of time, agriculture and the food industry have a 23.1% share in the total export structure, and in the import, they have a 6.2% share.

Differently from the overall economy, the negative balance of the domestic foreign-trade exchange of agriculture and the food industry from the first sub-period of time transformed into a positive one in the second sub-period of time with a surplus of over one billion USD. For the reason of a lower starting base, the export had a significantly

more dynamic increase than the import. The coverage of the import with the export increased from 91.1% to 206.2%. At the same time, in the structure of the export, i.e. import of overall agriculture and the food industry, the share of the export, i.e. import of the group of products tobacco and tobacco products is 2.6%, i.e. 8.5%.

With a tendency of significantly decreasing the deficit, the balance of the domestic foreign-trade exchange of the group of products tobacco and tobacco products is negative in both sub-periods of time. In the last one, i.e. in the second sub-period of time compared with the first one, the deficit of this group of products shrank by almost 69% and is around 31 million USD. In the structure of this deficit, the deficit from tobacco products, with an 84.14% share markedly predominates, while the share of the deficit from the subgroup tobacco has a significantly smaller share and totals 14.85%. Simultaneously, in the same sub-period of time, and correspondingly to the structure of the deficit, the structure of the total export and import of the analyzed group is also characterized by a predominant share of tobacco products. Their share in the subject export is around 57%, and the one of tobacco is around 43%, whereas in the import, the products have an around 67% share, and tobacco around 33%. With all this in mind, the degree of the coverage of the import with the export of 6.6% in the first sub-period of time increased to 64.1% in the second sub-period of time.

**Table 4.** The balance, dynamics and structure of the domestic foreign-trade exchange of tobacco and tobacco products

| Product | In thousand USD | | | | | | Index | |
|---|---|---|---|---|---|---|---|---|
| | Ø 2003 – 2004 | | | Ø 2009 – 2010 | | | Ø 2009/10 / Ø 2003/04 | Ø 2009/10 / Ø 2003/04 |
| | Export | Import | Balance (+ - ) | Export | Import | Balance (+ - ) | Export | Import |
| **Total economy** | **3,140,000** | **9,115,000** | **-5,975,000** | **9,069,400** | **16,395,000** | **-7,325,600** | **288.8** | **179.9** |
| **Total agric. and food ind.** | **688,000** | **755,000** | **- 67,000** | **2,093,200** | **1,015,250** | **1,077,950** | **304.2** | **134.5** |
| **Tobacco and products total** | **7,000** | **106,409** | **-99,409** | **55,355** | **86,313** | **-30,958** | **790.8** | **81.1** |
| **A. Tobacco** | **3,698** | **16,717** | **-13,019** | **23,820** | **28,419** | **-4,599** | **644.1** | **170.0** |
| 1. Tobacco, partly or fully threshed | 2,016 | 10,890 | -8,874 | 20,082 | 23,238 | -3,156 | 996.1 | 213.4 |
| 2. Tobacco unthreshed | 1,516 | 5,369 | -3,853 | 3,383 | 3,492 | -109 | 223.2 | 65.0 |
| 3. Tobacco waste | 166 | 458 | -292 | 355 | 1,689 | -1,334 | 213.9 | 368.8 |
| **B. Tobacco products** | **3,302** | **89,692** | **-86,390** | **31,535** | **57,894** | **-26,359** | **955.0** | **64.5** |
| 1.Cigarettes | 2,718 | 82,529 | -79,811 | 26,815 | 50,394 | -23,579 | 986.6 | 61.1 |
| 2.Tobacco for smoking | 1 | 5,344 | -5,343 | 47 | 322 | -275 | 4700.0 | 6.0 |
| 3.Other products | 583 | 1,819 | -1,236 | 4,673 | 7,178 | -2,505 | 801.5 | 394.6 |

*Source*: site webrzs.stat.gov.rs internal materials of the Republican Agency for Statistics of Serbia, Belgrade, and the calculation made by the authors.

As with the previously analyzed group of products tobacco and tobacco products, the balance of the subgroup tobacco is also negative in both sub-periods of time. With a falling tendency, the negative balance from the first sub-period of time or around 13 million USD decreased in the second sub-period of time by 64.67% and is around 4.6 million USD. In the same sub-period of time, in the structure of the subgroup's export, tobacco partly or

fully threshed, with the share of around 84%, takes the leading position, whereas the share of un-threshed tobacco (around 14%) and tobacco waste (around 1.5%) is significantly more modest. Correspondingly to this, in the structure of the import too, tobacco partly or fully threshed takes the leading position, with an around 82% share, while the share of un-threshed tobacco (around 12%) and tobacco waste (around 6%) is significantly smaller. The degree of the coverage of the import with the export of the subject subgroup increased from 22.1% to 83.8%. Observed per separate items within the subgroup, the coverage of the import with the export moves, with tobacco partly or fully threshed, from 18.5% to 86.4%, with tobacco un-threshed from 28.2% to 96.9%, and with tobacco waste from 36.2% to 21.0%.

Most frequently, tobacco was exported towards Belgium, Holland, Italy, Germany, Bosnia and Herzegovina, the Russian Federation, Macedonia, Greece, Poland, Switzerland, Montenegro, Ukraine, Croatia, Hungary, Turkey, France, Great Britain and Japan. At the same time, the import of this product was most frequently realized from Brazil, the USA, Italy, Malawi, India, Tanzania, Mozambique, Greece, Spain, Bulgaria, Mexico, Turkey, Macedonia, Zambia, Zimbabwe, Argentina, Germany, China, Uganda, Lebanon, Kazakhstan, Guatemala, Kenya, Poland, Montenegro, Canada, Portugal, Bosnia and Herzegovina and Pakistan.

The negative balance of the foreign-trade exchange of the subgroup of tobacco products had a crucial impact on the negative balance of the group of products on the whole – tobacco and tobacco products. Namely, with the tobacco products group, with a falling tendency, the negative balance from the first sub-period of time of over 86 million USD fell in the second sub-period of time by 69.48% and is over 26 million USD, which is an absolutely predominant negative item within the total deficit for the whole group of products – tobacco and tobacco products. In the same time period, in the structure of the export of the subgroup tobacco products, cigarettes take the leading position, with a share of around 85%, whereas the share of the so-called other products (around 15%) and especially tobacco for smoking (around 0.2%) is significantly more modest. In the same order, as well as with the export, cigarettes also have the biggest share in the import, with around 87%, only to be followed with the so-called other products with a significantly smaller share (around 12%) and tobacco for smoking (0.6%). The degree of the coverage of the import with the export of the subject subgroup from the first sub-period of time of 3.7% increased to 54.5% in the second sub-period of time. Such a low degree of the coverage of the import with the export of the subgroup is the resultant of the very low degree of the coverage of the import with the export of cigarettes, which increased from 3.3% to 53.2%. At the same time, the degree of the coverage of the import with the export of tobacco for smoking in the first sub-period of time was 0.02%, and in the second one it was 14.6%, whereas the same coverage with the so-called other products was to a certain extent more favourable and moved from 32.1% to 65.1%.

The export of cigarettes and other products from tobacco was most frequently to Bosnia and Herzegovina, Montenegro, Macedonia, Ukraine, Croatia, Hungary, Iran, Germany, Switzerland, the USA, Romania, Holland, the Philippines, South Africa,

Albania, Great Britain, Bulgaria, India and Greece. At the same time, the import of the subject products was most frequently absorbed from France, Holland, the USA, Germany, the Russian Federation, Croatia, Macedonia, Poland, Cuba, the Dominican Republic, Great Britain, Italy, Bosnia and Herzegovina, Sweden, Greece, Turkey, Malaysia, Switzerland, Indonesia, Costa Rica, Belgium, Austria, Brazil, Lithuania, Romania, Denmark and Canada.

The negative balance sheet positions of the domestic foreign-trade exchange of tobacco and tobacco products were most directly impacted by the manifested tendencies in the very production of these products. It is obvious that, in spite of available resources and market needs, their production is insufficient and unstable. Therefore, in order to achieve more favourable and more stable export results, it is necessary that, with bigger material investments and a more adequate credit and fiscal policy, the production of the analyzed products should not only increase but structurally better adapt to the market needs as well. The production must be standardized and highly productive, and the product must be competitive for its quality and price. The export should be diverged towards as many countries as possible and especially towards markets with bigger consumer purchase power.

## Conclusion

In the observed time period, the world production of tobacco and tobacco products are characterized by slightly negative growth rates, whereas, contrary to this, the trade records relatively modest positive development trends. The regional distribution of the production and trade, i.e. the surplus and deficit of all the analyzed products, is very different and imbalanced, not only per continents by per countries as well. The manifested tendencies of the observed phenomena are the resultant of not only numerous natural, agricultural and social factors, but also specially emphasized specificities in the production and consumption of the subject products as well as the strengthening of the awareness of the consumer of their damaging impact on the man's health. At the same time, Serbia's share in the total world production and trade of the analyzed products is very modest, because in both phenomena, it has a share within the framework from 0.1% to 0.6%.

In the same time period, the domestic production of tobacco and cigarettes is characterized by extremely modest positive growth rates, whereas the so-called other products have a negative movement trend. At the same time, simultaneously with a slight increase in the production of tobacco, an even slighter pace of growth and purchase of this product is noticeable.

The balance of the domestic foreign-trade exchange of the group of products tobacco and tobacco products is negative in both sub-periods of time. In the same sub-periods of time, the negative balance is noticed with both subgroups of products. In the total deficit of the group of products, the negative balance of the subgroup tobacco has an around 15% share, whereas the subgroup tobacco products has a share of about 85%,

while the share of cigarettes only, as the main, i.e. leading product, is over 76%.

The demonstrated unfavorable condition in the domestic production, i.e. the trade and foreign-trade exchange of the analyzed products, is a consequence of numerous causes which have already been mentioned in the paper. However, given the available resources and market needs, the measures mentioned in the wording of the paper should be used to eliminate the current causes of the unfavorable condition and maximally adapt the production of the subject group of products to the market needs not only in the volume but also in the structure, i.e. assortment, and do that in as short a time period as possible. At the same time, the production of export products should be especially stimulated, and it must be stable, standardized, highly productive and competitive. The export should be directed towards as many countries as possible and primarily towards those markets with bigger consumer purchase power.

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## SVETSKO I DOMAĆE TRŽIŠTE DUVANA I PRERAĐEVINA OD DUVANA

***Milutin Djorović[3], Simo Stevanović[2], Verica Lazić[2]***

### Rezime

*U radu je data regionalno-komparativna analiza važnijih pokazatelja svetskog i domaćeg tržišta duvana i prerađevina od duvana. Naime, za poslednjih 21 godinu, po posmatranim podperiodima, metodom komparativne analize izučene su kvantitativne i strukturne razlike u proizvodnji i prometu analizirane grupe proizvoda, kako na nivou sveta tako i na nivou kontinenata i pojedinih zemalja. Definisani su vodeći proizvođači, odnosno tokovi međunarodnog prometa i vodeći izvoznici i uvoznici duvana i prerađevina od duvana, s posebnim osvrtom na mesto i značaj Srbije, odnosno njenu poziciju na svetskom tržištu ovih proizvoda.*

*Shodno prethodnom i značaju analizirane grupe proizvoda za domaće tržište, odnosno poljoprivredu, agroindustriju i privredu u celini, u radu su pojedinačno izučeni bilansi, struktura, dinamika i regionalna usmerenost domaće spoljnotrgovinske razmene duvana i prerađevina od duvana. Osim toga, ukazano je i na potrebe, odnosno mogućnosti, mere i pravce daljeg razvoja domaće proizvodnje i izvoza predmetnih proizvoda.*

**Ključne reči:** *duvan, prerađevine od duvana, proizvodnja, tržište, promet, izvoz, uvoz, bilans.*

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# PREFERENCES OF WINE CONSUMERS ON SERBIAN MARKET[1]

***Branislav Vlahović[2], Velibor Potrebić[3], Marko Jeločnik[4]***

## Summary

*Wine, as worldwide known beverage left deep traces in tradition of many nations, and way it is consumed, very often reflects culture, customs and lifestyles of local communities. Beside health benefits, wine is very often symbol and sign of prestige, especially within wealthy consumers, and its' consumption is influenced mostly by tradition, confession, habits and level of life standard.*

*General recognition of wine initiated poll research survey during 2011 with basic goal to perceive factors that determine demand and consumption of wine in Republic of Serbia. In other words, survey tried to establish what are the preferences, motives, and consumer attitudes when buying a wine in domestic market. Gained results could represent useful database to wineries and wine importers who can based on that estimate current market potential and their products niche in domestic market.*

***Keywords:*** *wine, Serbia, national market, consumer preferences.*

**JEL:** *Q11, Q13, Q19.*

## Introduction

Word wine has similar etymological origin in many languages throughout the world (engl. *wine*, ger. *wein*, fr. *vin*, rus. *vino*, ital. *vino,* or sp. *vino*). Root of the word descends from Latin *vinum*, while ancient Romans took over this word from Aeolic Greek *Foívoς* (*woinos*).

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Mythical, cultural and religious dimension of wine could be found in its relation to deities such as Dionysus (Hellenes), Bacchus (Romans), Noah (Jewish), Osiris (Egyptians) or Amun-Ra (Libyans), while in Jewish and Christian legends vine receives divine attributes (one of the oldest viticulture ode could be found in Biblical canon).

It is assumed that first wine regions stretched across Mid-East, between Black and Caspian Sea. Foundation and development of viniculture within West Europe was under crucial impact of ancient Romans. They expand technology of wine making, especially in France (valleys of Moselle and Rhine), Germany and Austria (along the Danube River). After discovery of America, vine growing spreads also to Mexico and California, and later to South America and Australia.

Wine-making history in Serbia is long more than 2 millennia. First wines were made by indigenous tribes, and when, at the beginning of new age, Romans came, emperor Probus (276-282) erects first vineyards of noble varieties on Fruška Gora mountain slopes. Prosperity of vine growing in Serbia begins with Nemanjić dynasty (especially in Metohija).

Although currently is known around 10.000 wine grape varieties, they all descend from one vine type (*Vitis vinifera*). Varieties are, on the first place, result of natural selection with huge contribution of many grower generations. Vine grows almost exclusively between 30° and 40° parallel south or north to Equator. Wine is one of the most popular alcoholic beverages[5].

According to *FAO* data, during recent years world wine production varied in interval of around 26 to 28 million tons. The most of it was produced in Europe (65% of world production), and as leading producers appear France, Italy, Spain and USA (in last few years China also). As the largest exporters of wine are marked France, Italy, Spain, Australia and Chile, but observed by region, Europe (it gives ¾ of global export). Expressed by quantity, the largest exporter is Italy (approximately 1.8 million tons per year), and by value, France (export of over 10 billion USD per year, mainly as a consequence of great share of high quality wines). EU as largest regional producer, consumer and exporter in the world is simultaneously wine's largest importer. In value, the leading wine importers are Great Britain (annually over 5 billion USD), USA, Germany, Belgium, Canada and Japan. Obviously, the largest wine's consumers are European countries, amongst are far ahead France, Luxembourg, Italy and Portugal, with average consumption of over 45 l/capita/year. In group of non-European countries, Argentina stands out with average consumption of 29 l/capita/year, Uruguay with 26 l/capita/year and Australia with 22 l/capita/year.

Climate and soil in Serbia are favorable for vine growing, therefore it is grown in several regions with its' wine grooving sub-regions and areas (the most famous are Subotica, Bačka, South-Banat, Belgrade, Šumadija, Mlava, Niš, Knjaževac, Leskovac, Vranje, South and North Kosovo and Metohija, as well as sub-regions of Tri Morave and Negotinska Krajina).

5 National Wine Law defines wine as agro-food product gained by full or partial alcoholic fermentation of fresh grapes, pomace or grape must of wine grapes varieties.

Vine growing is tightly related to wine production, which in Serbia has some traditional characteristics, and is strongly leaned to national folklore and customs.

According to Serbian Chamber of Commerce total wine production in 2010, in Serbia, was 238.233 hl, where dominated naturally produced bottled wines (over 54%). Serbian business registers agency claims that in same year were registered 79 companies in area of wine production. Companies usually have completed production cycle, including wine distribution under the name of winery or certain brand name to retail chains, touristic facilities, or foreign market. Comparing production potential, annual turnover and influence to consumers, stand out following companies: Vršački vinogradi A.D. - Vršac, Navip A.D. - Zemun, Rubin A.D. - Kruševac, Vino Župa - Aleksandrovac, Čoka Winery, Wow Winery - Palić, Wine Cellar Erdevik – Novi Sad, or to consumer recognizable family wineries such are Kovačević, Aleksandrović, Radovanović, Jelić, Radenković, etc.

Based on data received from Customs Administration, during 2010, from Serbia is exported approximately 109.165 hl of different types of wine and wine products in total value of 13,5 million USD. Share of wine within total agricultural export was a modest 0,6%. As export destinations, by value, dominated CEFTA countries (before all BIH with around 6,8 million USD, i.e. 50,3% of total wine export), Russian Federation and EU countries (Germany, Austria, Czech Republic and France). In the same year it was imported 366.046 hl of different wine types and wine products, in total amount of around 39,1 million USD, with share of 3,8% within total agriculture import. Wine was mostly imported form Macedonia (about 20,8 million USD, i.e. 50,3% of total wine import), Montenegro and EU countries (France, Italy and Spain).

There are no accurate data of wine and fresh grape consumption in Serbia. Generally speaking it is low (European average is about 25 l/capita/year) and in Serbia is estimated to 3-11 l/capita/year for wine, and 2,2 kg/capita/year for fresh grape.

## Research goal, methodology and data sources

Research was conducted with main goal to perceive factors which establish demand and consumption of wine in Serbia, and in order to present general preferences and attitudes of domestic wine consumers. Concerning that similar survey was done during 2006, in paper, wherever it was possible was made comparison to previously expressed attitudes.

Used method was poll research survey, based on previously made questionnaire, done on simple random sample of 150 respondents within the area of Belgrade during the period June-August 2011. Despite to, by questionnaire numbers, relatively limited sample, received answers were indicative enough to be base for pointing out primary factors of wine consumption in the Republic.

Paper included, beside internal (survey) documentation, all other available data sources (official statistics and actual professional literature). Data processing and data analysis was based on standard statistical and mathematical methods.

## Results and disscusion

Wine culture is defined as a cultivated, refined and civilized wine consumption, which is not measured by the quantity of wine drank, but gained knowledge and procedures in the field of viticulture, wine production and catering. Very often, combination of food and wine makes of the meal one unique gastronomic experience, obeying the rule that there is no wine that could be not combined with certain meal, wherein enjoying a good wine to connoisseur is always a solemn ceremony. Dominant part of population in Serbia consider themselves as wine consumers, therefore albeit wine is put in group of alcoholic beverages, in accordance to tradition and customs, it is very often on the tables in many homes together with brandy and beer.

***Consuming wine*** – most of the respondents (83%) consume wine, while top reasons for not doing it, are: lack of habit (48%), health issues (15%), not taking alcohol at all, unacceptable taste, etc. It is notable that not a one respondent did mention the price of the wine as a reason.

***Wine consuming frequency and place of consuming*** – relatively large number of respondents consume wine on rare occasions (29%). Once to few times a week wine is consumed by 44% of examined persons, 2% of them takes it on daily basis and other respondents consume wine once in a month. Compared to results from similar survey from 2006, it is noted that relatively small impact of economic crisis reflected to wine consumption in direction of additional decrease of wine consumption frequency (then, 7% respondents were consuming wine on daily basis, and over 50% were drinking it once to several times a week)[6].

Most respondents consume wine at home (58%), while something more than one third of examined persons consume wine in restaurants[7].

***Motive for buying wine*** – Consumers could be viewed from different aspects, as individual, member of some social group or class, or as a representative of certain nation, race or religion, or also as person who buys certain product in order to satisfy personal needs, existential safeness and social acceptance, and even to show the prestige over other members of social community. The level of understanding consumers' motives when buying wine, greatly facilitates to producers and importers in on-time and adequate organization of all activities which contribute full consumers' satisfaction (more successful implementation of products on the market).

6 As a cause of consumption of wine, in a wide variety of given answers next are significant: during meals, on special occasions (celebrations), during the dates and meeting with friends.

7 On the other hand, by comparative analysis of respondents' age and place of consumption it was noticed that younger population are more likely consume wine in restaurants, what coincides with the assumption that among the young, wine has a pronounced social function. Similar situation is in Croatia, where young people usually drink wine in bars (45% of respondents) and much rarely at home, 25%. Also, analysis of the obtained results showed that with the growth of available income, respondents more likely choose the consumption of wine in restaurants.

As like in 2006 survey, basic motive that absolutely dominates when purchasing the wine is quality of wine (69%) and in smaller scale are present brand name, price, packaging, etc[8].

***The importance of brand name and level of substitution during the purchase of wine*** – The brand name is product name or name under which certain services are performed, and not so often it represents a decisive factor in consumers' purchase. Brand brings to consumer a message of its privilege i.e. that beside the need for pleasure, consumer simultaneously satisfies segments of power, respect, self-realization and self-achievement. More than 80% of respondents emphasize the importance of brand name when purchase wine (answers very or somewhat important) considering it as a guaranty of good quality[9].

On the other hand, question of substitution shows the consumers' readiness to buy some other wine in case they do not find the one they usually consume, in other words, level of loyalty to particular producer, brand or wine type. The majority of respondents (81%) are ready to buy product of some other winery, or other wine type, in case they do not find the wine they usually consume in retail store, what shows that in this segment of national market consumers' loyalty is not expressed enough.

***Wine purchase frequency*** – Gained answers show relatively low frequency of wine purchasing (approximately 88% of examined persons buy wine once in a month, or much rarely).

***Package size*** – Similar to results of study from 2006, in purchasing are dominant wines in 0,75l or 1l bottles (majority of respondents, 76%, when buying a wine are choosing the 0,75l bottle, considering that it contains wine of better quality). There were no respondent who preferred 0,2l and 5l bottles, or buying wine in a bulk[10].

Design and quality of package should be also mentioned, since it significantly influences the choice at purchase, considering that besides visual attractiveness, it guaranties preservation of quality and safety of final product. Mostly glass bottles are used and in some cases wine are filled in plastic bottles, or tetra pack (plasticized cardboard).

8 For example, consumers in Greece, when buying a wine, pay the most attention to cleanness of taste, wine origin and bottle label, while for consumers in Ireland, the three most important characteristics of wine are: country of origin, brand name and type of grape from which wine is made. After a similar study in Croatia, it was concluded that for the consumers, beside used technology, age of wine and name of winery (producer), the price is very important parameter during the wine purchase (almost 60% of respondents).

9 It is interesting that over 70% of the youngest respondents have the attitude that to them brand is extremely important when purchasing (the younger population is more loyal to the selected producer), while on the other hand, the importance of the brand comes to the fore with the rise of available income within the household.

10 The similar situation is in the Croatian market, where about 50% of consumers consider the most appropriate package of wine is 1l, or bottles of 0,75l (43%).

***Purchase place*** – Most of the respondents buy wine in retail stores of big retail chains (64%), while 20% of examined persons purchase wine in specialized stores (wine bars), or directly from producers[11].

***Wine market supply rating*** – Almost half of the respondents consider that supply of domestic market by offered assortment is on very good level, while only 8% of respondents were not satisfied with number of producers and offered wine varieties.

***Wine price*** – During last decade we are witnesses of tremendous pressure to food prices on world market. Focusing on wine, specificity of this product have to be considered, that quality (taste, i.e. what consumer likes, wants or expects form wine) is not necessarily correlated to its' price. Generally, world economic crisis affected on domestic market in a way that wine prices have slower raise rate, but it does not apply to collectors' pieces. Wineries and importers in Serbia are aware of purchasing power and consumption potential of consumers therefore very often they go to maximal depreciation of price pressure to final buyer, by delaying or moderating wine price jumps (wine price did not follow growth rate of other food prices).

Despite to this solution, only for one quarter of respondents wine is currently affordable by its retail price, and considering the high share of food in total costs of living for average family, wine in Serbia is usually considered as luxury food product.

Also, as like in study from 2006, most of the respondents (69%) stated that high retail prices of wine affects their choice when purchasing wine, usually choosing wines from the lower price categories[12].

***The influence of advertising on purchase of wine*** – Advertising as marketing concept's instrument represents paid way of company's mass communication to consumers, with goal to disseminate information which would induce consumer's tendency toward products and services of that particular advertised company. By that, consumer is assisted to quickly find certain product or service, or is introduced with new or improved products that appeared in the market. Most of the respondents (80%) have opinion that advertising does not have any influence on their choice during the wine purchasing.

***Influence of promotional activities*** – American Marketing Association defines this term as planned media and non-media activities, with basic goal to lead the consumer to buying (growth of sale). The most illustrative description of contemporary society functioning is

11 Greek consumers usually buy wine in supermarkets, and then in the wine cellars (wine bars), while the wine in Croatia is mainly sold through stores of retail chain (over 50%), or much less through the wine cellars (something above 10%).

12 According to one marketing theory, producer is worth the price he charges its' products, so when the price is only differentiating factor on the market, winery mustn't allow for consumers to perceive offered products as mercantile goods (goods that is hard to estimate its' quality and which is at the same time with lowest possible price). If this would be the case, personal commitment of producer in achieving competitive advantage would be reduced to minimum. In other words, wineries should strive for wine which have price reflected through brand, high recognition level and adequate way of sale.

given by *R. L. Stevenson* in his sentence *Everyone lives by selling something*, but to take over *Mr. Consumer* is nevertheless the hard task.

Domestic producers and wine importers are very fond of organizing promotional activities. Most often, they do this in arrangement with retail chains and restaurants (within the facility), through cultural-touristic events (*Wine Days*), or via mass-media. I this way they attract new consumers, reward loyal ones, retake the lost ones, shorten the time between two purchases, i.e. increase the amounts of purchased products.

*Sorts of promotional activities* – Larger number of respondents (49%) named TV commercial as promotional activity that they remember, while just over a quarter of wine consumers are aware of promotional activities in local retail store or restaurant. It has to be mentioned that as the most food products, the wine also, though in smaller scale, is affected by *Shelves War* [13] marketing phenomenon.

*Intensifying promotional activities* – Major of respondents (73%) are of opinion that promotional activities related to spreading of wine and viniculture are not on satisfactory level, therefore they have to be intensified.

It should be mentioned that wine tourism and events celebrating wine/grape are complex promotional activities where producers are intensively involved. According to wine map of Serbia Tourist Organization there are 46 wineries and wine cellars where tourists could taste local wines[14], among them, stand out *Winery Jelić* from Valjevo, *Winery Vrbica* near Aranđelovac, *Winary Aleksandrović* near Topola and wine cellars *Selekta* and *Nedin* close to Vršac[15].

Among events in Serbia, dedicated to wine and grape, by tradition and large numbers of visitors stand out: *Smederevska jesen* in Smederevo, *Berbanski dani* on Palić, *Dani berbe grožđa and Vinofest* in Vršac, *Župska berba* in Aleksandrovac, *Grožđe bal* in Sonta, *Karlovačka berba grožđa* in Sremski Karlovci, *Oplenačka berba* and *Sabor narodnog stvaralaštva Srbije* in Topola, etc.

***Classification of wines*** – Wine is always related to grape, but wine and grape do not match each other, meaning that tasteful grape does not give a good wine. Therefore

13 Average buyer makes decision in maximally 15 seconds, most often in front of the shelf. Since space within the shelf is limited resource, this commonly lead to situation when balance of power between producers is settled on the shelves, therefore wineries and importers arrange (pay for it) with retail chains the most desirable position to exhibit their products.

14 Basic condition for some winery to enter wine routes network is to poses taste room, to offer different types of wine, authentic food and interesting story from the region potentially interesting to wine tourists. Like a pioneer in wine tourism could be considered wine cellar Vinski dvor at Palić.

15 To date only Vršac have encircled wine route, and best example of wine tourism potential income is Toskana region in Italy which have approximately 1.600 registered wine cellars and annual visits of around 10 million tourists.

fine wines are made of grape sorts that are not so good for eating. Wines are most often classified by: *the method of production* (common wines, special wines and wines for distillation); *colour* (white, rose and red); *quality*, depending on chemical composition and tasting score (table wine, table wine with registered geographic origin, quality wines with registered geographic origin, premium wines with registered geographic origin)[16]; *content of unfermented sugar* (dry, semi-dry, semi-sweet and sweet wines); *purpose and usable value* (special, sparkling and prädikats wines); *age* (young, old, very old and archive wines).

***Wine selection by quality*** – Insight in these preferences could generally show general culture of domestic wine consumers, considering that consumers very often do not recognize differences which define particular wine in one of mentioned quality groups. Of course, it must not be forgotten that proportionally to quality of wine its' price rise, and that sometimes, as well as fact that drinking of wine is sometimes against the ethic, because it is done only for showing one's prestige in society.

Most of the respondents are choosing quality wines (64%), while approximately 17% are choosing premium wines. During the answers analysis it is noted that as available income raise, consumer preferences are moving towards premium wines.

***Wine selection by content of unfermented sugar*** – Similar to 2006 study results, consumers most often choose dry wines (approximately 40%), while at the same time, in the final purchase dessert wines have the smallest share (around 9%). This could be crucial information to wine producers/importers, and based on it they could adjust their production/import to the taste of domestic consumers[17].

***Wine selection by geographic origin*** – Respondents more often choose domestic wines (59%). Although current intensity of preferences is considerably lower compared to 2006 survey (79%), consumers still strongly influenced by tradition are attached to present varieties, representing valid confirmation of quality of wines offered by domestic producers. Among many answers, as main reasons for choosing domestic wine are: wine quality (40%), price/quality ratio[18] (18%) and supporting domestic producers (14%). On the other hand, consumers who prefer foreign wines[19], as basic reason for it quote quality (around 56%), or better taste and aroma (20%).

Focusing on foreign wines origin, it can be noticed that in over 50% cases respondents are choosing wines from former Yugoslav republics (Macedonia 24%, Montenegro

16 Wine name commonly originates from different grape sorts (Pinot Noir, Cabernet, Merlot or Chardonnay), and to have that name wine has to be made at least from 85% of the particular grape sort.

17 Results from similar research, conducted in Greece, show that most of respondents prefer dry wines, wherein both wine colours are equally represented.

18 Although domestic wines have a bit lower prices, some of them, especially premium wines have the same price as imported one.

19 Analysis showed that respondents with higher income more often choose imported wines.

20% and Croatia 7%). In higher percentage are also represented Italian (12%), French (11%) and Spain (10%) wines[20].

***The most often choice of domestic wines*** – When choosing domestic wines, most of the respondents choose red wines (65%), while only 3% of them choose rose wines. Compared to survey 2006, respondents' preferences are slightly moved towards red wines.

*Domestic white wine selection* – Absolute respondents' favourite among domestic white wines is Chardonnay, with 30%, when at the same time pretty big share has Graševina, with 13%. At other side, relatively large number of respondents (23%) stated that they have never consumed domestic white wines.

*Domestic red wine selection* – Consumer preferences showed domination of Cabernet with 32% and Vranac with 28%. Approximately 11% of respondents stated that they have never, under any circumstances, consumed domestic red wines.

***Effects of wine on health*** – Consuming wine in reasonable quantities have indubitable positive effects on human health. It is rich resource of acids (tartaric, citric, malic, lactic, salicylic), minerals (K, Ca, Na, Mg, Fe, Mn, Cu, Co, Zn, F, J, Se), vitamins (C, B1, B2, PP factor, vitamin P, pantothenate, B6, B12, biotin) and polyphenols. Wine is excellent in prevention and treatment of anaemia, lowering lipids and total cholesterol level in blood, reducing stickiness of blood cells, hypertension, and given the antibacterial characteristics of red wine it is excellent in Escherichia-coli prevention, periodontal disease and gingivitis.

Most of the respondents (90%) are acquainted with potential health benefits of wine. This led to conclusion that wine consumers in Serbia are well informed about advantages and disadvantages of wine, meaning that there is good communication between producers/distributors of wine, public health institutions and consumers.

***Improvement in wine consumption*** – Gained answers may serve to producers/importers of wine and retail chains to improve sale models (attract consumers). In large number of answers the most often are: general decrease of prices with levelling the prices between domestic and foreign wines of same quality, intensify education about wine consummation culture within population, better wine quality and more standardized products in offer, inventing new and amplifying present promotional activities, etc.

## Conclusion

Indubitably Serbia has good soil and climate conditions for viticulture, and relatively significant role as wine producer within the Balkan Peninsula. Beside presence of tradition and customs related to wine, it could not impose for years with total consumption, over consummation of other alcoholic beverages, on the first place fruit brandies and beer.

20 For example, consumers in Ireland prefer the most French, Italian and German wines and their choice is influenced mostly by recommendation of friends and relatives.

In recent years domestic consumers are more aware of wine advantages and also the fact that Serbia offers wine assortment that could satisfy different tastes. Insufficient in volume, but yet present, education of consumers, restaurateurs and producers influenced to renewal of areas under vine and opening of small family wineries (which parallel offer world recognizable wine selections and autochthonous wines characteristic for the region) and gradually rise of wine consumption culture within consumers.

According to results of conducted survey about preferences, motives and attitudes of consumers when purchasing wine on domestic market next could be concluded:

a) Intensity of consuming wine in Serbia could be described as relatively low. Non-negligible number of respondents consume wine very rarely (29%), while once to few times a week wine is consumed by, approximately, 44% of respondents. Only 2% of respondents drink wine on daily basis. Compared to 2006 survey, frequency of wine consuming is lightly decreased;

b) Relatively low purchasing frequency (almost 90% of examined persons buy wine once in a month or rarely);

c) Basic motive for consumers, when purchasing wine is its' quality (69%);

d) Dominant number of respondents (more than ¾) prefer 0,75l bottle;

e) Brand name to consumer usually sends message of privilege. Survey results showed that 80% of respondents emphasize the importance of the brand, considering it as guarantee of good quality. But, most of the respondents are ready to buy product of other winery, or other type of wine in case they do not find in retail store the wine they usually consume, showing that there is no any significant loyalty of consumers on this part of national market;

f) Consumers are aware of promotional activities for wine (most of them, 49%, remember TV commercial, and over 25% noted some of promotional activities within retail store/ restaurant). At the same time, 73% of respondents consider that promotional activities related to wine and wine consumption culture spreading are not on satisfactory level, therefore it have to be intensified and improved;

g) As in neighbouring countries, most of respondents buy wine in retail stores (64%), while only 10% of them purchase wine in specialized stores, or directly at producer;

h) Wine, in Serbia, is most often consumed at home. It is interesting that over 30% of respondents drink wine in restaurants, most often during social gatherings, and this group is marked by young people and people with higher personal income;

i) Summarizing the answers, it could be concluded that average consumer in Serbia most often choose standard 0,75 l bottle of quality, dry domestic wine. Simultaneously, respondents with higher income more often choose imported wines (or premium domestic wines). Usual consumer's choice are domestic red wines (65%), where as

favourites are imposed Cabernet (32%) and Vranac (28%), while among domestic white wines absolutely dominates Chardonnay (30%).

j) Something less than a half of respondents consider that market supply with wine assortment is on satisfactory level. Although one of wine characteristic is that its quality and price are not necessarily in correlation, most of respondents quote that retail prices are too high, and that price is main decisive factor during the wine purchase.

Most of noted correspond to similar survey performed in 2006. Comparing the statements and preferences it is concluded that in many cases there is no relevant differences, so that economic crises did not have greater impact on consumers' preferences.

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# PREFERENCIJE KONZUMENATA VINA NA TRŽIŠTU SRBIJE

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## Rezime

*Vino se kao planetarno prepoznatljiv napitak duboko utisnulo u tradiciju mnogih naroda, a način njegovog konzumiranja često oslikava kulturu, običaje i životne stilove lokalnih zajednica. Pored zdravstvenih benefita, vino često nosi i znak prestiža, pogotovo kod platežno sposobnih konzumenata, a na njegovu potrošnju najviše uticaja imaju tradicija, konfesija i navike, te visina životnog standard potrošača.*

*Opšta prepoznatljivost vina inicirala je sprovođenje anketnog istraživanja tokom 2011 godine sa osnovnim ciljem da se sagledaju činioci koji determinišu tražnju i potrošnju vina u Republici Srbiji. Drugim rečima, pokušalo se doći do saznanja o preferencijama, motivima i stavovima potrošača tokom kupovine vina na nacionalnom tržištu. Dobijeni rezultati mogu predstavljati korisnu bazu podataka vinarijama i uvoznicima vina, na osnovu koje mogu proceniti trenutne tržišne potencijale i mesto svojih proizvoda na nacionalnom tržištu.*

***Ključne reči:*** *vino, Srbija, nacionalno tržište, preferencije potrošača.*

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# VALUATION OF BIOTECHNOLOGY COMPANIES: REAL OPTIONS APPROACH UNDER UNCERTAINTY[1]

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## Summary

*Biotechnology is one of the most intensive industries in the past few decades. Essence of their operations leads to problem of determining the value of biotechnology companies, because in addition to their existing value, future product, market opportunities and intangible assets are difficult to value. Biotech companies don't have a standard format, and simple techniques, such as financial statements analysis or discounted cash flows cannot be applied. Due to the complexity of their work and high levels of risk, alternative method such as real options is applied. The concept of financial options can be extended to the valuation of investment opportunities in commercial companies, especially in biotech. This paper explains how real options provide various perspectives on the project (investment) value in relation to situations in which the project is: delayed, expanded, abandoned, business is contracted, operations are switched, products with multiple applications are grown, and optimal date for the product launch is determined.*

***Key words:*** *Risk, Real options, Valuation, Biotechnology*

**JEL**: *D04, D81, L65*

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## Introduction

Biotechnology as a science has a long tradition and numerous definitions, but the term biotechnology was first used by Hungarian engineer Karl Ereky 1919. Modern biotechnology is defined[3] as a set of techniques used to organically transform particular biological substance[4]. Regardless of many different definitions, biotechnology is perhaps the fastest growing industry in the 21st century, and it is not surprising that it is called the "*new industrial revolution*". Previous experience of developed countries shows that biotechnology will become a key determinant of agricultural development strategy. Expectations are high and it is considered that biotech industry will reduce cost of food production and significantly increase income from agriculture[5].

According to the latest report from Ernst & Young[6], revenues, investment in research and development, net income and number of employees are constantly increasing in recent years. It is consider that US based companies are pioneer of biotechnology industry, but nowadays these technologies have spread around the world, from Europe to China, India and Canada. Biotechnology growth is illustrated in data obtained from BIO (Biotechnology Industry Organization), and according to them the market capitalization of the biotech industry in the 1994-2006 has increased more than nine times[7]. If compared to other industries, except financial, this is an extraordinary growth. However, it is necessary to make a difference, because financial industry was hit hard by financial crisis, while biotech companies grew and developed during the 2009-2010 crisis period. Although this growth was intense, it didn't bring any significant consequences until recently. Reports on strategic business risks[8], however showed that the risks biotechnology companies are facing is growing. The level of risk is somewhat reduced by the current financial crisis, because it affected other industries. Nevertheless the very nature of the business makes risks in biotechnology industry very important.

3 For details on different definitions of biotechnology see Keegan, K. (2008). *Biotechnology Valuation* (ISBN 978-0-470-51178-7). John Wiley & Sons Ltd, Chichester and Montague, P. (1993). Biotechnology Patents and the Problem of Obviousness. *Australian Intellectual Property Journal,* The Law Book Company Limited, 4(1), pp. 1-31, Pyrmont.

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6 Ernst & Young (2011): Beyond borders Global biotechnology report 2011, p.37.

7 Biotechnology Industry Organization (BIO) (2008): The Guide to Biotechnology 2008, p. 3.

8 For details see Strategic Business Report Ernst&Young, 2008, 2009, 2010, available from Company's web page.

On the other hand Papić-Brankov and Lovre[9] argue that current financial crisis reduced level of investments in biotech industry, as investors seek risk-free investment. As a consequence of this trend number of biotechnology companies declined, capital structure concentrated and monopoly position of multinational companies in the field of biotechnology has strengthened.

## Valuation of biotechnology companies

Valuation has its theoretical basis in the economic theory of investment choice, which is on the other hand based on the investments profitability, *i.e.*, the evaluation process is focused on valuation of interest[10]. Because of the specificity of biotech companies, their value is defined as the sum of existing values, market opportunities and future products. Therefore, when valuating biotechnology companies, it is necessary to add value of all future products that are developed today. However, the problem is how to valuate existing opportunities, when they are not real products, but only chances that can become a usable product in the future, and on that basis make profit.

In order to understand valuation process, it is necessary to explain how new drugs (product) are developed in biotech companies. This process is by its nature very risky, expensive and long. Drug development process consists of several different phases, which can be summarized in two basic: research and development phase and commercialization. This paper shows only the basis of each phase, which will later serve in order to clarify biotech companies valuation[11]. The first phase is discovery, which is concept creation of new findings, based on the idea or hypothesis. This phase is followed by pre-clinical trials that can last from 3 to 6 years. If the first and the second phases are successful and all the necessary permits from the authorities are obtained, creating a drug enters the third phase, the phase of clinical trials, when product is tested on humans. The third stage can be divided into three parts or periods. In the first period tests are performed only on a small number of subjects and this phase can last from 6 months to a year. The second period involves use of the drug on a larger number of users who are in need of that particular product, and lasts just as long as the first period of this phase. In the third period that may last from 1 to 4 years a group of people to which the product is tested expands, and this phase is supposed to replicate market behavior of the drug. If all previous phases are successfully completed, a request for approval is submitted to regulatory authorities. The final stage involves the

9 Papić-Brankov, T., Lovre, K. (2010): *Implikacije svetske ekonomske krize na biotehnološku industriju*, Ekonomika poljoprivrede, Naučno društvo agrarnih ekonomista Balkana, Beograd, Institut za ekonomiku poljoprivrede, Beograd, Akademija ekonomskih nauka, Bukurešt, 57(3), p. 374, Beograd.

10 Pavlović, V., Knežević, G. (2008): Adekvatnost tržišne metode procene kapitala za potrebe privatizacije. *Računovodstvo*, Računovodstvo D.O.O. i Savez računovođa i revizora Srbije, 52(5-6), p. 110, Beograd.

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post approval, and includes post-marketing surveillance.When a product is already on the market and it can reap revenue, companies often invest more in marketing so they could boost sales of that specific products. Most authors agrees that it takes around 15 years in order to complete this process, while one of the world's largest commercial biotechnology company concludes that this process has recently accelerated, and is on average 12 years. It is considered that department of research and development is responsible for success of the particular product. As investment in research and development increases, the chances of drug success are bigger.

## Valuation of intangible assets in biotech companies

Intangible assets are fixed assets that don't have material (physical) form. These types of asset don't have a clearly defined, realistic marketable value as other forms of property, so its value is determined on the basis of future assessment its impact on profit increasing. Kruger[12] believes that organizations that successfully identify new opportunities have immaterial or cognitive infrastructure that allows them to see opportunities and to respond to them. Intangible assets have four basic characteristics that we must take into account when choosing method for valuating biotech companies. These assets can be used repeatedly at the same time and are not subject to the law of diminishing returns. Furthermore, intangible assets have a strong impact on the overall business. The most important characteristic is that intangible assets are oriented towards the future, and they increase future value of the company. According to Jovanovic et al.[13] intangible assets participation in business activities is constantly growing. From 5% in the late 1970s, this share increased to 90% in 2004.

## Probabilistic approach to the evaluation

If the company has a standard format, one can apply simple valuation techniques, such as financial statement analysis or discounted cash flows[14]. These methods are usually used to valuate companies that are in the mature stage of life cycle, don't have a lot of intangible assets, and cash flows and earnings can be easily measured. As biotech companies can't be categorized this way, these methods will not be addressed in this paper. Keegan[15] concludes

12 Krueger, N. (2000): The cognitive infrastructure of opportunity emergence. *Entrepreneurship Theory and Practice*, The United States Association for Small Business and Entrepreneurship, Spring issue, p. 6, Nashville.

13 Jovanović, S., Matović, D., Petrović, S (2011). Vrednovanje intelektualne svojine. *Industrija*, Ekonomski institut, 39(2), p. 96, Beograd.

14 For details about the shortcomings of discounted cash flow techniques seen in Rađenović, T. (2008). Real options. *Facta universitatis – series: Economics and Organization*, University of Niš, 5(1),pp. 89-92, Niš.

15 Keegan, K. (2008). *Biotechnology Valuation* (ISBN 978-0-470-51178-7). John Wiley & Sons Ltd, Chichester, p. 128.

that there are a growing number of studies that criticize the use of traditional technique for valuation of biotechnology companies. Namely, it is considered the traditional approach precludes future opportunities for growth, and potential value for shareholders. In biotechnology and other research intense industries, value in the product development process can occur long before going to market.

## Real options

Different types of options have always been used in commerce and trade. Romans and Phoenicians practiced a big part of their overseas trade through the options, while in the Netherlands options were used when buying tulip bulb, which subsequently led to the first price bubble in the world history. Financial options give the owner the right but not the obligation, to buy or sell a financial asset at pre-specified exercise price. The buyer (or seller, depending on the type of option) will exercise option only if there is financial benefit. If this doesn't happen, the buyer (or seller) will leave option to expire and it will not be exercised. Analogy between financial options and real investment first noticed Myers back in the 1984[16]. In his work[17] he used for the first time term *real options* suggesting that investment opportunities engaged in the research and development that have a great deal of intangible assets, can be evaluated according to the principle of financial options. These options have the same characteristics as all other financial options, but they are options of growth and development (so they are real), whose value is mostly affected by the strategic management investment decisions. Pakson[18] defined real option as opportunities (or commitments) to acquire or develop or dispose of real assets at a price determined (or estimated) in the present but settled, or delivered, in the future. He also stated that like financial options, there is conceptually an underlying asset, or liability, that determines the option value at expiration, but unlike financial options, real options are not commonly traded, are often difficult to identify, and may involve more complex methods for valuation. Some authors believe that the real options, as techniques for the valuation emerged from decision tree (decision trees are also used as a method for valuation under risk and uncertainty). In biotech real option valuation is equivalent to a series of call options in each of phases of drug development process, mentioned above.

Although real options were identified as an opportunity to valuate companies with a significant part of the intangible assets, more frequent use of these instruments wasn't possible until 1973 when two Nobel laureates Robert Merton and Myron Scholl developed, now legendary model (Black&Scholes) for valuation of options and other derivatives.

16 According to some authors the basics of real options, but not under that name, has set up Jevon in1871in his book Theory of Political Economy, for details see Jevons, W. (1888). *The theory of political economy* (ISBN: 81-224-1278-5). MacMillan and Co, London.

17 For details see Myers, S., (1984). Financial theory and financial strategy. *Interfaces,* Informs 14, pp. 126–137, Hanover.

18 Paxson, D. (1996). Real options in *The Blackwell Encyclopedic Dictionary of Finance* (ISBN-10: 155786912X). edited by Dean and Douglas Wood, Manchester Business School, p.287.

There are two basic types of options, put and call. Call option gives holder the right to buy the underlying asset at a pre-specified exercise price (or strike price). Thus, the buyer has the right but not the obligation, to buy certain assets. On the other hand, the seller is obliged to sell the same assets at the agreed terms. It is clear that buyer of a call option prefers when price of financial instrument he bought is growing. Seller of a call option, on the other side, gets a premium, but risks losing if the option price rises more than the premium. Put option is an agreement the two sides to exchange the underlying asset at a specified price, the strike, by a predetermined date, the expiry or maturity. There are three main possibilities in which the buyer and seller of call options can be found. The first one is called "*in-the-money*" and involves a situation where the cash flows from options are positive for seller, so the strike price of call (put) option must be lower (higher) than the current market price of basic assets. If the situation is reversed, and if it would provide a negative payoff, the situation is called "*out-of-the-market*". The last option means that exercise and market price are equal and it is said that option is "*at-the-market*". One more distinction is necessary to be mentioned, before we proceed with explaining the valuation process through the real options. There is also difference between American call option that can be it can be exercised anytime from the date of purchase until the expiration date and European call option that can be exercised only on the expiration date. For valuation of European options Black&Scholes model is best option, while American options are usually valuated with use of binomial trees. Black&Scholes model is based on financial call option, which is analogous to investment option in new product development after considering all relevant factors in biotech companies.

Call option price in the Black&Scholes[19] model is calculated as follows:

$$V = SN(d_1) - Ke^{-rt}N(d_2), \text{where:}$$

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + (r + \frac{\sigma^2}{2})t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 + \sigma\sqrt{t}$$

$V$ = value of an call option
$S$ = current value of the underlying asset
$K$ = strike price of the option
$r$ = risk-free rate corresponding to life of the option
$t$ = life to expiration of the option
$\sigma^2$ = variance in the value of the underlying asset

19 Black, F., Scholes, M. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy*, *University of Chicago Press,* 81, p. 637-654, Chicago

The process of options valuation has several steps according to Damodaran[20]. First, the inputs to the Black&Scholes model are used to estimate *d1* and *d2*. Then cumulative normal distribution functions, *N (d1)* and *N (d2)*, corresponding to these standardized normal variables are estimated. After this the present value of the exercise price is estimated, using the continuous time version of the present value formulation $Ke^{-rt}$ $Ke^{-rt}$ $Ke^{-rt}$. Finally the value of the call is estimated from the Black&Scholes model. Within the model, four parameters, the market price, the exercise price, risk free rate and time to maturity are known variables, or it is easy to calculate them. Variance in the value of the underlying asset is problem that must be estimated in order to valuate future business opportunities.

Real options are suitable for assessment of intangible assets because their value depends mostly on previous decisions and actions of strategic management, and also there is substantial uncertainty or risk related to them. If intangible assets are considered this way valuation can be identified with the valuation of financing options and Black&Schol model can be applied to valuation of intangible assets. Basic assumption would be: A company that has opportunity to invest in intangible assets has the ability but not the obligation to continue investment (or to invest for the first time) in order to ensure future positive cash flows from a specific project. So, now we can draw an analogy to specific Black&Schol model. The current price should be viewed as the present value of the project on which company has the option, the expected price would be the equivalent of project costs (final cost or cost of certain stages, depending on the horizon of observation), time to maturity is the same as time to make an investment decision, and the volatility of asset prices is related to the project uncertainty.

Damodaran[21] in his first paper about the use of real options in valuation states that real options can be used for capital budgeting, or to decide between three alternatives: delay, expand or abandon. Companies that have "luxury" to *delay* their investment usually have a good competitive position in the market or exclusive rights to the certain project. Projects that biotech companies implement have such characteristics, because their products are in essence, a new discovery. On the other hand there is a long horizon for new drug development, so delaying some phase of the project might be useful. The investment decision to be made in this case is equal to call option on that particular project. Strike price is identical to the initial investment and option time to maturity is the same as time that company needed so it can make a decision.

Often investment in project opens the possibility of investing in other (*expand*), which will make profit. If considering phases of drug development process in biotech industry, it is clear that this is a typical example of situation where investments could be expanded. Finalization of each phase opens up opportunities for next subsequent

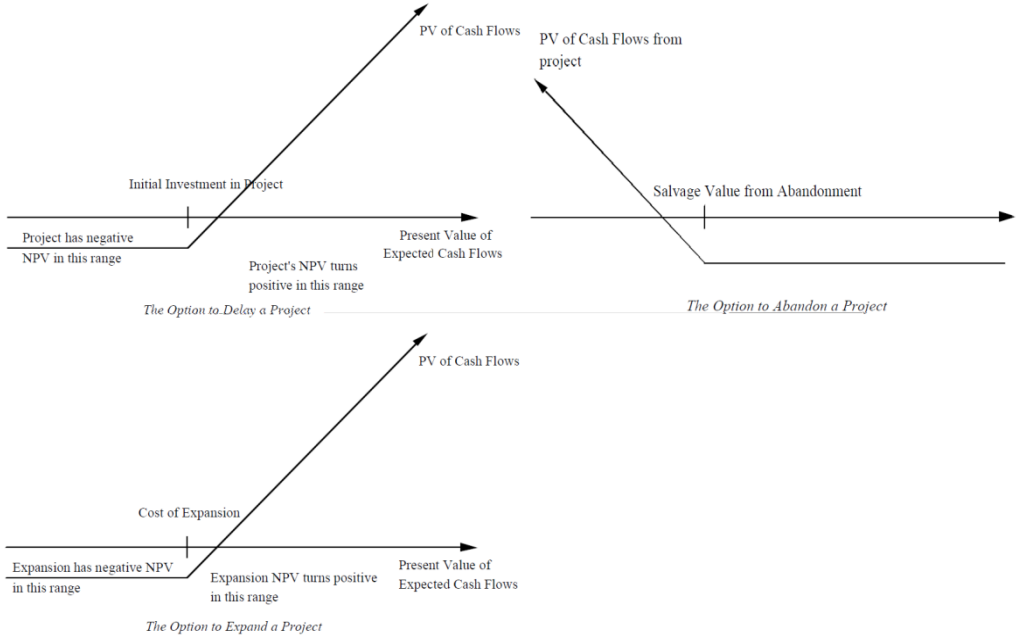
20 Damodaran, A. (2010). T*he Dark Side of Valuation Valuing Young, Distressed, and Complex Businesses* (ISBN-10: 0-13-712689-1). FT Press, New Jersey, p. 140.

21 Damodaran, A. (2001). The promise and peril of real options. Research Paper, Stern School of Business, New York, NY, p.25.

phase, and finally, creates the possibility of product realization and commercialization. Negative cash flows at the beginning of the project, are compensated by high cash flows in the commercialization phase. Valuation of this situation can also be identified with a call option, with exception that the strike price equal to the cost of expansion.

Sometimes it is better to *abandon* the project at earlier stages of development and with lower costs. Costs may pile up and the project could experience failure when entering the market. It is better to stop development of drug (product) in some part of clinical trials than to accumulate costs. This situation can be identified with put option. These three situations are graphically illustrated at following picture.

**Picture 1.** Illustration of different types of options




*Source:* Damodaran, A. (2010). The Dark Side of Valuation Valuing Young, Distressed, and Complex Businesses. FT Press, New Jersey.

These three options explained in Damodaran are universal and can be applied to companies in every industry. Keegan[22] adds more types of options that are specific to the biotech industry. The first option would be to *contract* activity, when it is determined that drug asset are deemed less attractive, either due to lack of effectiveness or a diminished commercial opportunity. The next option is an option to *switch* operations that can refer to the cost of restarting activities (for example manufacturing capability). Last option would be *grow* option, or development of products that are reusable and

22 Keegan, K. (2008). *Biotechnology Valuation* (ISBN 978-0-470-51178-7). John Wiley & Sons Ltd, Chichester, p. 129.

have multiple applications. In addition to Keegan Vernimen et al.[23] dealt with this issue and added two more options, option to *launch a new project*, which would be equivalent to a call option on the new investment project. This is especially applicable in the field of biotechnology, since the launch of a new product does not provide cash flows until final commercialization. Another option mentioned by the authors is option to determine *optimal date for starting up a project*. In this case the waiting period is identical to holding American option on the project, and this situation is a similar to an option to abandon project.

Although Keegan[24] believes that options are relatively good technique for the valuation in the field of biotechnology, he also states that they have significant shortcomings. Corporate investment and especially those in biotechnology are more complex than financial options that can be evaluated with Black&Schols model. The assumption about lognormal distributed project values is generally not appropriate, and formula from Black&Schols model is not intuitive. Volatility as an input is difficult to measure in practice. Also, Black&Schols model is suitable only for calculating the value of European options, while the valuation of American options is difficult and in this case some other techniques such as decision trees or Monte Karlo are suitable.

Criticism of real options can be found in Smith and Par[25] who argue that discounted cash flow technique is better, and that real options will always give greater value because they consider only favorable activities. Also they claim that real options are just permutation of basic discounted cash flow technique.

## Concluding Remarks

The last two decades of the 20th century are characterized by increasing use of intangible investments around the world, regardless of the industry within which company operates. These intangible assets are manifested in many different forms, such as skills, new organizational structures, know-how, patents, licenses, development of new products and more. Although these changes are felt in all areas of business, the greatest impact is on industries that are research intensive like for instance biotech companies. On the other hand level of risk in the global environment is constantly increasing while in the field of biotechnology it is traditionally dominant (it is considered that the biotechnology industry is the second riskiest, right after the property industry). So it is clear that there has to be done something in order to improve techniques for valuation in conditions of risk and uncertainty.

23 Vernimmen, P., Quiry, P., Dallocchio, M., Le Fur, Z., Salvi, A. (2009). *Corporate Finance Theory and Practice* (ISBN-10: 0470092254). John Wiley & Sons Ltd, Chichester, pp. 374-375.

24 Keegan, K. (2008). *Biotechnology Valuation* (ISBN 978-0-470-51178-7). John Wiley & Sons Ltd, Chichester, p. 128.

25 Smith, G., Parr, R. (2005). *Intellectual Property. Valuation, Exploitation, And Infringement Damages* (ISBN-10: 047168323X). John Wiley and Sons, New Jersey, p. 300.

Techniques such as simple discounted cash flow analysis are long outdated, and new methods that are created tend to involve a risk to existing models. This is the reason why improvement such as real option analysis, decision trees, scenario analysis, simulation and Monte Carlo models are introduced in order to improve discounted cash flow and other simple methods. It is shown more than once that the concept of financial options can be extended to the assessment of investment opportunities, especially in biotechnology. Real options provide a different perspective on the valuation of a project (investment) in situations in which the project is delayed, expanded, abandoned, contracted, switched, has a *grow* option, optimal date for *launching a new project,* or *optimal date for starting up a project is determined*.

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# VREDNOVANJE PREDUZEĆA IZ OBLASTI BIOTEHNOLOGIJE: PRISTUP REALNIH OPCIJA U USLOVIMA NEIZVESNOSTI

***Isidora Ljumović***, ***Janko M. Cvijanović***, ***Jelena Lazić***[26]

## Rezime

*Biotehnologija je jedna od najintenzivnijih industrija u poslednjih par decenija. Ovaj intenzivni rast došao je sa posledicama koje se prevashodno ogledaju u velikom nivou rizika koji preduzeća preuzimaju pri razvoju novih proizvoda. Zbog specifičnosti posla kojima se preduzeća iz oblasti biotehnologije bave, javlja se problem vrednovanja, jer se osim postojećih vrednosti, budući proizvodi, tržišne šanse i nematerijalna ulaganja teško valorizuju. Biotehnološka preduzeća nemaju standardni format, te se jednostavne tehnike, kao što je analiza finansijskih izveštaja ili diskontovanje novčanih tokova ne mogu primeniti. Usled kompleksnosti posla i visokog rizika primenjuju se alternativne metode kao što su realne opcije, koje su u ovom radu detaljno objašnjene, ali i stabla odlučivanja, scenario analiza, simulacije, Monte Karlo modeli, i ostalo. Koncept finansijskih opcija se može proširiti i na vrednovanje investicionih prilika u poslovnim preduzećima, a posebno u biotehnolgiji. Imajući ovo u vidu u ovom radu je objašnjeno kako realne opcije pružaju različite perspektive sagledavanja vrednosti projekta (investicije) u odnosu na situacije u kojima je projekat odložen, proširen, napušten, kontrakovana je delatnost, promenjene su mu operacije, razvijen je proizvod sa više namena, određen je optimalan datum za lansiranje proizvoda.*

***Ključne reči:*** *rizik, realne opcije, vrednovanje, biotehnologija*

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# IMPACT OF ORGANIZATIONAL FAILURE OF RELEVANCE CONSOLIDATED BUDGET

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**Summary**

*Financial concept of consolidated treasury account includes integration of basic factors of the business system's budget and other public funds. In this way established the relevance of the organizational structure of the system causes a systematic approach to fully satisfy the request. Normative conflict with the actual situation of the organization of the budget system causes partial financial coverage of budgetary positions and the actual non-compliance with the bookkeeping records.*

***Key words:*** *organizational structure, budget system, consolidation.*

**JEL:** *H61, H 60*

## Introduction

A financial segment of budget system reflects through a set of accounts and sub-accounts of the Treasury's consolidated account. Approved budget appropriations perform by the budget business through the set of goals and tasks of the budget assets' users.

The necessity of setting up the financial balance among the budget incomes and expenditures requires a use of accounting system in tracking the budget implementation. This system bases on the budget organizational structure, which sets up in accordance to advance created tasks and they appoint in front of the budget assets' users in forthcoming period.

Normative deeds must follow and, in legal sense, to reflect in such way set budget management, followed by financial organization of cleared budget assets' planning and implementation. In order to anticipate this system in normative system of financial tracking and reporting has been engaged also the international accounting standards for public sector.

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Integration of budget system factors into one accounting system improves a ground for making business decisions at the level of budget user, in its narrower and wider sense. Organizational failures, which could be developed in some of the budget system factors, would reflect on entire accounting system, and thereby on business decisions.

In this paper we will focus at the users of budget assets that cannot be rank neither in direct, nor in indirect users, but in other users of the budget assets, who have an open sub-account within consolidated treasury's account. Primarily, starting from their emergence time, through the organizational and normative changes, to the final purpose of these users of the budget assets, we encounter many unarranged and financially-undisciplined users of the budget assets.

Their detection and ascertainment of their organization and inclusion frame procedure into the budget system, by estimation of domicile and international regulatory rules, represents this paper's basic motive.

## Determination of other budget assets' users

Defining the other budget assets' users, beyond the direct and indirect users[4], who have an open account within the treasury's consolidated account, represents a great challenge, as in theoretical, as well as in practical sense.

A question what, in fact, represent other the users of the budget assets, puts as a motive for identification of causes in organizational failures' emergence, regarding the treasury's account consolidation and its adjustment to approved appropriations of the budget users.

For determination of other budget assets' users, we must proceed from a fact that the budget assets are within the public assets, managed by the state.[5] As the users of such represented budget assets appear the direct and indirect budget users, who have also been just a part of public assets' users, and besides them comprise also the assets` users of the organizations for obliged social insurance, public enterprises, as well as the legal entities under which the state have a majority share in equity capital.

Where then appear the other users of the budget assets, who have open sub-account within the consolidated account of the treasury?

The budget users represented in that way appear within the direct or indirect users of the budget assets, who use the same personal identification number and tax identification number, and were established by the manager's decision, i.e. the direct and indirect user of the budget assets.

What will be the status of such represented budget users is determined by their purpose and predominant relation with the user, it was founded by. This method of status determination is unknown to any normative system; it does not support it either, while

4 *Budget System Law*, Official Gazette of RS, No. 54/2009, 73/2010, 101/2010.

5 Bacoc, H., Jason, L. (2004): *Modern Budgetary System,* McGraw-Hill, Irwin, p. 307.

it means an attack to the completeness principle, as a basic principle of each reporting system, therefore the financial, too.

The purpose of the other budget users requires a research of their business activities, but, at the same time, is very significant for subject of our research in the segment referring to their organizational-legal status. In determination of these budget users' status will lead to a part of assets being excluded from the budget annual balance sheet, does not represent special annual balance sheet, but, at the same time being included in the consolidated account of the treasury.

This is one among many unsuccessfully executed transitions from partial users of public assets to unique arranged budget system.

A lack of regulated legal status of such represented users makes a vacuum in financial and material sphere of business of the budget assets` users and is insufficiently clear relation within the organizational system of the budget assets` users. In business environment, unregulated organizational-legal status of the other budget users makes difficulties which reflect as business ability of these entities which exist with the same elements as some indirect or direct user of the budget assets.

## Business of the other budget assets' users

The business cycle of the other users of the budget assets we will observe through their autonomy in using the material assets they are entrusted to use, and the financial assets which are approved for them from the budget.

Here, we will point out the "budget paradox", as an important characteristic regarding the financial assets which approve from the budget to the other users of the budget assets.

The budget paradox reflects in dual budgeting of assets being already budgeted by the state legislative body, by passing a normative deed on the budget. The budget paradox procedure starts at the moment when the assets approve to the direct or indirect user of the budget assets. Next phase continues with transfer of assets onto the sub-account of other user of the budget assets for certain purpose, in order that the way of such represented assets use is in competence of the other user of the budget assets, i.e. out of the budget procedures.

This paradox can be treated as a financial phenomenon of the twenty first century in domain of the public finances.

Even greater phenomenon in regard to the budget procedure, previously mentioned, is the procedure of signing a contract within the direct or indirect user of the budget assets, with the other user of the budget assets, who is the organizational part of the budget user. The business of, in this way defined user of the budget assets, has been subjected to normative regulatory rules, which refer to business companies, not on the budget assets` users.

In which extremes goes the business of such represented user of the budget assets, we will perform through information that the accounting system has been set up as

the system of economic accounting, while the financial statements do not deliver to authorized state body, because there is no legal ground for their creation, etc.

***Budget paradox***

The procedure of budget paradox was researched on sample of the other users of the budget assets within one direct user of the budget assets.

The budget system of financial resources' approval was organized by two-step model. This model implies that the assets approve to the direct budget user, and his internal body, competent for funding activities, assigns these assets to narrower internal organizational unit.

The second step is connected to the procedure when narrower internal organizational unit approves the assets to the other user of the budget assets. This procedure is closed to the tasks that have been set to the other user of the budget assets, along with defined amount of financial resources, which have been approved for that purpose.

The elements of financial resources budgeting to the other users of the budget assets rests upon empirical methods, while a normative which regulates this process has not had its legal source for decade behind.

Researching we came to data that budgeting method conducts in accordance to the methodology for determination of products' and services' value, created by the bodies of the budget assets` user, by which determine prices of components necessary for implementation of specific tasks and, in such way, results the amount which transfers to the sub-account of the other user of the budget assets.

This budget paradox reflects also to a number of employees in the direct user of the budget assets, because the employees of the other users of the budget assets do not fall into the total employees' number of the direct user of the budget assets.

The methodology for determination of products/services' value for needs of the direct user of the budget assets enables two price determination procedures, as following[6]:

1. Comparing the prices with identical products/services` prices at the market, but the fixed price reduces for the amount of belonging fiscal revenues, and

2. According to planned calculations of the other user of the budget assets.

6 Đorđević, D. (2006): Mikroekonomija-savremen pristup,University Business Academy, Novi Sad, p. 118.

On the occasion of fixing price by calculation apply: normative of materials and time costs for specific product or service, the costs of investment maintenance (the most to 2% of fixed capital cost value), the amount of other material expenditures, amortization, salary costs, as well as, in case of need, the amount of 6% to gross salaries for habitation needs.[7]

Characteristic for price fixing is a fact that the costs of business-information activity cannot belong to the price of product/service, except the services of vacation and recreation where the costs can be calculated in amount of 3 per mills of the total price.

The salary costs which include in the price of the product/service, determine according to net salary, increased for belonging taxes and contributions, in accordance with the region's average, increased for the amount of anticipated growth for the year in which prices fix.

Such fixed prices cannot be changed during the year, with exception of possibility to be changed, if comes to the price change of materials, services and other calculated costs over 5%. This value increase transfers the direct user of the budget assets to the other user of the budget assets.

### *Negotiations within the other users of the budget assets*

The other users of the budget assets within the direct, i.e. the indirect user of the budget assets, sign a contract with the direct/indirect user of the budget assets on goods delivery or services provision.

This kind of integral agreement, by which set rights and obligations of the contractual parties, includes obligatorily: subject of the contract, quantities, prices of products and services, quality and method of quality determination, delivery terms and mode, methods of reception and payment, quality warranties, way of complaints settlement, sanctions for non-fulfillment of contractual obligations and spare parts supply. The sanctions for non-fulfillment of contractual obligations set in an absolute monetary amount or in per mills of contracted business value for each day of delay.

What is characteristic for this kind of contract is that every litigation settles by common consent, and if impossible, the litigation is settled by order-issuing authority of the direct, i.e. the indirect users of the budget assets, whose decision is definite. This contract is anomalous, while it negotiates within one business entity, with regard that the direct user of the budget assets in this business does not have an obligation to apply the Public Procurements Law[8], which does not observe the other users of the budget assets, too.

7 Milojević, I. (2007): *Osnove budžetskog računovodstva*, University Braća Karić, Belgrade, p. 124.

8 Official Gazette of RS, No. 116/2008.

Giving warranties for quality is also a characteristic of this kind of integral agreement, which, in accordance to the Public Debt Law[9], cannot issue the other users of the budget assets. Therefore, such contracts represent real rarity, which can be seen in legal system of the modern state, and which has not been yet noticed in the budget system of some state.

## Accounting system of the other users of the budget assets

Organization of budget users' accounting system is basically arranged normatively by the Decree on Budget Accounting[10] and the Decree on applying the International Public Sector Accounting Standards[11].

In our research, the organization of the other users of the budget assets' accounting system has different concept. These users keep books by double-entry book keeping system, and by the account classification for business companies, cooperatives, other legal entities and entrepreneurs.

From previously mentioned, we can see that the accounting system is uncompatible with the accounting system of the direct and the indirect users of the budget assets. Legal regulatory rules which regulate the organization of business enterprises' accounting system[12], in its first paragraph, defines that its decrees do not refer to the budgets and the budget assets' users.

Such incompatible accounting system does not give a possibility for assets being *de jure* in state ownership to present *de facto* in accounting sense and in the budget's annual balance sheet. In this way, a part of the budget assets gets out of the consolidated budget[13] and gives a wrong picture of consolidation, because with that, internal incomes and expenditures show as external.

At the end of business year the other user of the budget assets makes annual balance sheet and deliver it, by the end of February, to an order-issuing authority of the direct user of the budget assets, who approves it. From previously mentioned can be seen that such represented user of the budget assets:

- Does business in business, not budget year,
- Makes annual balance sheet and delivers it to the direct user of the budget assets,
- His annual balance sheet is not included in the consolidated budget, and either is not delivered to the Serbian Business Register Agency.

9 Official Gazette of RS, No. 61/2005, 107/2009.

10 Official Gazette of RS, No. 125/2003, 12/2006.

11 Official Gazette of RS, No. 49/2010.

12 Accounting and Audit Law, Official Gazette of RS, No. 46/2006, 111/2009.

13 Consolidated budget is the budget after exclusion of mutual transfers between different sentities at certain authority level, in order to avoid double counting.

Determination and organization of profit with the other users of the budget assets conducts on a cash basis, i.e. their acknowledgement practices only after collection of realized incomes. Peculiarity of this kind of organization is that in incomes are not included next values:

- Set surplus of resources,
- Of parts and material being replaced in resources repair,
- *Materials being free of charge conceded for implementation of certain works and services, as well as value of services provided for free by the direct user of the budget assets*.

The replaced parts and materials in reparation the other users of the budget assets sell and, in that way realized income, pay on account of the direct user of the budget assets or gives away parts and materials free of charge.

## Conclusion

Establishing the organizational structure of budget system requires complex and overall research in which would, the current set status, adjust to required future status.

The budget system of the Republic of Serbia has not been arranged by that principle, but, by partial organization of individual systems, without overall research process of the current system, sets up a new budget system.

Within one direct user of the budget assets, we have determined by our research, the existence of the other users of the budget assets, who in their *de facto* condition, are the users of the budget assets, but *de jure* they exist completely excluded from the budget system, tangentially using the budget structure.

This manifestation effects to the structure of consolidated budget: in accounting sense does not exclude mutual budget transfers, but, at the same time, in budget sense does not apply the budget regulatory rules during the budget implementation, which certainly does not contribute to setting up of budget discipline and fiscal responsibility.

More complex arrangement of budget process and incompatibility of accounting reporting, effects directly to the system of decision making, as for legislative, as well as for top executive government bodies.

It is necessary to include, in accounting sense, these users of the budget assets into a compatible budget classifiable scope, and in business sense, in the budget procedures. Thereby would achieve a completeness principle in both segment of reporting, which would contribute to strengthening of position for decision making by management.

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# UTICAJ ORGANIZACIONIH PROPUSTA NA RELEVANTNOST KONSOLIDOVANOG BUDŽETA

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## Rezime

*Finansijski koncept konsolidovanog računa trezora podrazumeva objedinjavanje elementarnih činilaca poslovnog sistema budžetskih korisnika kao i drugih korisnika javnih sredstava. U ovako uspostavljenom sistemu relevantnost organizacione strukture uslovljava sistemski pristup zadovoljavanja zahteva potpunosti. Normativna neusaglašenost sa faktičkim stanjem organizacije budžetskog sistema uslovljava nepotpuno finansijsko obuhvatanje budžetskih pozicija i neusklađenost faktičkog sa knjigovodstvenim stanjem.*

***Ključne reči:*** *organizaciona struktura, budžetski sistem, konsolidacija*

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# SUSTAINABILITY OF AGRICULTURE IN DANUBE BASIN AREA[1]

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## Summary

*The main subjects of consideration in the paper are: conceptual issues of sustainability in agriculture and analysis of resources base, production systems structure and policy framework for sustainable development of agriculture in Danube basin area. In a dynamically changing and complicating environment the sustainability of agriculture is provided by the optimal mix of site-specific production systems and techniques that in dinamic interaction produce a trade-off of environmental, economic and social values and services in the area observed. Motivation of farmers and other stakeholders in their implementation is provided by coordinated actions of environmental, agricultural, spatial, economic and social policy. A variety of natural conditions and resources allow the use of various agricultural production systems in the Danube basin area, and the success in securing the sustainable development of the sector as a whole will depend on appropriate policy actions and stakeholder cooperation at all levels.*

***Key words**: sustainability, agriculture, production systems, Danube basin area*

**JEL:** *Q 01*

## Introduction

Faced with dinamic perturbations, related to climate changes, land competition, vital ecosystem services deterioration and food price volatility, the *high input – high output* g*reen revolution model* of intensive conventional production in agriculture, based on excessive use of water, fossil fuels, chemical fertilisers and pesticides is no longer

1 The paper is a part of the Ministry of Education and Science integrated and interdisciplinary research project 46006 "Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region."

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acceptable. However, the world's population continues to grow and change diet rapidly, so the food security issue once again comes to the forefront[5]. Scientists are looking for technological solutions to provide sustainable intensification of global agriculture based on *Producing more with less* model of increasing returns on existing agricultural land with environmentally suitable use of inputs.

Thus defined, intensive sustainable agriculture is seen as knowledge-, technology-, natural capital- and land-intensive. It is clear that no universal solution is expected, but a set of advances achieved by both *improved genetics* and *improved agricultural practices* and combined within *diverse production systems* with respect of different site-specific natural, economic, social and political conditions (*both/and approach*) (The Royal Society, 2009: 46-48).

Regardless of the efforts to work on the long-term technological improvements in different production systems, the question that arises is whether it is necessary to expect from each particular production system to address all of economic, environmental and social sustainability targets in a coherent and mutually reinforcing manner? *Either / or approach* used in the past for evaluating the capability of particular production systems to ensure sustainability of global agriculture, has proven inadequate. For instance, low input farming systems, maintained on small holdings and based on natural processes are environmentally sustainable and favourable particularly to HNV and intra-urban farmland, but are not sufficiently productive to provide global food security, and vice versa, conventional intensive agriculture, even adjusted to general environmental and food safety standards, is not appropriate for environmentally sensitive areas. Thus, the optimum sustainability of agriculture *at regional level* in future should be sought in the optimum balance of different types of farming system, from organic through integrated to conventional types, satisfying a range of ecological, social and economic functions in the region, given its ecological characteristics and the competing objectives of stakeholders (Tait, Morris, 2000: 250).

In doing so, we should bear in mind that agriculture takes place in the urban-rural context. Sustainable agriculture plays an especially important role in sustainable urban development. Urban (intra- and peri-) agriculture contributes to reducing food miles and take part in the shaping of urban open space. Although there are no precise borders between urban, peri-urban and rural systems - in most cases we will find a continuum from intra- to peri-urban and rural agriculture, comprising various farming systems - there are differences and complementarities and each of these create specific opportunities and challenges for the technical, organizational and institutional management of the related farming systems (Hoekstra, 2008).

And finally, something that definitely needs to be taken into account – competing objectives of stakeholders, particularly farmers, have a decisive role in defining regional

5 According to FAO, world food demand is expected to increase by 70% by 2050, (EC, 2010: 2).

mix of farming systems. Perceptions of sustainability might be quite different *at the farm level* where the economic viability is a priority. Policymakers have to encourage farmers by a set of regulatory requirements and financial incentives to opt for site-specific, but interactive and mutually suportive farming systems and techniques that will be able to provide sustainability of agriculture at the region observed.

## Data and Methodology

Research was based on the results of quantitative and qualitative analysis of natural conditions and agricultural resources data obtained from official statistics and numerous regional and local spatial planning documents and development strategy papers, that were consulted as well as scientific papers and national and EU legislation, policy documents and project reports. In the discussion and conclusions formulating process, the analytic-synthetic scientific method was used.

## Results and Discussion

### *Agricultural production systems and practices in Danube basin area*

Much of the high quality agricultural resources and food processing capacities of the Republic of Serbia are concentrated in the Danube basin area (Popović i ost., 2011b: 380-386). The main indicators of agricultural development in selected municipalities[6] of three different Danube farmland areas are presented in Table 1.

**Table 1.** Key agricultural statistics in selected municipalities of Danube farmland areas

| | UAA/ Total area, 2010, (%) | UAA structure, 2010 (%) | | | LU/ 100ha UAA, 2006 | Agricultural population, 2002, (%) | Cultivable land/ holding, 2002, (ha) | Holding population, 2002. (%) | | Holdings with agricultural and mixed incomes, 2002, (%) | Share of agriculture[1] in the NDP[2], 2005, (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Arable land | Orchards & vineyards | Meadows & Pastures | | | | Over 50 years old | Primary education, or less | | |
| **Upper Danube area** | | | | | | | | | | | |
| *Sombor* | 86.3 | 92.7 | 0.8 | 6.4 | 26 | 11.7 | 3.51 | 40.6 | 48.3 | 28.6 | 32.5 |
| *Apatin* | 69.9 | 89.4 | 1.0 | 9.6 | 14 | 9.2 | 2.07 | 43.4 | 46.2 | 22.5 | 18.9 |
| *Bač* | 73.7 | 90.1 | 0.5 | 9.4 | 14 | 18.4 | 4.14 | 39.9 | 53.6 | 35.5 | 51.6 |
| *Bačka Palanka* | 84.0 | 94.6 | 1.3 | 4.1 | 23 | 10.6 | 3.19 | 43.5 | 48.0 | 28.2 | 20.0 |
| **Belgrade – Novi Sad Metropolitan area** | | | | | | | | | | | |
| *City of Belgrade* | 67.8 | 80.4 | 9.1 | 10.5 | 41 | 2.3 | 1.72 | 43.9 | 41.8 | 18.9 | 3.5 |
| *City of Novi Sad* | 73.6 | 89.9 | 3.0 | 7.1 | 21 | 1.9 | 2.46 | 42.9 | 32.0 | 13.9 | 4.9 |
| *Beočin* | 47.4 | 61.6 | 9.1 | 29.3 | 33 | 6.6 | 2.59 | 37.6 | 50.6 | 23.0 | 8.9 |
| *Irig* | 76.4 | 82.3 | 8.6 | 9.1 | 23 | 19.6 | 3.58 | 41.4 | 54.6 | 38.8 | 82.4 |

6 Municipalities selected for the implementation of research in the framework of the Ministry of Education and Science Project 46006 in the programming period 2011-2014.

| | UAA/ Total area, 2010, (%) | UAA structure, 2010 (%) | | | LU/ 100ha UAA, 2006 | Agricultural population, 2002, (%) | Cultivable land/ holding, 2002, (ha) | Holding population, 2002. (%) | | Holdings with agricultural and mixed incomes, 2002, (%) | Share of agriculture[1] in the NDP[2], 2005, (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Arable land | Orchards & vineyards | Meadows & Pastures | | | | Over 50 years old | Primary education, or less | | |
| *Sremski Karlovci* | 50.3 | 51.9 | 23.7 | 24.4 | 8 | 2.5 | 1.74 | 40.9 | 33.9 | 10.5 | 19.4 |
| *Indjija* | 85.7 | 88.3 | 4.7 | 7.0 | 32 | 8.9 | 3.06 | 38.9 | 44.4 | 29.8 | 30.6 |
| *Ruma* | 74.3 | 95.8 | 1.8 | 2.4 | 29 | 11.7 | 3.51 | 39.7 | 49.7 | 30.9 | 33.4 |
| *Pećinci* | 71.0 | 93.2 | 0.7 | 6.1 | 35 | 23.4 | 4.04 | 36.5 | 49.6 | 38.2 | 51.2 |
| *Stara Pazova* | 85.1 | 96.7 | 0.8 | 2.5 | 25 | 6.9 | 3.28 | 39.7 | 42.8 | 27.7 | 22.4 |
| *Pančevo* | 80.7 | 95.4 | 0.9 | 3.6 | 20 | 5.0 | 2.70 | 41.9 | 44.2 | 18.8 | 17.3 |
| *Smederevo* | 78.9 | 79.8 | 15.1 | 5.0 | 33 | 10.1 | 2.27 | 41.2 | 55.6 | 37.1 | 21.7[3] |
| **Carpathian area** | | | | | | | | | | | |
| *Golubac* | 42.3 | 54.9 | 5.3 | 39.8 | 31 | 24.5 | 2.63 | 44.6 | 64.2 | 43.8 | 35.6 |
| *Kučevo* | 47.7 | 45.2 | 7.3 | 47.5 | 28 | 17.1 | 1.94 | 48.6 | 65.2 | 28.8 | 77.3 |
| *Majdanpek* | 21.6 | 32.4 | 7.1 | 60.5 | 23 | 8.9 | 2.22 | 50.2 | 72.6 | 34.5 | 31.3 |
| *Kladovo* | 45.7 | 60.4 | 4.0 | 35.6 | 10 | 8.9 | 2.09 | 50.8 | 69.1 | 19.9 | 25.2[3] |
| *Negotin* | 64.7 | 51.7 | 5.6 | 42.7 | 11 | 22.1 | 3.33 | 53.8 | 74.4 | 45.5 | 64.6 |

[1]Agriculture, hunting, forestry, water management, fishery; [2] Net domestic product at city/municipality level; [3]2004.

*Source:* **SORS**: Census, 2002: Agricultural funds - Books 1-3, Population - Book 19; Number of livestock, 01.12.2006; Municipalities in Republic of Serbia 2004, 2005; Municipalities and Regions in Republic of Serbia, 2011 / **RZS**: Popis 2002: Polj. Fondovi – Knjige 1-3, Stanovništvo – Knjiga 19; Broj stoke, 01. 12. 2006; Opštine u Srbiji 2004, 2005; Opštine i regioni u Republici Srbiji, 2011.

A variety of natural and socio-economic resources and conditions allow the use of various agricultural production systems in Danube basin area – from the intensive crop production on the Upper Danube and Kljuc-Negotin plain, and intense conventional and organic fresh food production in Belgrade-Novi Sad metropolitan, to extensive livestock grazing and traditional, integrated and organic production of local meat and dairy products, fruit and grapes in the HNV farmland areas along the Danube river.

***Upper Danube area***. The Upper Danube area is a part of a rural region with intense agricultural production and developed food industry. Large areas of fertile soil in the plain, developed hydromelioration network, the traffic and market infrastructure and the availability of the RD and extension services are the basic potentials for the development of an intensive plant and animal husbandry production. On private companies' farms, as well as on family farms one can find intensive production of cereals, oilcrops and sugar beet and to a lesser extent fruits and grapes on the slopes of the Fruška Gora mountain. The National Centre for Organic Vegetable Production and processing capacities in the vicinity (Selenča) encourage farmers to increase the area under organic production. Developed dairy industry in the northern part of the area (Subotica) give significant possibilities for intensifying livestock breeding , mostly dairy cows. Small family holdings and underdeveloped producers' associations and distribution channels

decrease the profitability of production on farms. There are favourable natural and market conditions for diversifying production (medicinal, aromatic and spice herbs, sorghum and broom production, biomass, goat breeding, beekeeping, fish farming), but the lack of investment and entrepreneurial spirit of older and insufficiently educated smallholders make this form of contribution to their economic and social sustainability more difficult.

Yet, the question of sustainability of agriculture in the Upper Danube area is first and foremost connected to ecological sustainability of intensive conventional production. Degradation of soil due to highly mechanized, intensive monocultural agricultural production, poorly maintained hydromelioration canals, degradation of quality of the water used for irrigation, and reduction of ecological infrastructure on the farms are just some of the negative externalities connected to this system of production. It is necessary to harmonize agricultural production with ecological constraints, especially in ecologically important areas, ecological corridors and their protective zones along the Danube, according to Regulation on Ecological Network (Official Gazette of the Republic of Serbia / Službeni glasnik Republike Srbije, No. / br. 102/2010). The development of agro-eco tourism, based on natural and cultural values of the area has priority, with strict following of legally binding constraints, developed partnership of local stakeholders and active cross-boundary cooperation (Popović et al., 2010: 341).

***Belgrade – Novi Sad metropolitan area***. Agriculture has an important share in the economy of the Belgrade – Novi Sad metropolitan area. Urban (intra- and peri-urban) agriculture implies the presence of different production systems – from law input production systems in agricultural enclaves within the city core (vegetables, fruits, mushrooms, nurseries, etc.) to intensive conventional and organic production of fresh food products for city green markets and retail chains (meat, milk, fruits, vegetables) in the peri-urban zone, depending on ecological, social and economic capacity of the area. Higher consumers' purchasing power enables the production and sale of local, highly valued organic and other niche market products, preferably in combination with nature tourism development on family farms in ecological oases on the periphery. Multifunctionality is inherent to urban agriculture. Urban surroundings and the vicinity of the market and research and development centres enable access to innovation, reduce food miles, increase food safety and quality and decrease production costs. Urban agriculture improves the environment, landscape and quality of life for the city's population and contributes to employment growth and social inclusion. On the other hand, pressures for agricultural land conversion and fragmentation are the strongest in peri-urban areas (Piorr et al., 2011:13,70-71). Intensive agriculture in an urban surrounding potentially causes, but also suffers from numerous ecological risks connected to jeopardizing soil, water, air, climate, biodiversity and landscape.

Agriculture plays an important role in supplying the ***Belgrade – Novi Sad*** metropolitan with fresh food and raw materials for food industry and export. An illustrative example is that of PKB Corporation. PKB has a total of 21,5 thousand hectares of arable land

on the territory of the City of Belgrade[7]. Most of this land is located in Pančevački rit – the fertile alluvial terrace near the city core where a highly intensive production of field crops and vegetable takes place using hydro-meliorations. It is a great comparative advantage of Belgrade compared to other European cities. PKB corporation is the main supplier of raw materials for the developed food industry of Belgrade. The production of milk alone reaches 68 million litres per year[8]. The surroundings of Smederevo and the slopes of Avala, Kosmaj and Fruška Gora mountains are covered by orchards and vineyards, and the more numerous family owned vineries and distilleries for producing brandy made from fruits and grapes strengthen the infrastructure of the Wine Roads of the Danube basin area. Organic production of grain and industrial crops for processing, and organically produced fruits and vegetables, honey and medicinal plants and spices have good sales prospects in the market niches of Belgrade – Novi Sad metropolitan area. But, organic production is performed mainly at small family farms. Poorly equipped with organic inputs and insufficiently integrated into the food chain, they generate low profits and discourage new entrants (März et al., 2011: 8-13, 24). Organic agro-ecotourism in HNV oasis on the urban fringe offers particular opportunities for ensuring viability of small organic farms (City of Belgrade Ecological Ring project[9]).

Intensive crop production, big livestock farms, orchards and food industry in the area of Belgrade and Smederevo are concentrated on the Danube bank area. The drenage waters from agriculture, along with untreated industrial, mining and communal waste waters jeopardize soil and water. In cities alongside Danube there are well-known industrial and minning environment pollutors (Novi Sad, Obrenovac, Lazarevac, Smederevo, Kostolac). Recultivation of brownfields doesn't happen at necessary dynamics. Downstream of the confluence of Tisa and Danube a slow down of Danube caused by the Hydroelectric Power plant "Djerdap I" is registered and the following elevation of the groundwater level and the soil salinization near the riverbanks must be kept under control. It is necessary to protect the natural resources and take care of ecological sustainability of urban agriculture, especially on the territory of ecologically important areas and ecological corridors and in their protective zone (Official Gazette of the Republic of Serbia – OG RS, No. 102/2010):

- following spatial planning solutions about agricultural production zoning and environment, public, animal and plant health standards,
- implementing innovation and rules of good agricultural condition of land and water (including IPM, IPNS, Precision farming, Vertical farming, etc.);

7 PKB Korporacija, ad , http://www.pkb-sr.com/resursi_1.htm, accessed 07. 03. 2012.

8 PKB Korporacija, ad , http://www.pkb-sr.com/proizvodnja.htm, accessed 07. 03. 2012.

9 Project of Belgrade Chamber of commerce and Organic Serbia Fund to perform Strategy of organic production and tourist eco-destination development on the urban fringes that will provide organic food for the city green markets and retail chains as well as direct sales and diverse gastronomic offer in organic farms and eco-tourist capacities, AGROPRESS, http://agropress.org.rs/tekstovi/ 18362.html, accessed 19. 02. 2012.

- providing budgetary support to farmers for participation in agri-environment programmes;
- resolving conflicts between farmers and other land users through an active process of dialogue and cooperation between authorities responsible for agriculture and spatial policy, including local stakeholders actions.

***Carpathian area***. Resource capacities and environmental sensitivity of the national park "Đerdap" and its protective zone, which make up the greatest part of the Carpathian area, predispose this area to reaffirmation and development of *traditional agriculture* and *integral* and *organic* production of healthy food with special characteristics of quality, based on traditional production methods heritage (Nikolić, Popović, 2010:205). The traditional, extensive way of agricultural production which has been preserved and built into the cultural historic heritage due to its poor accessibility and intensive emigration, has been in compliance with demands for limiting human activity which may jeopardize natural and cultural values of the protected area (Popović et al., 2011a: 105).

The area is recognisable by spacious meadows and pastures of the Carpathian Mountains, within the NP "Đerdap" and in its hinterland, in the area of Upper Ključ and the slopes of Deli Jovan. The protection and promotion of their ecological, productive economic and landscape values can only be secured through regular mowing or controlled grazing. However, the livestock density is far below the grazing potentials, especially in the hilly areas of Kladovo and Negotin municipalities, which are affected by depopulation. Forests, meadows, traditional orchards and small lots of fertile soil in their surroundings offer excellent conditions for beekeeping, growing fruits of autochthonous sorts, and growing and collecting medicinal herbs and wild fruits. Favourable terrains for organic fruit and cereal production can be found on the fringes of the Ključ plain, while those favourable for fruit and grapes production can be found on the smaller hills of the Negotin lowlands, in the protective zone of the Park (Nikolić, Popović, 2010: 203-204). The vineyards of Ključ and Negotin have excellent relief, microclimate and pedological conditions for vine growing and a centuries old tradition of winemaking.

The rural hinterland of the Park has ecologically safe locations for developing small and medium-sized enterprises for production of traditional local beef, lamb and sheepmeat and dairy products, fruit brandy, caviar, honey, teas and medical supplement products and special dessert drinks from medicinal herbs and wild/cultivated fruit and grapes. The tourist potential of the Park creates a market for local products and offers the possibility of regional branding, and the farmers get room for wider activity diversification and development of rural tourism, crafts, trade... One should also not forget the environmental management services (shifting of small cropland parcels and old orchards to feeding grounds and habitats of large carnivores, etc.).

In the area of Ključ and the Negotin lowlands *intensive conventional* cereal and vegetable production is located and this area is also favourable for stable livestock breeding. Significant agricultural resources are owned by several larger agricultural companies

that are waiting for the restructuration and upgrade of irrigation systems in the Negotin lowlands. This area is jeopardised by groundwaters and is being defended by 35 drainage systems, which are currently being rehabilitated. The vicinity of the National park and the Danube bank makes the question of ecological sustainability of intensive agricultural production in this area especially sensitive. Soil degradation is present, such as acidification and organic matter decline as well as pollution of the melioration canals by untreated communal and industrial waste water (SO Negotin, 2005: 87-91).

Poor age and educational structure of the family holding population causes slow diffusion of modern ecological and marketing practices in agriculture. The Agricultural Extension Service is expected to help farmers in accepting and applying the mandatory standards and good agricultural practice in maintaining agricultural land and water. An active role of agricultural policy and the local community is necessary for reversing depopulation, with special emphasis on the younger people animation to return from abroad and invest in the revival of traditional agriculture as a basis for the provision of valuable ecosystem services. Strengthening cross-border and regional cooperation could provide an additional impulse to development of agriculture and local economy.

***Policy Framework for Sustainable Agriculture in the Danube Basin Area***

In securing sustainable development of agriculture in the Danube area, the Serbian agricultural and environmental policies follow the EU legislation, policies and practices, as well as the obligations that result from international conventions, programmes and strategies.

The EU CAP for post-2013 period is set to have an increased focus on both the economic competitiveness (innovations, employment and growth) and environmental sustainability (climate, energy and biodiversity targets) of EU agriculture, in order to meet the objectives of 1) *viable food production*, 2) *sustainable management of natural resources and climate* and 3) *balanced territorial development*, and make a decisive contribution to Europe 2020 Strategy of smart, sustainable and inclusive growth (EC, 2010a).

New, better targeted income support, more effective safety nets measures and support to holdings restructuring and modernization, young farmers, producer's organizations and direct sales of local products will protect and strengthen the sector long-term competitiveness. In line with global efforts to produce more with less, an increased funding for agricultural research and innovation, including new European Innovation Partnership instrument, will support agricultural research projects and closer cooperation of science and technology, farmers and advisory services.

Direct Payments will continue to be linked to cross-compliance standards and GAEC rules, including WFD and the Sustainable Use of Pesticides Directive. All farmers will receive an additional green payment for crop diversification and maintenance of permanent pasture and ecological focus area. Separate support for organic farming will be available as well as a number of other measures in the frame of RD agri-environmental priorities for restoring, preserving and enhancing ecosystems and for resource efficiency and transition to low

carbon economy. Member states or regions may grant an additional direct payment for areas with natural constraints as well as the LFA payments available under RD envelope. Both measures are particulary favourable to HNV farmland. Investments in broadband infrastructure and renewable energy will go beyond small-scale and Leader will be used by all Common Strategic Framework Funds (ERDF, ESF, Cohesion, EMFF, EAFRD) as the common approach for community-led local development, including rural-urban cooperation (EC, 2011a, EC, 2011b).

Of special importance for sustainable agriculture in Danube area is the Community legislation on soil, water, pesticide and fertilizers management. Proposed Soil Framework Directive (CEC, 2006b), as an integral part of Soil Thematic Strategy (CEC, 2006a) aims to establish a common approach for the protection and sustainable use of soils by adressing the main causes of soil degradation – erosion, organic matter decline, salinisation, compaction, contamination, landslides and soil sealing. Water Framework Directive (2000/60/EC) aims to achieve good status in all bodies of surface water and groundwater by 2015 (2027 at the latest), through implementation of River Basin District Management Plans and Joint Programme of Measures[10]. Agricultural sector is observed as a source of organic and nutrient pollution, and the application of good agricultural practice will contribute to water as well as to soil protection. The Framework Directive on the sustainable use of pesticides stipulates that minimum requirements for Integrated Pest Management will become mandatory for all farmers at the latest by 2014, (Directive 2009/128/EC). Also, a proposal for a new *regulation on fertilisers* is expected by the end of 2012, (EurActiv, 2011).

In Serbia, the Law on agriculture and rural development (OG RS, 41/2009) states three kinds of incentives for agriculture and rural development (direct, market oriented and structural) and limits their usage to that by respecting environmental standards, public, animal and plant health, animal welfare and agricultural land protection. The Law also allows the possibility of support from the province and local budgetary funds, as well as the preferential treatment of users in less favoured areas. The following municipalities in the Danube basin area have this status: Beočin, Irig, Sremski Karlovci, Golubac, Kladovo and Majdanpek (OG RS, 3/2010, 6/2010, 13/2010). The policy of regional development also takes part in financing rural development, by building infrastructure in local communities.

The protection, consolidation and use of agricultural land in Serbia are directly regulated by the Agricultural Land Law (OG RS, 62/2006, 41/2009). Water protection is regulated and coordinated with the EU WFD by Law on Waters (OG RS, 30/2010). Provisions on the protection of land and water are also contained in the Law on Environmental protection (OG RS, 135/2004, 36/2009), Law on Nature protection (OG RS, 36/2009, 88/2010), Law on Plant Protection Products (OG RS, 41/2009) and Law on Plant Nutrients and Soil Improvers (OG RS, 41/2009).

10 Danube River Basin District Management Plan was established in 2009. (ICPDR, 2009: 51-85).

The Republic of Serbia has ratified a number of international conventions related to soil, water, climate and biodiversity protection (UNCCD, UNFCCC, Kyoto Protocol, UNCBD, Bern Convention on the conservation of European wildlife and natural habitats, etc.), as well as regional conventions, strategies and programmes related to Danube and Carpathian regions that are of special interest for sustainable agriculture in these areas.

Danube River Protection Convention (Official Gazette of the Federal Republic of Yugoslavia – International Agreements / Službeni list SRJ – Međunarodni ugovori, No. / br. 2/2003) deals with agriculture as a potential source of nutrient and pesticide pollution of groundwater.

Carpathian Framework Convention (Official Gazette of the Republic of Serbia - International Agreements / Službeni glasnik Republike Srbije – Međunarodni ugovori, No. / br. 102/2007) obliges contracting parties to maintain the management of land traditionally cultivated in a sustainable manner, in parallel with preservation of the traditional architecture, cultural heritage and traditional knowledge of the local people.

The development of Ecological network for the Carpathians, as a constituent part of the Pan-European Ecological Network, is one of the important objectives of the Carpathian Convention and the sustainable agricultural practices in the network area support the nature conservation targets. The assessment, carried out in the frame of BBI/Matra programme devoted to development of the network (2006-2009), indicates the critical importance of Serbia within the ecological network and requires a specific and immediate focus to ensure that this component of the network is well managed and protected (Zingstra et al., 2009: 19, 25,36).

FAO SARD-M project, that is realized in cooperation with UNEP-ISCC and Euromontana, involves all Carpathian countries and serves as a link between mountain issues and Sustainable Agriculture and Rural Development (SARD) (Weiß, Streifeneder, 2011: 25).

WWF Danube-Carpathian Programme promotes Carpathian Opportunity initiative for "More Business, More Jobs, More Nature", that aims to accelerate investment and business activities based on good environmental management and economic and social opportunities, with a regional focus that links urban to rural interests (WWF-DCP, 2007).

Networks of protected areas, like DANUBEPARKS, Carpathian Network of Protected Areas - CNPA, etc., and IPA CBC Programmes with Romania, Bulgaria, Hungary and Croatia give the posibilities for cooperation projects, like WWF UNESCO MAB "Danube–Drava–Mura", TC RAMSAR NP Djerdap & NP Iron Gate, etc.

According to EU Strategy for the Danube Region Action Plan, agricultural sector contributes to smart, sustainable and inclusive development of Danube Region participating in activities related to:

- sustainable use of biomass and exchange best practices on greenhouse gas emissions reduction, development of regional sustainable tourism, definition of eco-labels and certification schemes and promotion of Danube natural and cultural heritage (Pillar 1 - *Connecting the Danube Region*);

- water protection from fertilizers and manure pollution in compliance with Nitrate Directive, environmental risks prevention and protection of biodiversity, landscapes and the quality of air and soils (Pillar 2 - *Protecting the Environment in the Danube Region*); and
- support the competitiveness of agricultural, rural and traditional enterprises, including cluster development, urban-rural links fostering, exchange of good practices along the food chain and the construction of industrial and technological parks, as well as transport and market infrastructure (Pillar 3 - *Building Prosperity in the Danube Region*) (EC, 2010b).

The Danube Strategy calls for specific action in the Carpathian Area in the fields of renewable energy and biomass, tourism, water, environmental risk management and management of biodiversity and landscapes, with a view of promoting the Carpathians as an area of economic, social, and environmental progress and sustainability.

Strategic Action Plan for the Carpathian Area, that is a basis for future EU Macro-Regional Strategy for the Carpathian Area and for future ETCP Carpathian Space Programme, is embedded in the Danube Strategy. Agriculture and forestry is one of the priority areas with the following activities and project ideas: reorganization of mountain agriculture markets, promotion of agri-environmental practices and traditional products, establishment of a label for Carpathian quality agricultural products, biomass use in sensitive areas, inventory of Carpathian virgin forests and their protection, common forest management against illegal logging, implementation of forest-environmental schemes (UNEP-ISCC, 2011: 2,6,16).

By defining the Position in making the Strategy of Danube, the Republic of Serbia has supported strengthening of agricultural production and diversification of rural economy in the Danube basin area, by stimulating investments in building rural infrastructure, developing small and medium-sized enterprises, rural and agro-ecotourism and traditional crafts and strengthening capacities of the local community. Agriculture is also unavoidable in activities on enhancing water quality and developing the potential of protected areas as well as in the innovation and technology transfer (Vlada RS, 2010).

## Conclusion

A variety of natural and socio-economic resources and conditions in Danube basin area allow the use of various agricultural production systems in Danube basin area – from the intensive production of cereals and oil crops on the Upper Danube and Kljuc-Negotin plain, and intense conventional and organic fresh food production in Belgrade-Novi Sad metropolitan, to extensive livestock grazing and traditional, integrated and organic production of local meat and dairy products, fruit and grapes in the HNV farmland areas along the Danube river. The sustainability of agriculture and its contribution to sustainable development of the Danube area are provided through coordinated activity of agricultural and environmental policies on establishing the optimal balance of the present production systems in practice, within the framework defined by international

obligations. The success in these activities will depend on a closer cooperation between various stakeholders from the local and national to the regional and inter-regional level.

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# ODRŽIVOST POLJOPRIVREDE U PODUNAVLJU

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## Rezime

*Autori se u radu bave koncepcijskim pitanjima vezanim za održivost poljoprivrede i analizom resursnog potencijala, strukture primenjenih proizvodnih sistema i političkog okvira održivog razvoja poljoprivrede u Podunavlju. U okruženju koje se dinamično menja i usložnjava, održivost poljoprivrede se obezbeđuje optimalnom kombinacijom regionalno specifičnih proizvodnih sistema i tehnika, koji u dinamičkoj interakciji proizvode trade off ekoloških, ekonomskih i socijalnih vrednosti i usluga na posmatranom području. Motivacija farmera i ostalih stejkholdera za njihovu primenu obezbeđuje se koordiniranom aktivnošću politike zaštite životne sredine, agrarne, prostorne, ekonomske i socijalne politike. Raznolikost prirodnih uslova i resursa omogućava primenu različitih proizvodnih sistema u poljoprivredi u Podunavlju, a uspeh u obezbeđenju održivog razvoja sektora u celini zavisiće od preduzimanja adekvatnih mera institucionalne podrške i saradnje zainteresovanih strana na svim nivoima.*

***Ključne reči:*** *održivost, poljoprivreda, proizvodni sistemi, Podunavlje.*

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# REBORN OF ROMANIAN BRANDS BY E-COMMERCE

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**Summary**

*The paper analyses the evolution of the Romanian traditional brands during the last 20 years. We started the analysis with the presentation of the most famous Romanian brands during the communist period. Then, we presented the transition of the traditional brands to the market economy, under the influence of structural transformations in economy, globalization and strong competition on the market.*

*Some firms chose special strategies to enter on market or extend their share on market. Among them, the "reactivation" of old brands, from communist period, has an important place. The method seems to be successful and is based on the psychological implications generated by certain products in the nostalgic consumers' minds.*

*The analysis is close correlated with the evolution of the Internet and E-commerce. The new techniques of commercialization of the goods comprise the Internet use and promotion by Internet. That is why we will also present the impact of the Romanian traditional brands on Internet and E-commerce.*

*We intend to know if is possible for old brands to compete on the market, if there is enough capacity for the entrepreneurs to stand out on the market, to protect and promote their products in the tough competition environment, subject to globalization, regardless of the fact that they take over an already consecrated mark or create a new one.*

***Key words:*** *Brands, E-commerce, Strategies, Romania*

**JEL**: *L10, L17*

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## Introduction

The present paper attempts to highlight the main role played by the internet and electronic commerce in particular in the marketing strategy of the firms, as well as the importance that should be attached to the registered marks and consumers' awareness, in the international competition.

It is quite obvious that the approached subject is of actuality, mainly as a result of the current context, in which the globalization phenomenon is getting more intense and the competition on the world market is increasing. In this conjuncture, in order to survive on the market or to get the supremacy, any marketing strategy is welcome, as long as it observes the current legislation. That is why the strategy chosen by certain firms, to reactivate the older marks, which temporarily disappeared from the market as a result of the new economic conditions and conjuncture, is not only interesting but also efficient, as it builds on the preferences of a certain segment of consumers for certain products that had penetrated into the consumers' behaviour many years ago.

The phenomenon is not singular for Romania, the same strategy being adopted in other former communist countries as well, with their "traditional" products from the communist time. The method seems to be successful and is based on the psychological implications generated by certain products in the nostalgic consumers' minds; in this case this means a well-defined market niche, which exists regardless of the country, and which, if adequately exploited, can bring great benefits and in the future can create new segments of consumers even among the younger people or among the people who do not fall into the category of the nostalgic. It is from this idea that we started in the development of the present paper.

In this psychological market game, the mark has a main role. In our analysis we desired to evoke the trajectory of the main Romanian marks from the communist period on the free competition market. This analysis used the data that were periodically published by the Romanian newspaper "Adevărul", following the surveys and studies conducted by Gemius and Evensys (popularity tops of the fourth edition of the study Leading Brands by Romanian Users 2011), as well as other specialty works, the studies made by Alexander Dolgin in particular.

## Trends in E-commerce

Technology is perceived as an important catalyst of the commercial activity restructuring and of the company development strategy in the business world nowadays. The companies activating in the most diverse fields change their business operation modality so as to benefit from the power of the new technologies. The growth of Internet and Intranet networks revolutionized the communication between companies and their staff, business partners or customers.

In recent times, we have witnessed a proliferation of commercial applications that benefit from the public operation standards that Internet provides. These applications cumulate the Internet access with the transaction systems, databases or automation of commercial processes.

For many companies, the first incursion into the electronic commerce world consists in being present on World Wide Web, in order to publish their job, products or commercial policy offer. Many times the sites are subsequently developed in order to integrate other activities of companies, for instance the processing of orders.

E-commerce makes it possible for companies to improve their relations with customers, suppliers and business partners. The most used implementations refer to on-line shopping. On-line shopping represents one of the fastest growing markets in modern economy.

At present, the virtual shop windows enable people to buy everything that can be supplied by the conventional shops, in fact customers can order the product directly from producers, which mean the elimination of intermediaries and costs related to retail sale from conventional shops.

A great number of companies save a lot of money from the sale and production activities from the implementation of solutions provided by e-commerce. The friendly use of navigation software programs and the multimedia character of the Web pages content largely attracted the public. The growth of interest in Web of people who have access to Internet entailed Internet development itself.

## Romanian brands in the communist period

There were a few products that before 1989 were a true symbol of the communist industrial production. They were omnipresent and all Romanians used them. Some of them were successfully exported, mainly in the former socialist countries. We shall next briefly present some of the most representative marks, in the communist period, in food industry.

The chocolate bars named *"Rom"* began their history in the year 1895, Kandia at that date. The activity was carried out by only six employees, in a sweets factory from Timişoara. In 1920, the producer had 300 employees, and in 1948 the factory was nationalized. The first chocolate bar, the "grandfather" of the popular Rom, appeared on the market in 1964. Similarly to the living standard from that period, the recipe was increasingly degraded, first milk was removed, and the rum cream was replaced by substitutes.

As regards beverages, there are a few marks that "marked" our youth for some of us. The most popular beer was *"Bucegi"*. The beer *"Azuga"* was more difficult to find, being distributed on a selective basis, similarly to the beer *"Silva"*, produced at Reghin. The latter went mostly to export. Besides beer, there were also some other alcoholic drinks that were famous at the time, among which the vodka *"Săniuţa"* or the cognac *"Ovidiu"*.

In the category of wines we would like to mention the wine *"Murfatlar"* in particular. It was the main wine found on special occasions, at weddings, christening parties, large parties. At the same time, it was "hard currency", being treasured for "special occasions" and gifts.

*"Cico"*, *"Brifcor"* and *"Quick-Cola"* are products that those under 25 years old do not much appreciate, as they are stories. However, for the other people, they "volens-nolens" represented substitutes of the Western products, being well-known and much appreciated in Romania. The impact of these soft drinks on the market was quite strong, they remained in history an folklore; furthermore, "Brifcor" (Indigenous Soft Drink Produced with Original Romanian Concentrate) generated even conflicts between companies, and the disputes lasted in courts for years. Designed in the laboratories of the Research Institute for Fruit and Vegetables, the juice was produced throughout Romania in the '80s. Immediately after the long-dreamed "Coca-Cola", "Fanta" and "Sprite" appeared on the market, the Romanians forgot about "Brifcor".

## Transition of "communist brands"

### *International competition*

Many marks that dominated the market in the communist period could not face the shift to capitalism and were replaced in the Romanians' preferences by imported products. Before 1989 we had no other choice: we brushed our teeth with the same tooth paste called "Cristal" or we used only "Cheia" soap.

Once they could buy products they had ever dreamt of, the Romanians they were very glad when they discovered, for the first time in dozens years, that they have several choices for the products they want. They gave up "Cico" and "Quick-Cola" for the true brand "Coca-Cola" and the tooth paste "Cristal" for "Colgate" or "Blend-a-Med", for instance.

While many domestic "communist" brands succeeded in getting re-invented and are still on the market, others disappeared earlier or later or got under the umbrella of great multi-national companies. Thus, even though certain factories are still operating, the commodities they produce bear foreign names. For example, the factory from Craiova that manufactured automobiles "Oltcit" in the '80s will soon place the new "Ford B-Max" on the market. At present, the Romanians began to miss the marks that they love from the very reason that now they can no longer find them.

Let us take for example, the cigarette industry. In March 2010, the cigarette factory from Sfântu Gheorghe was closed down, and the legendary cigarettes *"Carpaţi"*, *"Snagov"* and *"Mărăşeşti"* no longer exist. After 113 years of activity, the factory Covasna closed down, and the 103 employees became unemployed. In 1931, in the town Sfântul Gheorghe, the first cigarettes "Carpaţi" and "Mărăşeşti" had been produced. In the '70s the same factory began to produce the cigarettes "Snagov", the first Romanian filter cigarettes. In the year 2004, the National Society "Tutunul Românesc" SNTR

(Romanian Tobacco) got privatized. Galaxy Tobacco took over 53.72% of SNTR shares by a transaction worth almost 18 million USD. Practically, the new owners paid 1.6 million USD for the factory, whose debt amounted to 11 million USD and promised investments of five million USD.

Unfortunately, for the continuity of industrial development in Romania and the permanence of the Romanian marks on the market, the true emblems of the communist period had to be sold by piece, and the plants were demolished or bought by the large foreign companies, which chose to stop production and move their operations to foreign countries (as, for instance, the case from Colgate-Palmolive, which bought the factory Norveea Braşov, and then relocated the operations in Poland).

***Reborn of communist brands***

Either they appealed to the Romanians' nostalgia, or they built themselves a new image, several autochthonous marks present even since the communist time are still on the market nowadays. Most Romanian brands that survived during the shift to capitalism were bought by the great foreign companies.

Some of us become nostalgic when we remember the products that we used to buy in the communist regime. Many of these products could not face the competition on the free market and were lost in the face of cheaper alternatives from foreign countries. Yet when we speak about the automobile Dacia, the mattresses "Relaxa", the refrigerators "Arctic", detergent "Dero" and cosmetics "Farmec", the feeling is not the same. This happens because they are as present in our lives as they used to be in the past.

In some way or another, these autochthonous brands succeeded in getting re-invented and survived in capitalism. Furthermore, the transnational companies bought them and put them into value, as they reached the conclusion that Romanians' nostalgia can bring profit. More and more companies appeal to the past in order to sell the products that have been on the market since the communism time. With improved recipes, with no restriction with regard to ingredients and prices limits under the form of "directives", but rather imposed by production costs and competition on the market, certain autochthonous brands "flourished" after the shift to capitalism.

Others disappeared immediately after 1989, when the Romanians were happy to give up the products that they used to buy in the communism time as they had no other alternative.

For instance, the chocolate bars *"Rom"*: in the year 2005, the group Kandia-Excelent relaunched the chocolate bar "Rom" through the campaign "Tough sensations since 1964". The publicity spots that evoke the communist period had the expected results, and Kandia, the company that kept changing its owner after 1989, still produces and sells large amounts of chocolate bars "Rom Tricolor" each year. Furthermore, in Kandia Dulce (Sweet Kandia) portfolio the sweet Măgura is still found nowadays. In the year 2007, the giant Cadbury-Schweppes bought Kandia with 100 million dollars. In

2010, in order to comply with the European Commission conditions (regarding the fusion with Kraft), Cadbury gave up the company Kandia for 40 million euro. In this way, in the year 2010, the production of "Rom" bars reached 3,500 tons, according to the general manager from Kandia.

One of the well-known beer marks from the communist period, *"Azuga"*, was bought by SABMiller in 2009, which is the largest beer producer in the world, for 7.1 million euro. "At the moment the mark was purchased (January 2009), the consumer studies revealed a great affinity for the mark Azuga and the desire that this mark should be available at national level, not only locally", declared the marketing vice-president of Ursus Breweries, the SABMiller branch in Romania. "What Azuga intends now is to recall and learn from the good things that happened in the past", he also added. Since 2009 up to the present moment, "Azuga" tripled its market share.

By an efficient management, the wine producer *"Murfatlar"* had a smooth transition to capitalism. "Many things changed at Murfatlar. The market share almost doubled in only five years, and the turnover was twice as high in the last two years", the manager of the wine producer declared. Last year (2010), the table wine sales were up by 40%. The turnover of the group reached 140 million Lei, and a 45 million increase is expected in the year 2011. The brand "Murfatlar", with everything behind it, can be easily evaluated at over 100 million euro.

*"Cico"*, *"Brifcor"* and *"Quick-Cola"*; beginning with the year 2006, Romaqua Group relaunched the soft drinks from the communist period: "Brifcor, the juice you longed for ", together with "Quick-Cola". The company management staff announced from the very beginning that their main promotion strategy will be based on the Romanians' nostalgia for the past times.

Yet the rights over the brand "Brifcor" were disputed in courts until 2010. Finally, the instance decided that the mark belongs to Consuc SA (owned by the group Trust Orizont) from Suceava, and last year this resumed the production. At present, the factory produces 1,000 tons of "Brifcor" each month, but they hope to reach the maximum capacity of 3,000 tons soon, as the marketing director of Trust Orizont declared for the newspaper "Adevărul". Romaqua, which had under its umbrella another strong Romanian brand – *"Borsec"*, did not give up and still bottles and sells "Giusto-Brifcor" and "Quick-Cola". At the end of 2010, the group also re-launched "Cico".

## Romanian brands and E-commerce

In this chapter, we analyze the E-commerce with national products, named "Romanian brands", those products well-known on the national market even since communist times and which are still present on the market. From the multitude of Romanian brands we made a selection and focused on those that are considered the most representative for us.

Thus, according to the study made by Gemius and Evensys (the popularity tops of the fourth edition of the study Leading Brands by Romanian Users 2011), the criteria that define the on-line presence of a certain brand are the following, in the order of importance: information on its products/services and contact data available on-line (42%), its on-line image (web site, banners, graphics, design) (41%), possibility for on net buying its products or services (31%), on-line communication with customers by several modalities (27%), intensive on-line promotion (25%), discussion blogs, social networking, forums (14%).

In the Romanians' vision, a successful brand is defined by: high quality products/ services (66%), the fact that it is well-known (37%), it has products/services that are sold very well (32%), is differentiated from the other brands (23%), its products are innovative (20%), it has a multitude of fans (5%).

According to the Gemius and Evensys study, the most present Romanian brands on Internet, in 2011, are:

1. Dacia - 33% (29.6% in 2010)
2. BCR - 9.5% (9.6% in 2010)
3. eMag - 5.8% (3.5% in 2010)
4. Ursus - 5.6% (4.1% in 2010)
5. Borsec - 5.6% (2.0% in 2010)
6. Petrom - 4.6% (7.3% in 2010)
7. ProTv - 4.4% (1.2% in 2010)
8. Dorna - 3.1% (2.0% in 2010)
9. BRD - 2.8% (2.6% in 2010)
10. Chocolate bar Rom - 2.7% (0.4% in 2010)

We used italic words for the Romanian agri-food products most present on Internet. Except the product "Chocolate bar Rom", the rest are beverages, old brands, which "survived" on the global market. We underline that their presence on the market is increasing year by year.

According to the same study, the most reliable Romanian brands, in 2011, are:

1. Dacia - 26.5% (27.2% in 2010)
2. Borsec - 7.3% (4.9% in 2010)
3. BCR - 7.2% (7.4% in 2010)
4. Ursus - 5.1% (3.3% in 2010)
5. Petrom - 4.1% (5.1% in 2010)
6. Dorna - 3.9% (4.4% in 2010)
7. Chocolate bar Rom - 3.4% (0.9% in 2010)
8. Farmec - 3.4% (1.9% in 2010)
9. Gerovital - 3.1% (2.2% in 2010)
10. ProTv - 3.0% (0.8% in 2010)

In the top we can observe almost the same brands like in previous, but the ranks are different. The agri-food products, present in the classification, are the same: "Borsec" – mineral water, "Ursus" – beer, "Dorna" – milk and dairy, "Chocolate bar Rom" – chocolate. In the same time, we want to highlight that the reliability of these brands is bigger and bigger (except "Dorna").

Having in view the same study mentioned above and taking into account the popularity of the Romanian brands, the most popular, in 2011, are:

1. Dacia - 30% (32.8% in 2010)
2. Chocolate bar Rom - 8% (3.5% in 2010)
3. Ursus - 7.3% (5.6% in 2010)
4. Borsec - 5.9% (3.7% in 2010)
5. BCR - 5.5% (4.5% in 2010)
6. Petrom - 4.5% (5.4% in 2010)
7. Dorna - 3.8% (2.7% in 2010)
8. Cotnari - 3.5% (2.2% in 2010)
9. Napolact - 3.4% (2.6% in 2010)
10. Poiana - 3.3% (3.6% in 2010)

Compared with the first two classifications, the last contains much more agri-food products, beside the products mentioned before we meet wine "Cotnari", milk and dairy "Napolact" and chocolate "Poiana". They are most popular year by year (except "Poiana").

From the three classifications presented we can conclude that there is a close connection between the popularity, the presence on the market and the reliability of the consumers in a brand. Four products are present in all three classifications: Chocolate bar "Rom", beer "Ursus", mineral water "Borsec" and milk and dairy "Dorna". Obvious, the popularity among consumers, which comes during communist period, made possible the nowadays commercialization and intensive presence on the Internet and market. It was like a "special recipe" for some owners of traditional brands who re-activated them and make profit based on the psychological aspects of the marketing. Of course, the media and especially Internet make it possible having in view the impact and utilities among consumers, most of them from young generation. E-commerce is growing and growing very fast, the interference with modern life style is obvious and will have a bigger influence on the future way of living and consume.

## Conclusions

We shall briefly present below a few conclusions than can be drawn from the paper presented.

It is without doubt that the protection of own products is a must for the safety and peaceful development of business. While in the communist period the brands were strictly regulated by the legislation into effect at that date, and as a result of the absence of private entrepreneurs there were no disputes and conflicts between the producers, the state being the only owner of trademarks, after 1990, with the emergence of the new private firms, the activity in this field has significantly grown.

After the completion, updating and transposition of the EU legislation, the well-defined legal framework contributed to market stability and market competition in normal, fair and competitive terms. In this very dynamic context, the old marks, symbols of consumption in the communist period, were reactivated, making use of the the psychological impact that these have on a certain population segment. The selected strategies were successful and we consider that this reactivation is welcome and it highlights our national identity and which also refers to the consumer behaviour. Even though the owners of the former state companies have been changing in the last 20 years, the new owners, some of them foreign entities, who at the moment they bought the mark did not know in detail the impact of old marks upon consumers, or did not intend to use them, they did reactivate these marks, registered them, protected them and successfully exploited them, having in view the fact that in general turnovers and sales obviously increased.

It is without doubt that Internet became a life style, being present in all the activity fields and in our daily life. In these conditions, the economic operators got adapted very fast and developed their business in close connection to the development of Internet. The continuous development of the electronic commerce in Romania, as well as throughout the world, since 1990, and the development of the interfaces

used and software used, fully contributed to the significant changes of consumers' behaviour that we perceive at present.

Adapted to the economic activities and present in people's homes, regardless the place were it is found, the Internet will be the main communication and information tool in the future as well, to put it briefly, it will mean knowledge. As a result, we consider that the focus on promoting the Romanian traditional products in close connection with the new breakthroughs in communication, and we here refer to Internet, is a success. That is why we consider that our approach based on this paper, by which we attempted to highlight the influences and interferences between the traditional marks and the modern commerce, is also successful.

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# CATTLE STOCK AND THE ANALYSIS OF TOTAL MEAT PRODUCTION IN THE REPUBLIC OF SERBIA[1]

***Slavica Arsić[2], Nataša Kljajić[3], Predrag Vuković[4]***

**Summary**

*Over the last few decades cattle stock has been greatly reduced and therefore the production of all kinds of meat has been reduced as well, as a result of those changes.*

*This work shows, based on the data of the Republic Bureau of Statistics, the results of cattle stock and total meat production variability in Serbia for the period from 2000 to 2009. In 2009 the production of all kinds of meat was 457.000 tons which was 1,5% less than in 2008 and 3,4% less than in 2000. However, in 2009 the production of beef was 1% higher than in 2008, as well as the production of mutton and lamb – 8,7% and the production of poultrymeat – 5,3% higher than in 2008. The biggest fall – 5,3% was recorded in the production of pork. If compared to the production in 2000, the production of mutton and lamb was 31,6% higher, the production of poultrymeat was 19,4% higher, while the production of beef was 2,9% less and the production of pork was 11% less.*

*Thanks to the Government of the Republic of Serbia measures for stimulating cattle breeding, cattle breeding has slowly been taking the place that it deserves in the economy again.*

***Key words:*** *cattle breeding, the production of beef, pork, mutton and poultry meat.*

**JEL**: *Q10, Q19*

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## Introduction

Total level of agricultural production development in a country depends on the share of livestock production in the structure of agricultural production.

In 2009 the benefit of realized livestock production in Serbia was estimated at 1.675 million dinars and it was 69 million less than in the year before, while the share of 30% in total agricultural production benefit was 10,5% less.

These data point to the insufficient development of agriculture, one of the branches of the economy of our country.

There has been a deep crisis in cattle breeding in the Republic of Serbia, in spite of distinct favorable agroecological conditions. During the period of last two decades the number of head of cattle has been falling at an annual rate from 2 to 3%. As a result of such changes, the drop in the production of meat from 600.000 tons during the nineties to 457.000 tons in 2009 occurred, while in 2008 the consumption of meat was reduced from 65 kg per capita to 44 kg per capita (60,3 kg with meat products).

The reasons for such a bad condition are numerous, but above all the reasons are: disturbed price parity, the loss of markets, imposibility to export (except for young beef and thermally processed pork), reduced purchasing power, disturbed financial system and lack of government support, insufficient financial means in agrarian budget, disintegration of the production process in relations of primary production and procession (because the privatization process hasn't been done properly), inadequate stock management, etc.

## Working method

Statistical data processing for the period from 2000 to 2009 on the number of cows and the production of beef, the number of pigs and the production of pork, the number of sheep and the production of mutton and total number of poultry and the production of poultry meat in the Republic of Serbia was done. During the research, apart from statistical data on livestock production, the data of the Ministry of Agriculture, Trade, Forestry and Water Management were used, as well as the data of the Food and Agriculture Organisation (FAO) and professional literature.

Basic aim of the work is to analyze recent tendency in realization of livestock production in the Republic of Serbia that could represent a solid base for making certain predictions about production range of livestock production that could be expected in the future.

## Results and discussion

Basic socio-economic aims of meat production and meat products development are: to satisfy human nutritional needs, to provide raw material for the Food Industry, to make necessary food products reserves and to export meat and meat products.

## Total number of head of cattle and meat production

Cattle breeding production in Serbia, which represents the base of modern livestock production, participates with 46,6%, while its share in total meat production is 21-23%. During the period of transition from 2000 there has been a tendency towards increase in the number of head of cattle and in 2009 statistical research recorded that the number of head of cattle (1.002.295) was 2,2% higher in relation to the average number for the period from 2000-2008, while it was 5,2% less in relation to 2008 (Table 1.).

**Table 1.** The total number of cattle and meat production in the Republic of Serbia

| Year | Cattle (in thousands) | | | Meat (thousand tons) | | |
|---|---|---|---|---|---|---|
| | Total number of cattle | Chain index % | Base index 2000=100 | Beef meat | Chain index % | Base index 2000=100 |
| 2000 | 1.246 | - | - | 103 | - | - |
| 2001 | 1.162 | 93,3 | 93,2 | 93 | 90,3 | 90,3 |
| 2002 | 1.128 | 97,1 | 90,5 | 97 | 104 | 94,1 |
| 2003 | 1.112 | 98,5 | 89,2 | 95 | 97,9 | 92,2 |
| 2004 | 1.102 | 99,1 | 88,4 | 93 | 97,9 | 90,3 |
| 2005 | 1.079 | 97,9 | 86,6 | 90 | 96,8 | 87,4 |
| 2006 | 1.096 | 101,6 | 87,9 | 83 | 92,2 | 80,6 |
| 2007 | 1.087 | 99,2 | 87,2 | 95 | 114,4 | 92,2 |
| 2008 | 1.057 | 97,2 | 84,8 | 99 | 104,2 | 96,1 |
| 2009 | 1.002 | 94,8 | 80,4 | 100 | 101,0 | 97,0 |
| **Average** | 1.107,1 | 97,6 | 87,6 | 94,8 | 99,7 | 91,1 |

*Source:* Authors calculate according data from Statistical Office of the Republic of Serbia

Observed internationally, the share of the number of head of cattle in the world is about 0,2%, while its share in Europe is 1,2%, which points out relatively insignificant international importance of Serbian livestock production.

According to the data of the Republic Bureau of Statistics, at the beginning of 2010, 586.000 of cows and young cows in calf were recorded statistically, which represents reduction in relation to 2008, it is 6,3% less in relation to 2008 and 18,9% less in relation to the average number for the period from 2000-2008. Regarding breeding structure, *Simmental* breed is dominant, the share of *Half-breed* breed is also very high, while the share of Holstein is about 10%.

During the last three decades the average rate of decrease in the number of head of cattle was 2,5% and that represents the highest rate of decrease among all domestic animals breeds. During the last ten years total decrease ocurred in Central Serbia, in other words in hilly and mountainous regions and it was 2,9%. In depression regions

which includes Vojvodina, during the same period, livestock production was 2,1% higher. Regional share in the number of head of cattle between Central Serbia and Vojvodina is 75,3% and 24,7% in relation to the Republic of Serbia. The share of Central Serbia in the total number of head of cattle was significantly higher two decades ago – almost 85%.

There is a strong genetic base for cattle breeding in Serbia and it represents the base for human nutrition. Above all, this claim is related to Simmental breed which represents basic production because the production of beef is based mostly on domestic colourful head of cattle – *Simmental breed* (56,6%) and *Pure Simmental breed* (25,3%), and less on *Holstein-Friesian breed* (6,5%) and other breeds and *Half-breed* (17,8%). Although the quality of our domestic *Simmental* head of cattle represents strength, not weakness of our meat production, recent import in mostly Simmental breed improved breeding structure for both purposes of production (meat and milk), however this improvement mostly happened on the farms which imported, but it haven't been spread among other population. The production of beef, young beef and veal was 100.195 tons in Serbia in 2009, which is 1% higher than in 2008, or 7,5% higher in relation to the average production for the period from 2001-2008 (Table1.) The share of these kinds of meat in total meat production is 21,9%. Observed internationally, the share of this production in the world production is about 0,17% or 1,3% in European production which points out relatively insignificant international importance of Serbian meat production.

Farms (farmers) specialized for the production of meat are aiming to the production of young beef for domestic demands and export. The future of Serbian meat export lies, above all, in the production of young beef with such quality that meets the requirements of a certain market (Italy, Greece etc.).

Over the last years Serbia significantly reduced export of beef and young beef. During the period from 2007-2009 the export of beef and young beef was 60% less. (Table 2.). During the same period, placement of beef and young beef on the EU market was reduced as well at the same rate. Preferential use of export quota (8.700 tons) was just 11% in 2009. Serbia lost the status of an important exporter of young beef which, during the eighties, represented special international brand regarding quality. Just as an example, in 1985 20.000 tons of beef and young beef worth 35 million USD was exported. On average, about 120.000 of young cows were exported and annual income in foreign currency was approximately 100 – 150 million of dollars, while at the same time import was far less (about 50 million per year).

**Table 2.** Exports of beef and baby beef in the period 2007 - 2009

| Year | 2007 | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| Element | Quantity in t | Value in mil. USD | Quantity in t | Value in mil. USD | Quantity in t | Value in mil. USD |
| **Baby beef and beef - total** | 9.158 | 38,8 | 6.341 | 35,8 | 3.568 | 20,2 |
| **Baby beef-EU** | 2.289 | 12,3 | 993 | 6,2 | 984 | 6,2 |

*Source:* Statistical Office of the Republic of Serbia, Statistic of foreign exchange

Apart from the export of young beef, the export of livestock (young cows and calves) becomes more and more frequent on the markets in the surrounding countries, which produces negative effects on meat production in the Republic of Serbia. According to the data of the Republic Bureau of Statistics, the export of livestock was increased from 1.432 head of cattle in 2006 to 19.604 head of cattle in 2007, 72.492 head of cattle in 2008 and 65.232 head of cattle in 2009.

The export of cattle intended for slaughter and beef (young beef and veal) is being done in very complicated conditions, restricted by domestic restrictions and weaknesses, as well as by factors in the surroundings, in other words by international market. Only special quality and prices that are accepted and accredited by world market represent a guarantee for the placement of meat products - our products produced for foreign market.

## Total number of pigs and the production of pork

Total number of agricultural households that are dealing with pig breeding is about 400.000, which is two times more than the number of agricultural households that are dealing with cattle breeding (about 200.000). Average number of pigs of all categories per agricultural household was 9 in 2008, and the share of non-family households in the total number of pigs was 17% and it is higher than in cattle breeding (family agricultural households had 93,8% of the total number - 1.057.000 head of cattle, and the remaining 6,2% belonged to non-family agricultural households).

The total number of pigs in Central Serbia is 62% on agricultural households and 38% is on agricultural households of Vojvodina.

Breeding structure of pigs is primarily *Half-breed* (58%) F1and F2 generations of pure breed. Apart from *Half-breed*, there is also *Dutch Landrace* (30-34%), *Big Yorkshire* (3-5%), *Hampshire*, *Duroc*, *domestic meaty pig and other Landrace breeds* (3%). Therefore, pure breeds are dominant, as well as half-breed of pigs for meat and fat production, while the share of extremely meaty breeds (*Hampshire, Duroc* and *Pietren)* is only 3% and they are used as terminal sire breeds for crossbreeding with Half-breeds F1 and F2 generations aiming to get material for meat production. The presence of a large number of Half-breeds got by unplanned crossbreeding is characteristic, as well as the diversity of genetic material, but on average the level of quality of head is low. The data that shows that the percentage of artificial

insemination is below 15% also shows the conditions in which planned selection on small farms is. Until the mid – eighties of the last century hog raising in Serbia had had a growing trend and the total number of pigs had reached 5,5 million, but after mid – eighties there was a reduction in the number of pigs especially on the territory of Vojvodina. Sudden rise in fodder prices in 2008 caused decrease in the prices of all categories of pigs, which caused serious harm to pig fattening agricultural households.

The share of the production of pigs in the total livestock production reached 34,5% in 2009 and it was worth 591 million of USD, while its share in the total meat production was higher than 57%, depending on the year. According to the data of the Republic Bureau of Statistics the total number of pigs in 2009 reached the number of 3,631 million, which is 1% less than in the period from 2000-2008, but 1% higher in relation to 2008 (Table 3). At the same time, the number of sows and pregnant young sows was 3,7% higher. The share of the number of pigs in Serbia which numbers 3,6 million pigs in relation to the world number is about 0,45% and in relation to the European number is 2,1%. The number of pigs in the world continually grows (*according to FAO: Statistical Yearbook 2009*) and it reached 941 million in 2008 and 1,3 billion of pigs were also produced intended for slaughter during the same year.

**Table 3.** The total number of pigs and meat production in the Republic of Serbia

| Year | Pigs (in thousands) | | | Meat (thousand tons) | | |
|---|---|---|---|---|---|---|
| | Total number of pigs | Chain index % | Base index 2000 =100 | Pork meat | Chain index % | Base index 2000 =100 |
| 2000 | 4.066 | - | - | 283 | - | - |
| 2001 | 3.615 | 88,9 | 88,9 | 254 | 89,7 | 89,7 |
| 2002 | 3.587 | 99,2 | 88,2 | 277 | 109,0 | 97,9 |
| 2003 | 3.587 | 100,0 | 88,2 | 258 | 93,1 | 91,2 |
| 2004 | 3.634 | 101,3 | 89,4 | 242 | 93,8 | 85,5 |
| 2005 | 3.439 | 94,6 | 84,6 | 253 | 99,2 | 89,4 |
| 2006 | 3.999 | 116,3 | 98,3 | 255 | 100,8 | 90,1 |
| 2007 | 3.832 | 95,8 | 94,2 | 289 | 113,3 | 102,1 |
| 2008 | 3.594 | 93,8 | 88,4 | 266 | 92,0 | 94,0 |
| 2009 | 3.631 | 101,0 | 89,3 | 252 | 94,7 | 89,0 |
| **Average** | 369,4 | 99,0 | 89,9 | 262,9 | 98,6 | 92,1 |

*Source:* Calculate according data from Statistical Office of the Republic of Serbia

The second, according to the benefits of agricultural production in Serbia is the production of pork which was 252.188 tons in 2009. It is dominant on family households (Total number of pigs on family households in 2009 was 2998.000 which was 82,5% of the total number of pigs in Serbia, while economic organizations and collective farms owned 633.000 pigs which was 17,4% of the total number of pigs in Serbia) and it has extremely distinctive natural features because of low market value which was

only 20% in certain years. The share of pork in the total meat production in Serbia is 55,2% while if observed in relation to 2008 the production is 5,3% less. In relation to the average realized production during the period from 2001-2008 it is 3,8% less, while in relation to 2000 it is 11% less (Table 3). The share of realized production of pork in 2009 in relation to the world production was 0,2%, and in relation to the European production it was 1,3% (*according to FAO*).

There was high demand for pork on Serbian meat market once, however trend of demand for pork has been decreasing and in 2007 it was 36%, but because of unfavorable price trend in 2008 decrease trend increased to 41%.

Recently Serbia has been importing more and more pork. In 2009, 3.751 tons of pigs intended for slaughter worth 6,3 million of USD were imported. At the same time, the import of pork and frozen meat products was 7.338 tons worth 18,2 USD (Table 4).

**Table 4.** Imports of live pigs for slaughter and pork meat in the period 2007-2009

| Year | 2007 | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| Elemet | Quantity in tons | Value in mil. USD | Quantity in tons | Value in mil. USD | Quantity in tons | Value in mil. USD |
| Live pigs for slaughter | - | - | 304 | 0,7 | 3.751 | 6,3 |
| Pork meat with frozen slaughter-house products | 2.401 | 4,7. | 5.912 | 16,1 | 7.338 | 18,2 |

*Source:* Statistical Office of the Republic of Serbia, Statistic of foreign exchange

CEFTA countries like Montenegro, Bosnia & Herzegovina and FYR Macedonia are the biggest importers of pork and meat products from Serbia. There is a strong demand for meat in Croatia, but this market is unavailable for our country because law regulations of our and their country are not in accordance regarding sanitary and veterinary supervision. Last year the total export of meat from Serbia was 88,3 million of USD and pork was dominant.

The total meat production in Serbia is 457.000 tons anually and more than half of it – 252.000 tons is pork. The average meat consumption per capita in Serbia is about 50 kg anually and more than half of it is pork – 25 kg per capita, while in Austria and in Holland it is 70 kg per capita.

## Total number of sheep and the production of mutton

Nowadays, sheep breeding has been spread over the world thanks to their good features of acclimatization. World's leading sheep-breeders are in China and according to FAO there are 136 million of sheep. The number of sheep in the world regarding continents in 2009 was: Africa: 297,12 million, Asia: 452,6 million, Australia: 105,12 million (Just Australia with New Zealand – without other parts of Oceania), Europe: 131,2 million, South America: 72,4 million (without some parts of Central America) and North America: 65,7 million (without some parts of Central America). Total number of sheep in the world in 2009 was about 1,07 billion.

In spite of the fact that we own natural resources and tradition, sheep breeding in Serbia regarding productivity is on an unenviable level. The dominant breed is *Pramenka* (80%) with races like *Pirotski, Sjenicki* and *Svrljiski*, while the remaining 20% are *Cigaja* (5%) and half-breeds with foreign races, mostly *Virtemberg* and *Il d'France*.

According to the recent research *(Selection in Cattle Breeding, 2005 Institute for Cattle Breeding, Belgrade)* and statistical da ta the average fertility of important races of *Pramenka (Pirotski, Sjenicki and Svrljiski)* is 110%, income from wool is 1,8 kg, milk yield 45 l (without milk for sucking lambs) and sheep body weight 3,9 kg at their birth and 20 kg at the age of 90 days, before slaughter. Regarding *Ciglaja* and *Half-Breed*, productivity is a bit higher, but because of small share in the total number of sheep, the effects are insignificant.

The estimated cattle breeding benefit regarding activity in 2009 for sheep breeding was 100 million USD with the share of 5,9%.

Sheep production is on the fourth place in cattle breeding of Serbia regarding the number of head of cattle, and regarding meat production. The number of sheep realized in 2009 was 1,504 million, which is 3,4% less in relation to the average number of head of cattle during the period from 2000-2008, in other words it was 6,3% less in relation to 2008. The total number of sheep in 2009 in relation to 2000, taken as the base year, was 6,7% less, while in 2007 and 2008 there was approximately the same number, which was only 0,3% less (Table 5).

In relation to the total number of sheep in the Republic of Serbia in 2009 (1.504 million), 83,2% was in Central Serbia and 16,8% in Vojvodina. 98,9% was on family households and 1,1% was on economic organizations and collective farms.

83,5% of the total number of sheep on family households in the Republic of Serbia is in Central Serbia and 16,5% is on agricultural households in Vojvodina. The share of economic organizations and collective farms in Central Serbia is 52,8% and 47,2% in Vojvodina in relation to the total number in the Republic of Serbia.

**Table 5.** The total number of sheep and sheep meat production in Serbia

| Year | Sheep (in thousands) | | | Meat (thousand tons) | | |
|---|---|---|---|---|---|---|
| | Total number of sheep | Chain index % | Base index 2000=100 | Muuton | Chain index % | Base index 2000 =100 |
| 2000 | 1.611 | - | - | 19 | - | - |
| 2001 | 1.489 | 92,4 | 92,4 | 17 | 89,5 | 89,5 |
| 2002 | 1.448 | 97,2 | 89,9 | 15 | 88,2 | 78,9 |
| 2003 | 1.516 | 104,7 | 94,1 | 18 | 120,0 | 94,7 |
| 2004 | 1.586 | 104,6 | 98,4 | 20 | 111,1 | 105,2 |
| 2005 | 1.576 | 99,4 | 97,8 | 21 | 105,0 | 110,5 |
| 2006 | 1.556 | 98,7 | 96,6 | 20 | 95,2 | 105,2 |
| 2007 | 1.606 | 103,2 | 99,7 | 20 | 100,0 | 105,2 |
| 2008 | 1.605 | 99,9 | 99,6 | 23 | 115 | 121,0 |
| 2009 | 1.504 | 93,7 | 93,4 | 25 | 108,7 | 131,6 |
| **Average** | 1.549,7 | 99,3 | 95,8 | 19,8 | 103,6 | 104,6 |

*Source:* Calculate regarding data from Statistical Office of the Republic of Serbia, Belgrade

During the observed period, the data show that a significant productivity growth in the productivity of sheep production has been noticed. There is a trend of decrease in the total number of sheep, while meat production range, with small oscillations, remained on the same level from 2004-2007, but in 2008 and 2009 there was an increase in meat production.

The production of mutton and lamb in 2009 was about 25.000 tons and its share in the total meat production in Serbia was just 5,5%, while in relation to 2008 the production was 8,7% higher and in relation to 2000 it was 31,6% higher (Table 5.).

The share of Central Serbia in the total meat production in the Republic of Serbia in 2009 was 4,6%, while the share of Vojvodina was 0,6%.

Observing the production of mutton and lamb regarding the total meat production in Central Serbia its share is 7,7%, while its share inVojvodina is 1,6%. Sheep breeding as a branch of cattle breeding is mostly related to hilly and mountainous regions, therefore it is least present in Vojvodina.

In the sector of individual agricultural producers, sheep production is realized at about 98% and therefore development programme should be adapted to this sector.

Of all the meat that we could offer for export, apart from young beef, the fastest results we could get with the export of lamb.

In 2009 we imported 72.071 kg of mutton worth 437.701 USD. At the same time, we exported 85.645 kg of mutton worth 587.417 USD. The data in the Table show that the import of mutton was 49.432 kg increased in relation to 2007 and the export was 25.211 kg or 22,8% reduced (Table 6.).

**Table 6.** Import and export of mutton

| Year | Import | | Eksport | |
|---|---|---|---|---|
| | kg | USD | kg | USD |
| **2007** | 22.639 | 77.754 | 110.856 | 647.760 |
| **2008** | 70.694 | 160.18752 | 24.120 | 762.6458 |
| **2009** | 72.071 | 437.701 | 85.645 | 587.417 |

*Source:* Statistical Office of the Republic of Serbia, Belgrade

However, Serbia has to implement the complete system of EU regulations in order to be able to offer what EU market demands and accepts. This sector could contribute more significantly to the intensification of meat, milk and wool production by implementing new technologies.

**Total number of poultry and the production of poultry meat**

Poultry raising is dominant regarding livestock production on agricultural households in Serbia. Low level of specialization on family agricultural households results in the fact that the largest number of households are engaged in this type of production within the total productional structure. 66% of the total number of poultry in the Republic of Serbia in 2009 was on agricultural households and 33% was on economic organizations and collective farms.

That relation in 2010 was 73,2% on agricultural households and 26,8% on economic organizations and collective farms.

Poultry once had positive trend of growth, during the eighties and after that period the number of poultry, according to the official statistics, has been decreasing. During the nineties, the number of poultry was 29.907.000, in 1995 it decreased to 25.591.000, in 2002 it decreased to 19.000.000 and over the last several years it has been ranging from 16.500.000 to 17.500.000.

In 2009, the number of poultry was 22.821.000, however already during the following year 2010 it was decreased to something more than 20.000.000 (Table 7.). During the period from 2000-2008 the most significant decrease in the number of poultry ocurred in the area of Central Serbia, while in Vojvodina the number has been continuously growing since 2004. The share of Vojvodina in the total number of poultry in the Republic of Serbia was increased to 43% in 2008 in relation to 2007, and in 2009 it was increased to 59,9% in relation to 2008. This increasing trend in Vojvodina leads us to the conclusion that the production of poultry is being moved from the South to the North of Serbia.

Globally observed, growth rate of poultry was recorded in all branches of cattle breeding. The total number of poultry was 3 % increased on average per year and in 2008 it reached 18,4 billion. An estimated benefit from poultry raising in our country in 2009 was 219.000.000 USD with the share of 12,8%.

The production of poultry meat represents the most intensive activity in livestock production and the quantity realized in 2009 was 80.204 tons with the growth of 5,3% in relation to the previous 2008. After the observed period from 2000 to 2008, the production of poultry meat in 2009 recorded growth of 19,4%, which points to the fact that poultry raising in Serbia, after years of decrease, is on the way to recovery. (Table 7.).

The share of poultry meat in the total meat production in the Republic of Serbia in 2008 was 16,4%, while in 2009 it was 17,5%. Regionally observed, 60% of poultry meat was produced in Vojvodina and 40% in Central Serbia. The share of poultry meat in total meat production in Central Serbia (262.000 tons) in 2008 was 12,6% and in Vojvodina 21,3%. The share of production of poultry meat in total meat production in Central Serbia (270.000 tons) was 13% and in Vojvodina 24,1% of 187.000 tons (total meat production).

**Table 7**. The total number of poultry and meat production in the Republic of Serbia

| Year | Poultry (in thousands) | | | Meat (thousand tons) | | |
|---|---|---|---|---|---|---|
| | Total | Chain index % | Base index 2000=100 | Poultry meat | Chain index % | Base index 2000=100 |
| **2000** | 20.372 | - | - | 67 | - | - |
| **2001** | 19.290 | 94,7 | 94,7 | 62 | 92,5 | 92,5 |
| **2002** | 18.804 | 97,5 | 92,3 | 66 | 106,4 | 98,5 |
| **2003** | 17.677 | 94,0 | 86,7 | 59 | 89,4 | 88,05 |
| **2004** | 16.280 | 92,1 | 79,9 | 65 | 110,2 | 97,01 |
| **2005** | 16.631 | 102,1 | 81,6 | 67 | 103,07 | 100,0 |
| **2006** | 16.595 | 99,8 | 81,5 | 75 | 111,9 | 111,9 |
| **2007** | 16.422 | 98,9 | 80,6 | 70 | 93,3 | 104,5 |
| **2008** | 17.188 | 104,6 | 84,4 | 76 | 108,6 | 113,4 |
| **2009** | 22.821 | 132,8 | 112,0 | 80 | 105,3 | 119,4 |
| **Average** | 18.208 | 101,8 | 88,2 | 68,7 | 102,3 | 102,8 |

*Source:* Calculate regarding data from Statistical Office of the Republic of Serbia, Belgrade

Based on the data that was mentioned it could be concluded that the production of poultry meat, regionally observed, is the largest production in Vojvodina, which means that most of agricultural households are engaged in an intensive broiler production.

Through chicken incubators and broiler production of poultry meat and eggs, poultry production has been completely industrialized and therefore could be highly productive and profitable cattle breeding branch. (In the commercial sector which produces for the market, there are about 70 big broiler farms with the capacity of 10.000 to 120.000 poultry, where the total capacity is about 10 million broilers), (according to the Republic of Serbia-Effects of liberalization on the Agriculture in Serbia)

The consumption of poultry meat used to be up to 12 kg per capita once (at the beginning of the nineties), in 2008 it was about 10 kg and today it decreased to approximately 8 to 9 kg per year. In our surroundings, in Albania, the consumption is 7,9 kg per year; in Bosnia & Herzegovina it is about 4,8 kg; in Bulgaria it is 15 kg; in Croatia it is 6,8 kg; in FRY Macedonia and Romania it is 15 kg.

World production of poultry meat should reach a record of 85 million tons this year (100 million is expected in 2015, and even 143 million in 2030 which will represent 40% of world meat production), while 9 million tons will be exported.

80.000 to 85.000 tons of poultry meat is produced in Serbia each year, in other words about 70 million broilers. With that kind of production our farms and slaughterhouses have products to export, but that reffers only to CEFTA countries – FYR Macedonia, Bosnia & Herzegovina and Montenegro. The export to the EU countries is impossible before basic international standards are not satisfied.

**Table 8.** Import and export poultry meat

| Year | Import | | Export | |
|---|---|---|---|---|
| | kg | USD | kg | USD |
| **2007** | 196.133 | 429.108 | 2.305.637 | 5.495.131 |
| **2008** | 196.328 | 213.030 | 1.213.378 | 2.350.194 |
| **2009** | 376.352 | 821.848 | 1.676.971 | 4.753.776 |

Source: Statistical Office of the Republic of Serbia, Statistic of foreign exchange

Table 8. shows that the import of poultry meat in 2009 91,9% increased in relation to 2007 and the export 27,3% decreased. In relation to 2008, the import 91,7% increased, while the export 38,2% increased, which means that there was the increase in export in 2009.

Food safety system that exists in the EU is considered to be one of the strictest in the world, regardless that it is on the fourth place in the world according to the production of poultry meat, behind the USA, China and Brasil. All the participants in the poultry industry, beginning with food producers, farmers, slaughterhouses, meat processing plants, to trade associations must own detailed documentation about the origin of products. Serbia began with coordination of its regulations with the regulations of the EU, Russian Federation and the third countries. That means that Serbian producers of poultry, if they want to survive on the domestic market and especially if they plan to export poultry meat and eggs, will have to organize themselves better and quicker in order to reach quality standards and standards in food safety and hygiene, as well as efficient control systems requirements for the whole production line.

## Conclusion

From the previously presented results, it could be concluded that cattle breeding in Serbia could be evaluated as unfavorable because the number of head of cattle of all domestic animals permanently decreases. This condition causes the fall in the production of cattle products, especially in meat production.

During the period from 2000-2009 the number of head of cattle had falling tendency and in 2009, when the number of head of cattle was recorded statistically – 1,002.295 – it was 2,2% higher in relation to the average number for the period from 2000-2008, but 5,2% less in relation to 2008.

The production of beef in Serbia in 2009 was 100.195 tons which is 1% above realized production in 2008 or 7,5% higher production in relation to the average realized production during the period from 2001-2008. In relation to 2000 the production of meat was about 3% less.

Apart from the export of young beef, there is a growing number of live animals exports (young bulls and calves), which has a positive effect on the level of meat production in the Republic of Serbia. According to the data of the Republic Bureau of Statistics live animals export was increased from 1.432 in 2006 to 19.604 in 2007, 72.492 in 2008, and 65.232 in 2009.

According to the data of the Republic Bureau of Statistics the total number of pigs in 2009 reached the number of 3.631.000 which was 1% less in relation to the period from 2000-2008 and it was also 1% more in relation to 2008.

The production of pork was second regarding benefit in agricultural production in Serbia and it is dominant on family households. In 2009 the production of pork was 252.188 tons. The share of pork in the total meat production was 55,2% in 2009, while observed in relation to 2008 the production was 5,3% less. In relation to the average realized production during the period from 2001-2008 it was 3,8% less.

In 2009 total number of sheep was 1,504 million, which is 3,4% less in relation to the average number during the period from 200-2008 and it was 6,3% less in relation to 2008. The total number of sheep has falling tendency , while the range of meat production remains on the same level, with small oscillations, from 2004-2007, but in 2008 there was an increase of 15% and in 2009 also – 8,7%. From the aspect of bigger involvement of our country in the *world* and *especially* in the European sheep market, the advantage could be the fact that there is an offer of young lambs (aged ninety days), with high quality meat, *because of a specific taste*, which resulted from the production in special conditions (preserved environment, abundance and variety of fauna) but also breeding population of meaty types which will offer quantity together with quality and therefore bigger profit.

In 2009 the number of poultry was 22.821 million which was 32,8% more than in 2008.

The most intensive activity in livestock production represents the production of poultry meat and its realization in 2009 was 80.204 tons, with the realized growth rate of 5,3% in relation to the previous year – 2008. During the observed period (from 2000-2009) the production of poultry meat in 2009 was 19,4% increased and its share in the total production of meat in Serbia was 17,5% , which points out the fact that the poultry production in Serbia after years of decrease, is on the way to recovery.

Regionally observed, various tendencies are present in the development of cattle breeding. The largest reduction in livestock production is on the territory of Central Serbia. On the territory of Vojvodina, there is an increase in the number of head of cattle, as well as in the production in cattle breeding and poultry raising, which points out the fact that there is larger number of commercial agricultural households on the territory of Vojvodina.

The available cattle stock, in spite of the unsatisfacory number of cattle in relation to the available arable land (30 conditional head of cattle per 100 ha in Serbia, 33 conditional head of cattle per 100 ha in Central Serbia and 25 conditional head of cattle per 100 ha in Vojvodina in 2009), it still represents a significant development resource, on condition that there must be a very intensive improvement process in genetic traits in cattle, as well as the improvement in technology and organization of production.

On the state level, certain measures should be taken aiming to increase agrarian budget and to increase stimulus measures supported by the Government of the Republic of Serbia, then bigger involvement of local self-management through its expert service and through the Fund for Agricultural Development and the Department of Agriculture, so that cattle breeding could take or bring back its deserved place in the Economy.

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# STOČNI FOND I ANALIZA UKUPNE PROIZVODNJE MESA U REPUBLICI SRBIJI

*Slavica Arsić[5], Nataša Kljajić[6], Predrag Vuković[7]*

## Rezime

*Poslednjih nekoliko decenija dolazi do smanjenja stočnog fonda kao rezultat takvih promena javlja se i smanjena proizvodnja svih vrsta mesa.*

*Na osnovu podataka Republičkog zavoda za statistiku prikazani su rezultati kretanja stočnog fonda i ukupne proizvodnje mesa u Srbiji za period od 2000 do 2009. godine. U 2009. godini proizvodnja svih vrsta mesa bila je 457.000 hiljada tona što je za 1,5 % manje u odnosu na 2008. godinu, odnosno za 3,4% manje u odnosu na 2000. godinu. Međutim, u 2009.posmatrano u odnosu na predhodnu godinu, ostvarena je veća proizvodnja govođeg mesa za 1%, ovčijeg i jagnjećeg mesa za 8,7% i živinskog mesa 5,3%. Najveći pad od 5,3% ostvaren je u proizvodnji svinjskog mesa. U odnosu na 2000.godinu povećanje je u proizvodnji ovčijeg i jagnjećeg mesa za 31,6%, i živinskog mesa 19,4%, dok proizvodnja govođeg mesa za 2,9 % i svinjskog za 11% manja.*

*Zahvaljujući podsticajnim merama Vlade Republike Srbije, stočarstvo polako dobija odnosno počinje da vraća svoje zasluženo mesto u privredi.*

***Ključne reči**: stočarstvo, proizvodnja govođeg, svinjskog, ovčijeg i živinskog mesa.*

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# BENCHMARKING AS A FUNCTION OF COMPETITIVENESS AND EFFICIENCY IN BUSINESS

***Jovan Babović, Vuk Raičević, Marko Carić***[1]

**Summary**

*Benchmarking is a method of comparison between its' own and the best possible organization that would contribute to the implementation of best practice solutions, new technologies, improvement of business processes and the quality of products, cost savings, increase of productivity, creativity, innovation and competitiveness on the market, and would lead to satisfying the needs and desires of consumers, as well as achieving efficiency in its' own business.*

*However, the concept of benchmarking affects the creation of new ideas and lucrative solutions to improve the existing organization, process and competitive products of high quality. It is, without doubt, the easiest way of applying and achieving best practice leader for the maximization of profit in business.*

*There are several types of benchmarking, such as: the internal, external competitive, external functional, external generic, combined internal and external benchmarking. For a successful implementation of benchmarking, it is inevitable to choose a small number or a single leadership organization suitable for comparing and increasing of competitiveness and profitability in business.*

***Key words:*** *benchmarking, method of comparison, creativity, innovation, competitiveness, profit.*

**JEL:** *M31, M14, L16*

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## Introduction

Dynamic changes in business environment request adjusting of business activities of one particular organization in order to gaining success on the global market, all due to achieving the maximum profit. Making business in harsh terms of globalization demands the application of benchmarking, reengineering, partnership with both the suppliers and the consumers, and other modern managing activities *(Kotler, 2000)*.

Benchmarking is used as a method of adjusting one organization to the dynamic changes in business through permanent measuring and comparison of its' results to the best results of other competitors, in order to achieve the same or maybe even create greater results of its' own. In this manner, it is essential to use the achievements, practice, solutions and ideas of leading organizations, and therefore to improve them creatively and implement in practice.

Comparison of their own activities are carried out with the best results and activities of other organizations in the same activities, with the best in the world regardless of the activity of the country, competitors that have the best products and results, companies with the best technical solutions and technology and best-defined business process.

The creative application of benchmarking into practice affects the rationalization of work processes, quality promotion and the range of products and services, increase of efficiency, expansion of business activities, the development of innovations, creativity, competitiveness and profitability in business.

## The aim and method of research

The aim of the research is to investigate the concept, process and use of benchmarking in order to improve business efficiency by comparing the organization to the market leaders and best applying the practices to achieve competitiveness and profitability in business. Hereby, we shall consider the types of benchmarking, with whom the comparison will be done to, and also emphasize the positive effects of the practice. Benchmarking, as a method of management, has a new meaning in the business in order to evaluate the effectiveness of business of their own organization on the market, compared to the best organizations on both the domestic and international markets. Benchmarking is also a process of constant measurement, internal and external comparison to the leaders with the best practice, all due to gaining knowledge and creating conditions for improving their own solutions and results in business.

In this paper, we have used quantitative and qualitative methods and therefore conducted the studies based on our own research, original scientific research papers, studies and available literature on benchmarking.

## Benchmarking as a managing-marketing activity

***Concept, development, definition and objectives of benchmarking:*** Benchmarking has its' roots in an English word "benchmark" which comes from a construction terminology, meaning leveling, leveling point, the standard measure of value-benchmark by which other values are measured and compared to. The original word in the English language has been identified as a new word "buzzword" which is used in theory and practice to describe a modern method of comparing its' own business to the greatest organizations. Nevertheless, benchmarking is a standard for comparing, measuring and marking a reference point.

The application of identical methods is present with the ancient civilizations and nations in the distant past. Some authors point out that the concept of benchmarking was first used at the beginning of the 20th century.

A more intense use of this term was applied by Japan after the World War II when the experts studied and compared the business of the best organizations worldwide, as well as the best practice and results with their own, along with coming up with new solutions to apply in their organizations.

The modern concept of benchmarking was developed in the United States of America in the middle of the 20th century. At the beginning of 1960's, IBM was starting to use the internal benchmarking due to large differences in the business of lower organizational units. Therefore, it was estimated that the business processes in one part of the company more efficient than the other parts, while the task was to define the internal business standards and to apply the results to other parts of the company. Finally, the company had decided to reduce costs and improve the quality by accepting the world's best practices and thus achieving a significant competitive advantage in the global market.

Term "competitive benchmarking" was first launched in the 1982 in a company named "Xserox" during an employees' training in New York. Benchmarking was then characterized as "a possibility and the need for comparison not only to direct natural competitors, but also to any company no matter whether it is a competitor or not, or if it's big or small. The point is for a company's business practice to be compared to one of a leading or innovating companies' of a certain business function".

"Xserox" has, however, compared its' products to the ones of a Japanese organization called "Fuji-Xserox". The focus was to determine how the Japanese manufacturer sells its' products on the market of photocopying equipment at a lower cost of production costs of "Xserox".

Afterwards, "Xserox" bought the Japanese products, separated the appliances technically, discovered the way of production and measured the costs of every phase of production, while the costs of production, ways of servicing equipment and other aspects of business. This has resulted in the increase of economy, productivity and created innovation in manufacturing. "Xserox" has learned how to improve the quality of its' products, cut costs and prices of products" *(Macura, P., 2010, pg. 11).*

AIC (Agricultural Industrial Complex) „Sirijum“ in Sremska Kamenica applies the combination of discriminatory and comparative analysis, that is benchmarking. In order to improve the internal economy and to increase the profit, seventeen agricultural organizations have been ranked by the dicrminatory method I of distance *(Ivanović, B., 1963),* according to:

- ***conditions*** ( X1 – Equipment assets, X2 – Fixed assets per employee, X3 – Equipment of instrument, X4 – The functional ability of fixed assets, X5 – Working capital per employee, X6 – Working capital, X7 – Technical equipment, X8 – The qualifying ratio of employees, X9 – Total assets per employee, X10 – The profit, X11 – Total invested capital ) and

- ***results*** ( Y1 – Operating profit, Y2 – Profit per employee, Y3 – Net profit per employee, Y4 – Total expenditure per employee, Y5 – Costs of sales, Y6 – General liquidity, Y7 – Profit before interests and taxes, Y8 – Net profit margin, Y9 – Gross profit margin, Y10 – Return on assets, Y11 – Return on equity, Y12 – The financial indebtedness, Y13 – Trade receivables ), and therefore established the general ranking.

**Table 1.** Rank organizations under the conditions and results of the general coefficient of rank

| Organizations | Production conditions | | Operating results | | Rank coefficient | Rank according to Ker |
|---|---|---|---|---|---|---|
| | Value I distance | Rank | Value I distance | Rank | Ker | ( Ker ) |
| I | 0,4979 | 5 | 0,6281 | 1 | 1,2614 | 1 |
| II | 0,1636 | 17 | 0,1999 | 7 | 1,2218 | 2 |
| III | 0,2842 | 13 | 0,2640 | 4 | 0,9289 | 3 |
| IV | 0,3845 | 8 | 0,3302 | 2 | 0,8587 | 4 |
| V | 0,2896 | 12 | 0,1918 | 8 | 0,6622 | 5 |
| VI | 0,4384 | 7 | 0,2543 | 5 | 0,5800 | 6 |
| VII | 0,5026 | 4 | 0,2807 | 3 | 0,5584 | 7 |
| VIII | 0,3660 | 9 | 0,1904 | 9 | 0,5202 | 8 |
| IX | 0,2837 | 14 | 0,1345 | 11 | 0,4740 | 9 |
| X | 0,3190 | 11 | 0,1403 | 10 | 0,4398 | 10 |
| XI | 0,3402 | 10 | 0,1300 | 12 | 0,3821 | 11 |
| XII | 0,6220 | 1 | 0,2143 | 6 | 0,3445 | 12 |
| XIII | 0,2834 | 15 | 0,0973 | 15 | 0,3433 | 13 |
| XIV | 0,1746 | 16 | 0,0379 | 17 | 0,2170 | 14 |
| XV | 0,5914 | 3 | 0,1236 | 13 | 0,2089 | 15 |
| XVI | 0,6083 | 2 | 0,1161 | 14 | 0,1908 | 16 |
| XVII | 0,4616 | 6 | 0,0951 | 16 | 0,1104 | 17 |

*Source:* Babović (2010). The application of discriminant analysis to assess business performance, Novi Sad.

The dicrminatory method of distance I indicated the presence of significant reserves for improving internal economy in business through a better use of available resources. Organizations with the best conditions have achieved poorer results, whilst, on the other hand, organizations that had lower means of equipment, technical equipment, a lower, less engaged foreign capital have worked better and achieved higher economic results.

The comparative analysis has shown that adequate results in business cannot be achieved according to available conditions. There are certain differences concerning the income, growth rates, productivity, expenditures of materials, labor and resources per hectare found in organizations when compared to the best one. Also, standards in production technology have been defined in organizations with poor results, as the best organization, and have therefore been put in practice. All of this inevitably caused progress in the yields and cost savings, as well as a rapid increase of income, earnings and profits *(Babović, 1981, pg. 24, 2010, pg. 7).*

*Stoner,et all. (1995, pg. 224)* sees benchmarking as „a process of discovering the best product, production process and services and their use as standards to improve the company's own products, processes and services".

*Harington, H.Y.& Harington, J.S. (1996, pg. 15)* defines benchmarking as a constant process of identification, comprehension and adjustment to products, services, equipment and actions of organizations with the best practice, aimed at improving their own business. The process includes: comparison of the organization and its parts with the best, not limited to the same activity or same country; comparison of products and other activities of organizations with activities of other organizations of the same kind in order to define the best; comparison of products and services of organizations with products and services of leading competitors; comparison of technical solutions of organizations in order to choose the best equipment for specific applications; application of best defined business process; planning of future development directions as well as active adapting to new trends and consumers' satisfaction and surpassing expectations.

*Kotler, P. (1994)* says „benchmarking is the skill of determining how and why some individuals or organizations do business better than others" (Macura, P. 2010, pg.12).

*Drucker (2003, pg. 83)* considers benchmarking to be one of the lastest tools to obtain information on productivity. He also believes that all organizations can do everything equally. Equalizing the quality according to the leader in the industry is an essential condition for competitiveness.

*The American Center for Productivity and Quality* considers benchmarking to be a "systematic and constant process of measuring and comparing business processes of one organization to business processes of a leader on the world's market in order to gain information that will help the organization take action to improve their performance". *(Cvetković, K., Arsić, Lj., 2010, pg. 80).*

## Application of benchmarking

In modern business, the existence and development of organizations are initially influenced by the external environment. The internal economy is important due to increase of productivity, economy and profitability. In the aspect of international and marketing and competitiveness, organizations are dealt with issues of how to retain and the existing and win new markets. By introducing benchmarking, orgnaizations determine the objectives in accordance with the needs and demands of consumers or costumers. These organizations therefore monitor their own results, as well as accomplishments of other competititors, compare them, and so they percieve their position, strengths and weaknesses in relation to the competition. Also, it becomes obvious where to intervene, whereas new business ideas and solutions to improve their own competitiveness are created as well.

In order to make an organization the best one, it is necessary for it to know itself, its' strengths and weaknesses, to comprehend the way the leading companies conduct their business on the market it wants to gain success, too, and to use the best available procedures, to constantly improve them and never stop upgrading their own business *(Jovanović, B., Kilibarda, M., 2009, pg. 6)*.

**Table 2.** Application of benchmarking process

| | |
|---|---|
| Strategic planning | Defining short nad long term goals |
| Anticipation | Anticipation of upcoming business trends |
| New ideas | Functional learning and thinking |
| Comparison of products and processes | Comparison with competitors or organizations with best practices |
| Defining objectives | Defining business objectives based on the best organization |

*Source:* Modified by Jovanović, B., Kilibarda, M., (2009). Benchmarking analysis of logistics services, Belgrade.

*Haringtoton (1996, pg. 5)* points out that the success of an organization lies in the possession of relevant measuring indicators of business, understanding how well the organization can perform the same activities better, understanding why others work better than it, identifying any differences between it and other organizations and taking quick and operational actions for its' prevalence.

Application of benchmarking contributes to comprehension of critical processes, studies and motivation, learning from other competitors' business, creating business systems, showing organizations how to manage business and adapt to changes, directing towards the demands and needs of consumers and the market itself, a better and more quality decision-making, making organizations become aware of their

strengths and weaknesses, motivating employees to accept and introduce innovations in the enterprise, increase of the economic efficiency and profitability of the business *(Ćorović, B., 2008, pg. 3 ).*

## Types of benchmarking

According to the nature and ways of comparison, there are several basic types of benchmarking in theory: *internal, external competitive, external functional, external generic, combined internal and external benchmarking.* The focus of benchmarking research is the part of the organization that the process of benchmarking is applied to in order to improve it. However, these major focuses are: products, services, methods and business processes. The aim of the comparison is to identify and define the best practices and examples that would be transferred, adjusted and improved in the organization.

*The internal benchmarking* refers to comparison within the organization, among its' units. It also provides an internal business analysis and improvement in accordance to the best unit that is productive, efficient and profitable. Based on the internal benchmarking, it is easy to determine the standards within an organization, according to the best unit, sector or department. When internal benchmarking is applied, all necessary data and low costs are available.

*The external competitive benchmarking* is based on a comparison of activities of the organization with direct competitive organizations due to obtaining all the relevant data on the business of the competitors. This type of benchmarking is used to position a company's own range of products, services and business itself, according to other competitors. The issue of getting reliable data is slowly conducted and it takes means of research to gain an objective insight into the processes and business of the competitors. In this manner, the secondary data is used, as well as data from the environment and the results of marketing research. Along with this, competitive products are bought, and a complex analysis is then being conducted in order to determine the competitor's advantages in the quality of its' products and services.

*The external functional benchmarking* involves the comparison of products, services and business processes with the same activities of the leading organizations worldwide, no matter what kind of business they conduct and whether they belong to the same activity or not. The aim of the comparison is to create and determine an ideal business of extremely high quality. The competition score is based on the quality and availability of products, quality of technical assistance and the support and quality of the marketing staff.

External generic benchmarking includes a variety of activities which, when compared, lead to discovering the similarities among many business processes. Nevertheless, this type of benchmarking stands for a comparison of the total level of various industrial and service activities. In this way, many innovative processes, such as business culture, communication, code of conduct and other similar actions used by numerous efficient

business systems are revealed. This sort of benchmarking is suitable for successful organizations capable of competing with the leading companies worldwide.

*The combined internal and external benchmarking* is used when organizations begin their business with the internal, and finish it by using the external benchmarking. However, this sort of benchmarking, without doubt, provides the best results. Here, many parts of one organization are compared to numerous parts of other organization. It is mainly used for finding the best products, manufacturing processes, along with their use as standards for improvement. Needless to point out, all organizations are free to combine these processes according to their needs and preferences.

*The strategic benchmarking* suggests seeking the successful strategy already created and defined by the leading companies. This type of benchmarking directs the organization towards achieving successful results with the available resources by comparing its' activities with other organizations and their strategies. In addition to this, it is used when it is necessary to align strategies that have become inadequate due to the changes in technology and the consumers' demands, and it should also be applied to processes that are relevant to fruitful operation of the organization.

## Benchmarking process

The benchmarking process can be observed through different phases which are basically steps towards their realization. Benchmarking is a synthesized structured process that requires knowledge of its' own organization's business, partners and participants, competitors, market leaders and the use of the best practice. The fact that is common for all processes is that they are based on planning, collecting information, comparative analysis and application of solutions and innovations that lead to improving business.

The benchmarking process consists of several phases. According to *Thompson (2008)*, benchmarking has four phases: *planning, collecting information, analysis* and *application* (Cvetković, K., Arsić, Lj., 2010, pg. 82).

When it comes to *planning* based on research, it is essential to carry out an analysis of the organization's business in order to define sections for benchmarking to be applied to. Both internal and external analysis is a solid base for evaluation of competitiveness, as well as the organization's advantages and disadvantages. It is crucial to create a working team and make a plan for implementation of certain actions with timelines for each activity. Thus, a selection of the best organizations based on their size, market position and trust that can be treated as benchmark is made.

In the phase that considers *collecting data* on the selected organizations, it is important to conduct a survey and an exchange of information on the products, features and strategies. Also, the research needs to be focused on resolving the issues. When it comes to the exchange of information, it is essential to follow the ethical principles.

As far as the *analysis* of the selected organizations is concerned, all data is being handled together with the creation of a final report, as well as a selection of benchmark partners. Also, marketing research is therefore conducted, along with the quantitative comparison of a company's business with other organizations and the defining of ultimate goals of the research and the level of performance that are to be achieved. This leads to determining the differences or gaps that exist at the beginning of the research.

When we talk about the *application*, the organization performs changes, information and knowledge of the practice, and therefore monitor the goals' achievement. Also, the development of the organization at the beginning and at the end of the process is being illustrated, too.

*Harrington (1996, pg.94),* on the other hand, devides benchmarking into five phases: *planning, analysis, intergation, action* and *maturity*. The *first phase* defines the object of benchmarking, collection of data and the activities that need to be compared. The *second phase* performs the analysis that would determine the gap between its' own organization and the competitors, and establish new standards and trends. The *third phase* of the integration represents the communication that would result in accepting standards, new practices and defining operational goals that need to be changed. Throughout the *fourth phase*, new plans for action, implemenation, promotion and re-establishment due to the dynamic changes are being created. In the maturity stage, the best processes are being strengthened and transferred into business processes, all leading to a creation of new market leaders *(Cvetković, K., Arsić, Lj., 2010, pg. 82)*.

Benchmarking includes innovation and creativity along with the imitation. Hereby, innovations are used to eliminate the existing standards and to promote business activities and strategies. However, external generic benchmarking, which is vital for improvement and application of innovations and significant improvement in business, is going to be used more and more in the future.

*Atkison (1999, pg. 629)*, however, suggests five benchmarking processes, which are: *internal study and comparative analysis, developing the long-term commitment to the benchmark project and splicing with the team, identification of a benchmarking parntner, methods of collecting and sharing information* and *taking actions for competition*.

Due to a better comprehension of benhcmarking processes, some of the synthetic steps towards its' realization according to Harrington are being illustrated.

**Table 3.** The steps in the benchmarking process

| | |
|---|---|
| Planning | -Identification of what needs to be benchmarked<br>-Identification of a company that is to be compared to<br>-Identification of methods for collecting data |
| Analysis | -Identification of gaps in the existing performances<br>-Designing new future performances |
| Integration | -Revealing the benchmarking findings and providing acceptance<br>-Setting up functional goals |
| Action | -Developing plans of action<br>-Implementation of specific actions and monitoring of their improvement<br>-Re-evaluation of benchmarking |
| Maturity | Achieved positions of leadership, practices that are fully integrated into processes |

*Source:* Todorović, J. et all (2000). Strategic Management, Belgrade.

Benchmarking has significant advantages in application compared to conventional methods, given that it is based on the use of experiences and results of the best organizations and defining their own standards that are achieved in successful organizations. Therefore, reasons why some organizations are more successful than others are also determined. The usage of this method helps coming up with the best solutions to contribute to successful business.

According to numerous authors, application of benchmarking leads to: permanent improvement of business processes and the business itself, improving the quality of products and services, achieving competitiveness on the market, increasing creativity, eliminating bad performances, costs savings, better comprehension of competitors, new systems of handling, increasing productivity per operations, identification of objective demands and increasing the satisfaction of consumers, application of solutions of best practices by using the modern technologies, products and superior performances, setting up new business goals and increasing of economic efficiency and profitability.

On the other hand, the disadvantages of benchmarking come out as a result of: miscomprehension of process, objective and the technique of benchmarking application, disrespect of processes and conditions of the environment, collection of relevant information of other organizations, difficulties in identification of the best practice, a complex, expensive and often impossible collecting of information, bad choice of benchmark objects and activities which they are to be applied to, choice of a benchmark organization to be compared to, selection and comparability of certain performances, properly planned time and costs of the research, integrated support to benchmarking from the whole organization. For successful implementation of benchmarking, it is necessary to select a small number or just one single leadership organization suitable for comparison and improvement of business.

## Conclusion

Benchmarking stands for a management method used to explore the best practices procedures of the world's leading organizations and to apply and improve the processes, products and best practices in their own organization in order to increase competitiveness and profitability of the business. Application of benchmarking allows the comparison of their own activities with the activities and best results of other organizations of the same activity, with the leading organizations worldwide, regardless of the activity and the country, with competitors that have products and results of the highest quality, technical solutions and technology in production, as well as the best-defined business process.

Benchmarking is a modern method of comparing their own with the best organization; it also contributes to the implementation of the best practice solutions and new technologies, improvement of business processes and quality of products, increasing efficiency and productivity, creativity, innovation and competitiveness on the market, along with satisfying the needs and demands of costumers and achieving efficiency and profitability in business.

According to the nature and ways of comparison, there are several basic types of benchmarking in theory: internal, external competitive, external functional, external generic, combined internal and external benchmarking. The basic phases of benchmarking are: planning, collecting information, analysis and application. For a successful use of benchmarking and overcoming the weaknesses in its' application, it is essential to choose a small number of organizations or a single leadership organization suitable for comparison and achieving competitiveness and profitability of the business.

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# BENČMARKING U FUNKCIJI KONKURENTNOSTI I EFIKASNOSTI U POSLOVANJU

***Jovan Babović, Vuk Raičević, Marko Carić***[2]

**Rezime**

*Benčmarking je metod poređenja sopstvene s najboljom organizacijom koji doprinosi primeni rešenja najbolje prakse, novih tehnologija, unapređenju poslovnih procesa, poboljšanju kvaliteta proizvoda, uštedi u troškovima, povećanju produktivnosti, kreativnosti, inovativnosti i konkurentnosti na tržištu uz zadovoljenje potreba i želja potrošača i ostvarivanje efikasnosti u poslovanju. Koncept benčmarkinga utiče na stvaranje novih ideja i kreativnih rešenja za poboljšanje postojeće oranizacje, procesa i kvalitetnih konkurentskih proizvoda. On je najednostavniji način primene i postizanja prakse najboljih lidera za maksimizaciju profita u biznisu. Postoji interni, eksterni konkurentski, eksterni funkcionalni, eksterni generički, kombinovani interni i eksterni benčmarking. Radi uspešnog sprovođenja benčmarkinga potrebno je odabrati manji broj ili samo jednu lidersku organizaciju pogodnu za poređenje i postizanje konkurentnosti i profitabilnosti u poslovanju.*

***Ključne reči:*** *benčmarking, metod poređenja, kreativnost, inovativnost, konkurentnost, profit*

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# RESEARCH REGARDING OIL SEEDS CROPS DEVELOPMENT IN ROMANIA IN THE EU CONTEXT

*Agatha Popescu*[1]

## Summary

*The paper aimed to present the dynamics of sunflower, soybean and rape cultivated area, yield and production in Romania in the period 1990-2009 and established the 2012-2015 forecast. In this respect, the statistical data have been processed based on fixed indices and average annual growth rate. Romania is an important oilseeds producer contributing by 8.22% to the EU-27 production. In 2009, Romania oilseeds production counted for 1,764 thou tons of which sunflower seeds 62.24 %, rapeseeds 32.29 % and 5.47 % soy beans. In 2015, it is forecast as oilseeds production to reach 7,850 thou tons, of which 73.84 % sunflower seeds and 25.26 % rapeseeds.*

***Keywords:*** *rape, soybean, sunflower, cultivated area, yield, production, Romania*

**JEL:** *Q10, Q01*

## Introduction

Oil seeds crops have become more and more important worldwide and in Romania too [11, 12].

In 2011, world oil seeds production counted for 264.22 million MT for soybean, 60.50 million MT for rapeseed and 32.93 million MT for sunflower seed being by 20.34%, 24.74% and, respectively 20% higher in comparison with the records in 2008, reflecting a continuous increasing trend of production [2].

In 2009, the EU-27 cultivated area with major oil seeds totalized 10,952 thousand ha, of which: rapeseed 6,498 thou ha (59.33%), sunflower 3,900 thou ha (35.60%) and soybean 304 thou ha (2.77%). All these three crops represented 97.70 % of oil seeds area in the EU-27 [2]. In 2009, the EU-27 registered the top oilseeds production counting for 29,729 thou tons of which: 21,446 thou tons rapeseeds (72.13%), 7,000 thou tons sunflower seeds (23.54%) and 863 thou tons soybeans (2.90%). According

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to the international expert reports, the expectation for the EU-27 oilseeds area is 11.45 mil ha of which 6.73 mil ha rapeseed, 4.24 mil ha sunflower and 0.30 mil ha soybean, because of the high interest to produce more energetic crops for producing bio fuel. Oil seed production is expected to reach 29.4 mil tons in 2012 of which 20.8 mil tons rapeseeds, 7 mil tons sunflower seeds and 1.1 mil tons soybeans [14].

Therefore, rape will remain the most important oils seed crop followed by sunflower and soybean in the EU-27[15].

Sunflower, rape and soybean are the major oilseeds crops in Romania because of their importance for human food, animal feed and industry. Their high fat content (sunflower 50%, rape 34 % and soybean 20%) make them useful for oil and bio fuel industry. Sunflower main products are represented by refined oil used in human consumption and food industry ( margarine, canned products, soap, lecitine, etc.), high protein meals destined to animal feeding, artificial fibers and plastics produced by textile industry, the whole plant utilized in building industry [1, 6]. Soybeans are processed into a large variety of products for human consumption such as: soybean oil flour, milk, tofu, textured vegetable protein (for meat and dairy analogues), soy sauce, fermented bean paste, also soy meal utilized as an excellent cheap source of protein for animals [1]. Rape has become more and more important as source of bio diesel and green fertilizer with an essential role in environment protection [3, 16].

Sunflower and rape are considered low input crops and also low production cost crops a reason to stimulate farmers to cultivate them on larger surfaces but without forgetting of the limits imposed by crop rotation [8].

Romania has a long tradition in vegetable oil production, sunflower keeping the 1st position with 66% of cultivated area, being followed by rape and soybean, linseed etc [3].

Romania's foreign trade with vegetable oils and fats has been developing rapidly during the last 10 years and mainly after the country entry into the EU. In 2007, Romania's export with vegetable oils and fats counted for Euro million 55 being by 10% higher compared to 2006. Also, Romania's import reached Euro mil 108, being 5.4 times higher than in 2006 [8].

In this context, the purpose of this paper was to analyze the dynamics of oilseed cultivated area, yield and production during the period 1990-2009 in order to identify the main trends and prospects for sunflower, rape and soybean development in Romania. Finally, a forecast for the period 2012-2015 was estimated based on average growth rate of the cultivated area and yield in the studied period [10].

## Material and Method

The main indicators used in this analysis have been: cultivated area, yield, production, producer's price and price indices. The data regarding the period 1990-2009 have been provided by National Institute for Statistics and have been processed using the usual statistical methods such as: fixed basis index, average and average annual growth rate, as presented in the formulas given below [7, 10].

***Fixed Basis Index ( FBI)***: $FBI = \frac{X_n}{X_0}$ x 100 ,

***Average (A)***: $A = \frac{X_1 + X_2 + ...X_n}{n}$

***Average annual growth rate (R)***: $R = \left( \sqrt[N-1]{\frac{X_n}{X_0}} - 1 \right)$ x 100

## Results and Discussions

***Oil seeds cultivated area*** has continuously increased in the analyzed period from 654.7 thousand ha in 1990 to 1,253.8 thou ha in 2009 compared to total cultivated area which has declined by 16.15%. In 2009, Romania's oilseeds cultivated area represented 11.44% of the EU-27 cultivated area with oilseeds crops.

In the same year, sunflower cultivated area reached 766.1 thousand ha, being by 94.09% higher than in 1990. Rape cultivated area registered the most spectacular increase being placed on the 2nd position with 419.9 thou ha. In 2009, rape cultivated land was 32.05 times higher than in 1990.

Soybean cultivated area has varied from a period to another but generally it has continuously decreased from 190.2 thou ha in 1990 to 48.8 thou ha in 2009. This happened due to the EU decision to forbidden cultivating of Roundup Ready cultivar [8].

In 2009, the weight of sunflower, rape and soybean in oilseeds cultivated area represented 98.48% in comparison with 91.33% in 1990 (Table 1).

**Table 1.** Oils seeds cultivated area structure, 1990-2009 (thousand ha*)*

| | 1990 | 1995 | 2000 | 2005 | 2009 | 2009/1990 % |
|---|---|---|---|---|---|---|
| Oilseeds cultivated area - total | 654.7 | 806.8 | 1,067.4 | 1,205.5 | 1,253.8 | 191.50 |
| Sunflower | 394.7 | 714.5 | 876.8 | 971.0 | 766.1 | 194.09 |
| Rape | 13.1 | 0.5 | 68.4 | 87.8 | 419.9 | 3,205.34 |
| Soybean | 190.2 | 73.4 | 117.0 | 143.1 | 48.8 | 25.65 |

*Source:* National Institute for Statistics. Own calculations

In 2009, the cultivated area with sunflower, rape and soybean totalized 1,234.8 thou ha representing 15.65% of Romania's cultivated area compared to 6.96% in 1990 (Table 2).

**Table 2.** Share of oilseeds crops in Romania's cultivated area (%)

| | 1990 | 1995 | 2000 | 2005 | 2009 |
|---|---|---|---|---|---|
| **Cultivated area ( ha)** | 9,402.1 | 9,224.6 | 8,499.8 | 8,467.9 | 7,884.1 |
| **Sunflower** | 4.29 | 7.74 | 10.31 | 11.46 | 9.71 |
| **Rape** | 2.02 | 0.79 | 1.37 | 1.69 | 0.62 |
| **Soybean** | 0.13 | 0.005 | 0.80 | 1.03 | 5.32 |

*Source:* National Institute for Statistics. Own calculations

Rape has become a more and more attractive crop for farmers due to the EU subsidy (Euro 45/ha) provided since 2005 for encouraging bio fuel production [8].

Sunflower cultivated surface has continuously increased because to the importance of its seeds for oil production in a country where sunflower oil is still in the top position in human consumption.

***Oilseed yield*** has substantially increased, despite that it is still low compared to the one recorded in other EU countries [8].

Sunflower yield registered the lowest gain, only 1.70% reflecting a relatively constant performance per surface unit. However, sunflower yield was directly influenced by climate conditions. The climate change has resulted in different yield levels. The most serious droughts have been noticed in the years 2000 and 2007 when sunflower production per hectare was the lowest one [8].

Soybean yield has achieved the highest gain in the analyzed period. In 2009, 1,726 kg soybeans have been harvested per hectare, meaning 2.32 times more than in 1990. Soybean yield also achieved a large variation from 0.6 tons/ha in the dried years to 2.4 tons in the years with normal climate conditions. In 2007, the driest year, soybean yield was the smallest one.

Rape yield has increased by 63.29% from 831 kg/ha in 1990 to 1,357 kg/ha in 2009.

***Oilseeds production*** has been 2.38 higher in 2009 compared to 1990, mainly because of the positive impact of the increased yield. In 2009, it reached 1,764 thou tons in comparison with 739.3 thou tons in 1990. Romania's production registered in 2009 represented 8.22% of the EU-27 oil seeds production (Table 3).

**Table 3.** Yield by oilseed crop, 1991-2009 (kg/ha)

| | 1990 | 1995 | 2000 | 2005 | 2009 | 2009/1990 % |
|---|---|---|---|---|---|---|
| **Sunflower** | 1,409 | 1,304 | 821 | 1,381 | 1,433 | 101.70 |
| **Rape** | 831 | 1,178 | 1,113 | 1,681 | 1,357 | 163.29 |
| **Soybean** | 742 | 1,470 | 594 | 2,186 | 1,726 | 232.61 |

*Source:* National Institute for Statistics. Own calculations

Sunflower production has increased from 556.2 thou tons in 1990 to 1,098 thou tons in 2009, meaning 97.41% production gains in the analyzed period. The increased sunflower production was imposed by the demand of oil industry able to process 70 % of domestic seeds. This situation has been encouraged by the EU higher and higher needs for fats and oils of vegetable origin. For these reason, farmers have been stimulated to produce more sunflower seeds. They are aware as sunflower is a low input and cost crop as long as it requires a small amount of seeds and fertilizer per surface unit [1].

Romania is situated among the top sunflower producers in Europe contributing by 23% to the EU-27 sunflower production [13]. It comes on the 1st position in the EU-27, being followed by France (21%), Bulgaria (18%) and Hungary (17%). These 4 producers cover 79% of the EU-27 production [8].

Rape production has recorded a continuous increasing trend in the analyzed period. In comparison with 10.9 thou tons carried out in 1990, in 2009, Romania achieved 52.25 times more, i.e. 569.6 thou tons rapeseeds. Rape seeds production has started increasing since 2007 at the moment when the EU decided to expand energetic crops for bio fuel. Therefore, production performance has been determined both by the increased cultivated surface as well as by the increased yield (Table 4).

**Table 4.** Oilseeds Production, Romania, 1990-2009 (thousand tons)

| | 1990 | 1995 | 2000 | 2005 | 2009 | 2009/1990 % |
|---|---|---|---|---|---|---|
| **Sunflower** | 556.2 | 932.9 | 720.9 | 1,340.9 | 1,098 | 197.41 |
| **Rape** | 10.9 | 0.4 | 76.1 | 147.6 | 569.6 | 5,225.68 |
| **Soybean** | 141.2 | 107.9 | 69.5 | 312.8 | 84.3 | 59.7 |
| **Total** | 739.3 | 1,055.4 | 868.5 | 1,803.1 | 1,764 | 238.60 |

*Source:* National Institute for Statistics. Own calculations

Despite that rape seed crop does not need irrigation, it could perform high production under normal climate conditions. In the dried year, the lack of water may have a negative impact on its production. Romania's contribution to the EU-27 rapeseed production is very small representing just 1% [4, 5].

Soybean production has registered a continuous decline imposed by the EU interdiction to cultivate genetically modified cultivars. The measure is not justified as long as the EU purchases soybean protein from other countries in order to balance the diminished internal production and this aspect has also a negative impact on food safety [8]. For this reason, in 2009, Romania produced 84.3 thousand tons soybeans by 40% less than in 1990.

***Producer's oilseeds price*** has varied from a year to another but in general registered an increasing trend in the period 2001-2009. In 2009, sunflower price reached Euro 0.23/kg (Euro 1= Lei 3.73) being by 82.97% higher than in 2001. In the same year, one kilogram of soybeans was sold for Euro 25, a price by 65.51% higher than in the first year of reference (Table 5).

***Oil seeds price indices*** presented in Table 6 reflect a large variation from a year to another but mainly a continuous increase starting from the year 2007. The increased price is justified by demand/offer ratio and by the increased demand of oilseeds in the internal and external markets.

**Table 5.** Oilseeds Producer's price, 2001-2009 (Lei/kg)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| **Sunflower** | 0.47 | 0.66 | 0.60 | 0.77 | 0.72 | 0.70 | 0.84 | 1.12 | 0.86 |
| **Soybean** | 0.58 | 0.71 | 0.71 | 0.79 | 0.63 | 0.57 | 0.78 | 0.97 | 0.96 |

Source: National Institute for Statistics. Own calculations. No statistical data for rape seeds price

**Table 6.** Oils seeds Price indices (%) 2000=100, 2005=100

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|
| **Sunflower** | 218.1 | 202.7 | 99.2 | 118.3 | 157.3 | 118.2 |
| **Soybean** | 214.9 | 167.1 | 94.8 | 124.0 | 181.5 | 148.5 |

*Source:* National Institute for Statistics. Own calculations. No statistical data for rape seeds price

***Supply Balance*** has pointed out the resources and uses, showing the increased production and decreased import, as well as the increasing export and domestic use (Table 7).

**Table 7.** Sunflower, Soybean and Rape Supply Balance (thousand tons)

| | 2000/2001 | | | 2005/2006 | | |
|---|---|---|---|---|---|---|
| | **Sunflower** | **Soybean** | **Rape** | **Sunflower** | **Soybean** | **Rape** |
| **RESOURCES** | 778.7 | 126.5 | 76.0 | 1,377.3 | 323.0 | 149.3 |
| **-Production** | 720.9 | 69.5 | 76.0 | 1,340.9 | 312.8 | 147.6 |
| **-Import** | 57.8 | 57.0 | - | 36.4 | 10.2 | 1.7 |
| **USES** | 778.7 | 126.5 | 76.0 | 1,377.3 | 323.0 | 149.3 |
| **-Export** | 34.6 | 8.1 | 73.8 | 260.8 | 49.8 | 130.0 |
| **-Stock variation** | -4 | - | - | -94.7 | 17.0 | - |
| ***-Initial stock*** | 4 | - | - | 672.4 | 30.0 | - |
| ***-Final stock*** | - | - | - | 577.7 | 47.0 | - |
| **-Domestic use** | 748.1 | 118.4 | 2.2 | 1,211.2 | 256.2 | 19.3 |
| ***-Seeds*** | 9.8 | 6.1 | - | 4.8 | 10.0 | 0.7 |
| ***-Forages*** | 2.0 | 6.4 | - | 1917 | 14.0 | - |
| ***-Losses*** | 4.2 | 1.4 | - | 20.0 | 0.2 | 0.3 |
| ***-Industrial processing*** | - | - | - | - | - | 18.3 |
| ***-Transformation*** | 732.1 | 104.5 | 2.2 | 933.0 | 225.3 | - |
| ***-Human consumption*** | - | - | - | 61.7 | 6.7 | - |

*Source:* National Institute for Statistics: Reference period I-VII (previous year) – 30 VI (current year)

***Oilseeds trade.*** In the international market, Romania is recognized as a net exporter of oilseeds, oils and meals especially of sunflower origin. Sunflower export has continuously increased, exceeding import and resulting a positive trade balance. Because of the increased rape seeds in the EU market, Romania's rape seeds export has deeply developed. In the period 2001-2007, it increased by 70 %. The EU regulations regarding the mixture of essence with 2 % ethanol will stimulate Romania's export opportunities. In 2020, it is estimated as bio fuels to represent 10 % of all fuel consumed in the EU. Unfortunately, for farmers the subsidy for encouraging energetic crop was available only till 2010 [8].

***Forecast for Oilseeds cultivated area, yield and production, 2012-2015*** has been determined based on the achievements in 2009 and annual growth rate calculated for the period 1990-2001 whose values have been the following ones: (a*) for cultivating area*: 3.50% for sunflower, -7.10 % for soybean and 20 % for rape; (b) *for yield:* 27.50% for sunflower, 4.50% for soybean and 2.60% for rape.

In 2015, it is expected as oilseeds cultivated area to reach 2,226.8 thousand ha, of which: 941.7 thou ha sunflower (42.28 %), 31.4 thou ha soybean (1.41%) and 1,253.7 thou ha rape (56.31%). Also, in the same year, it is expected as production per surface unit to reach: 6,156 kg sunflower seeds, 2,247 kg soybeans and 1,582 rape seeds.

In consequence, in 2015, oilseeds production will account for 7,850.9 thou tons, of which 73.83% sunflower seeds, 25.28% rape seeds and 0.89% soybeans (Table 8).

**Table 8.** Forecast for Oilseeds cultivated area, yield and production, 2012-2015

| | Achieved 2009 | Annual average growth rate (%) | Forecast | | | |
|---|---|---|---|---|---|---|
| | | | 2012 | 2013 | 2014 | 2015 |
| **Cultivated area (thou ha)** | | | | | | |
| ***Sunflower*** | 766.1 | 3.50 | 849.3 | 879.1 | 909.5 | 941.7 |
| ***Soybean*** | 48.8 | -7.10 | 39.1 | 36.3 | 33.7 | 31.4 |
| ***Rape*** | 419.9 | 20.00 | 725.5 | 870.6 | 1,044 | 1,253.7 |
| **Yield (kg/ha)** | | | | | | |
| ***Sunflower*** | 1,433 | 27.50 | 2,970 | 3,786 | 4,828 | 6,156 |
| ***Soybean*** | 1,726 | 4.50 | 1,969 | 2,058 | 2,150 | 2,247 |
| ***Rape*** | 1,357 | 2.60 | 1,465 | 1,503 | 1,542 | 1,582 |
| **Production ( thousand tons)** | | | | | | |
| ***Sunflower*** | - | - | 2,522.7 | 3,328.2 | 4,391 | 5,797.1 |
| ***Soybean*** | - | - | 76.9 | 74.7 | 72.4 | 70.5 |
| ***Rape*** | - | - | 1,062.8 | 1,308.5 | 1,611 | 1,983.3 |

*Source:* Own calculations

## Conclusions

Romania oilseeds surface is expected to reach 2,226.8 thousand ha in 2015, being by 70.60% higher than in 2009. Important changes will take place in crop structure: rape will pass on the 1st position and its share in cultivated area will be 56.30% and sunflower will pass on the 2nd place with 42.28%.

Oilseeds production is expected to attain 7,850.9 thou tons in 2015. Sunflower seeds will remain on the 1st position contributing by 73.83% to oilseeds production and rape will come the 2nd contributing by 25.26%.

As a conclusion, in the coming years Romania will continue to become a more and more important oilseeds producer and exporter in the EU-27.

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# THE CONSUMPTION OF MINERAL FERTILIZERS AND WATER RESOURCES' QUALITY IN THE EUROPEAN UNION AND THE REPUBLIC OF SERBIA[1]

***Svetlana Roljević[2], Aleksandra Nikolić[3], Rajko Tepavac[4]***

**Summary**

*Its goal is to point out to a significance of tracking the nitrate emission in agricultural production, by which makes bases for undertaking adequate measures of water protection and other natural resources from agriculture effect. This paper is focused on analysis of mineral, i.e. nitrogen fertilizers consumption, and their effect on the environment, i.e. surface waters. Data from the relevant institutions in the EU on consumption of mineral fertilizers and loading of waters by nitrates, which origin from agricultural production, were collected by desk research method. Data on consumption of mineral fertilizers in the Republic of Serbia for the period 1985-2001. year are taken from official statistics for selected years, while the display of water quality data is given for research by local authors. As a general conclusion imposes a fact that in our country have been spent significantly less amounts of mineral fertilizers in relation to the community of 27 countries, but there is still a profound adverse impact on the environment owing to inadequate laws implementation and lack of infrastructure in the field of ecology.*

***Key words:*** *Agriculture, water resources, mineral fertilizers, nitrates.*

**JEL:** *Q25, Q53*

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## Introduction

According to FAO data, total resources of fresh water in the world are estimated at approximately 43,764 km$^3$/per annum and are arranged in accordance with the climatic and physical-geographical conditions (FAO, 2003). Systematized data show that around the world consumes about 50% of available drinking water, and it was estimated that the consumption might reach even 80% of capacity, in next two decades. Globally, agriculture is the largest consumer of water. The need for a rational approach to the consumption of potable water on a global level is more and more pronounced because the water is considered as a strategic resource of the XXI century.

Agriculture is the main, but not the only, nitrates polluter of water. Of the total amount of nitrogen burdening water systems on Earth during last 30 years, arable land is releasing even 50-80%. As the nitrogen compounds are very mobile, the entire surplus that the plants do not adopt, is flushed to the water's surface, or gone into the deeper layers of soil thus reaching the groundwater. Basic indicators of increased concentrations of nitrogen compounds in the environment are acidic soil reaction (which affects the composition and abundance of species in the ecosystem), raising the level of nitrate in freshwater systems and their eutrophication. As a result of large amounts of nutrients (nitrogen and phosphorus) in water, algal blooms reducing water transparency are emerging. As well as reducing the transparency of water, algae secrete substances toxic to fish and people, and for their decomposition microbes consume large amounts of oxygen, leaving a dramatic impact on living things in the water and the ecosystem as a whole.

## Mineral fertilizer consumption in the European Union and unfavorable effects on the environment

Intensive exploitation of existing agricultural land and "repairing" of soil fertility in today's conventional agricultural practice is inconceivable without the use of mineral fertilizers, integrated into the very notion of agricultural production and, thus, becoming an integral part of production and food supply chain.

Of the EU 27 (432,525,000 ha) total territory, 38% is covered with agricultural land (Eurostat database)[5]. The European Union countries, particularly those economically developed, are consuming large amounts of mineral fertilizers. For this reason, agricultural production in the European Union is regulated by a number of laws and directives which lay down the rules of plant and livestock production, in order to protect the environment, manage natural resources in a sustainable manner and produce sufficient quantities of food.

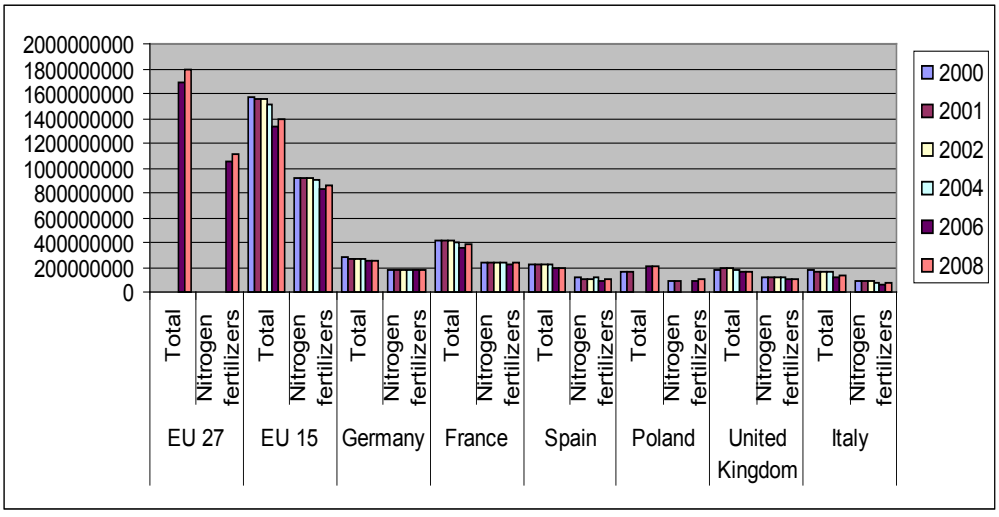
According to Eurostat data which shows a graph, the total amount of fertilizer consumed at the level of EU 27 in 2008 amounted to 17,897,623.29 tons of active ingredient, which is 965,073.04 tons more than in 2006 year. However, realized consumption in 2008 was approximately 5 million tones lower than the one in 1985, when countries in Western

5 Agricultural statistics, 2008-2009, pp. 98.

Europe consumed about 22 million tons of artificial fertilizers. Nowadays (2009), members of EU-27 spend an average 74 kg per ha of agricultural land, where average consumption is 59 kg nitrogen per ha, phosphorus 6 kg per ha, 11 kg potassium per ha[6].

The largest consumers of artificial fertilizer among the 27 EU members are France, Germany, Spain, United Kingdom, Italy and Poland. Figure 1 shows a slight decline in total consumption of fertilizers in the period from 2000-2008 in all countries, and at the level of EU 15, too. Contrary to this fact, the community of 27 European countries recorded a growth in consumption of fertilizers between the 2006 and 2008, because the restrictions on the consumption of fertilizers, which are valid in economically strong countries of the European Union, do not apply in developing countries. Agricultural households in developing countries do not have enough funds to purchase the optimal amount of crops fertilizer, and therefore achieve less pressure on the environment, and in these conditions, limits concerning the use of fertilizers give superb performance without application.

**Chart 1.** Total consumption of mineral fertilizers and nitrogen share in total consumption of fertilizers in some of the 27 EU member states in the period 2000-2008.




*The source:* Eurostat database

Major problem in environmental policy of economically developed countries is consumption of nitrogen fertilizers, which in total consumption of mineral fertilizers account for more than 50%. So, at the EU-27 level nitrogen fertilizers covers 62% of the total mineral fertilizers consumption, while in Germany the participation of nitrogen in the total consumption of mineral fertilizers, is 70%. At the level of EU 15 member-countries, during the period of 2000-2008, there has been a stable consumption of nitrogen fertilizer, from about 9 million tons, while consumption in EU-27 level increased by about 6%

6 http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Fertiliser_consumption_and_nutrient_balance_statistics

In addition to fertilizer, an important source of nitrate is intensive livestock production. Intensive livestock breeding requires the use of stable higher capacity and more intensive crop production, which released large amounts of fertilizers into the environment thus undermining the stability of ecosystems. According to the European Commission report on implementation of Nitrates Directive for the period 2004-2007, the amount of nitrogen originating from livestock breeding, concerning the agricultural area is about 9.3 million tons per year in EU 27 and 7.7 million tons per year in the EU 15[7]. In Belgium and the Netherlands, as well as some parts of Italy, France, Spain and Portugal over 170 kg of nitrogen originating from manure per hectare of arable land is spent. Between 120 and 170 kg N per ha is spent in Denmark, UK, as in several districts in Ireland and northern parts of Germany.

How much the above mentioned nitrates emission trends in agriculture affected water quality it is shown in Table 1, where the results of two consecutive reports are shown, presenting the surface water condition for the period from 2000-2003 and from 2004-2007 in the EU15 countries.

**Table 1.** Nitrates concentration in surface freshwater in the EU15 countries[8]

| Period | 2000 – 2003 | | | |
|---|---|---|---|---|
| Nitrates concentration | ‹ 2 mg $NO_3$/l | 2-10 $NO_3$/l | 40-50 $NO_3$/l | › 50 $NO_3$/l |
| Gaging stations share | 19 % | 53 % | 4 % | 2,5 % |
| Total number of gaging stations | 22.000 | | | |
| Period | 2004. – 2007. year | | | |
| Period | ‹ 2 mg $NO_3$/l | 2-10 $NO_3$/l | 40-50 $NO_3$/l | › 50 $NO_3$/l |
| Nitrates concentration | 24 % | 30 % | 4 % | 4 % |
| Gaging stations share | 22.000 | | | |

*Source:* "Report from the Commission to the Council and the European Parlament On implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources for the period 2000-2003" and "Report from the Commission to the Council and the European Parlament On implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources for the period 2004-2007"

The data in Table 1 point out that water quality of surface water flows which had less than 10 mg/l was improved between the two observed periods, but, on the other side, the share of measuring spots, in which concentration was above 50 mg $NO_3$/l, was increased. According to the reports from the period from 2004-2007, France

7 Report from the Commission to the Council and the European Parliament on implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources for the period 2004-2007, pp. 3

8 Note: Monitoring stations in Great Britain represent 30% of the total number of gaging stations in the EU15, where water samples with nitrates concentration above 25 mg/l are most frequent. Because of such uneven disposition of gaging stations on the territory of EU15, final report showing surface water quality is not actually realistic.

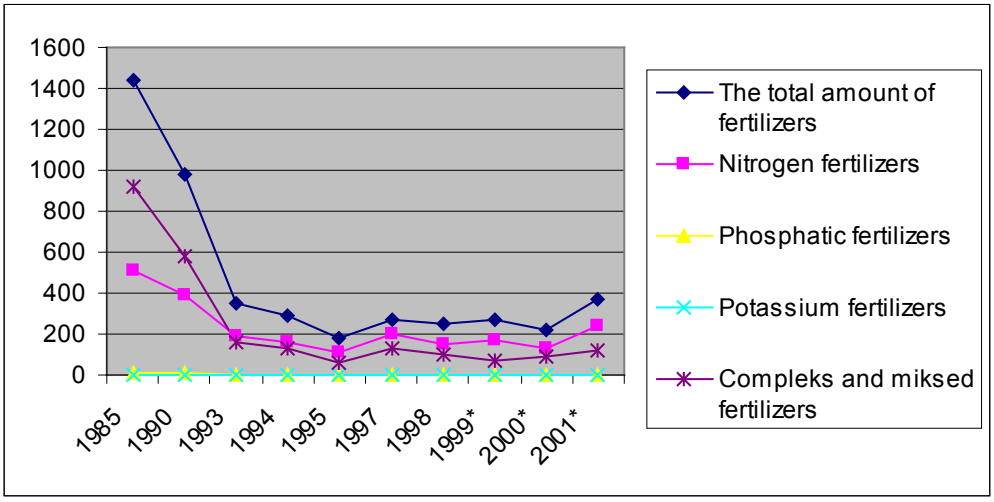
achieved significant positive results with gaging stations which recorded largest share of improvement in surface water quality, whereas in Greece and Luxembourg gaging stations recorded largest share of reduction in surface water quality.

As the main indicator of the environment condition in a community of 27 countries, European Agency for Environmental Protection is using the *gross nitrogen balance*, which refers to the excess nitrogen in agricultural areas. The gross nitrogen balance represents the difference between nitrogen ingested (mineral fertilizers, manure, atmospheric nitrogen, nitrogen adopted by the legumes) and adduced amount of nitrogen (nitrogen that adopt crops) per hectare of used area. According to European environmental standards, the gross nitrogen balance for the EU 15 in 2000 was 55 kg/ha, representing 16% less than in 1990. Surplus in gross income of nitrogen was reduced in all members of EU 15, except in Ireland and Spain. The largest national surpluses of nitrogen are in the Netherlands and Belgium and slightly lower in Spain, Italy and the UK

## Consumption of mineral fertilizers in the Republic of Serbia

All up to 2001, the consumption of mineral fertilizers in the Republic of Serbia has been sistematically tracked by the Republic Statistical Office, which has given a good ground also for evaluation of primary agricultural production influence on the environment. After 2001, the consumtion has not being followed, but only the production of mineral fertilizers within the industrial production of chemicals and chemical products. According to data provided by the Statistical Office ran until 2001. consumption of mineral fertilizers in Serbia is characterized by a declining trend, particularly after the 1992. With 1.44 million tons (1985) consumption is reduced to approximately 220,000 tons (2000), showing the tendency to gradually increase, to 300,000 tons (2003). After 1992, oscillating of all types of mineral fertilizers consumption are noticed, as a consequence of the state's economic weakening and its productive potentials, as well as insufficient economic power of households to apply optimal amount of nutrients in crops. The largest share in total consumption during this period had nitrogen and mixed fertilizers, while their dominance changed from year to year (Figure 2). The average consumption of nitrogen fertilizers in the period 1985-1992 at the Republic of Serbia level, was amounted around 230 thousand tons annually, while in the period 1992-2001 that amount had decreased on 60 thousand tons of nitrogen fertilizers for totally arable land (5,058,000 ha). Over time, the threat to the environment and eutrophication of aquatic systems were reduced. According to the 2009 State Report of Environment in. the territory of Vojvodina has been identified as the most polluted area of the Republic of Serbia, because 25% of the analyzed soil samples showed high content of phosphorus, while 56% of the analyzed territory believed to be still in the process of acidification. These results were expected since the Vojvodina region has the biggest agricultural production in Serbia, and therefore in the soil a large amounts of residues mineral fertilizer and pesticides are presented.

**Chart 2:** Consumption of mineral fertilizers in the Republic of Serbia in the period 1985-2001, in thousands tons




*The source*: Statistical Office of the Republic Serbia
Note: In 1999, 2000 and 2001, data for Kosovo and Metohija are missing

The data on consumption, which dispose within last decade, derive from export-import balance of mineral fertilizers in our country, which furthermore lead to data on mineral fertilizers consumption in the Republic of Serbia about 36 kg of active matter per a hectare of arable land (data from 2002), i.e. about 25 kg of nitrogen per a hectare of arable land (total arable land 5,058,000 ha). Such amounts of mineral fertilizers are minor in regard to fertilizers use in the EU, which means that the consequences for the environment are more delicate, but still miss better monitoring of these matters appliance on natural environment in Serbia.

Great potential in food production and environment protecting is to increase the efficiency of mineral fertilizers. Specifically, the average efficiency of applied nitrogen fertilizers is approximately 30-50%, which means that there is considerable scope for increasing efficiency and reducing loss of nitrogen, while the efficiency of phosphorus fertilizers is even lower, representing approximately 20 percent.

## Balance quality of surface waters in the Republic of Serbia

Since 2010, the legal status of waters, integrated water management, water facilities and water land, resources and financing of water services, as well as other issues relevant to water management in the Republic of Serbia are defined by the Law on Waters (Official Gazette RS, No. 14/2010). Surface water quality is regularly monitored by the competent authorities of the Republic Hydro-meteorological Service of Serbia (RHSS) according to the program on an annual basis by the Government of Serbia. Network Monitoring Station includes 159 profiles of 84 watercourses.

According to Veljkovic and Jovicic research (2009), in 2007 the water area of Morava was the most loaded by nitrates with concentration of 1.78 mg/l ($NO_3$-N), than follows the water area of Sava 1.13 mg/l ($NO_3$-N) and according to our legislature the concentrations of nitrates are in limits, regulated for I and II class of water quality.

Regarding the burden of lakes and reservoirs by nitrates and phosphates in Serbia, based on analysis of samples collected in 2005-2009 period terms by the Bureau of hydro meteorology, one can say that the quality of water in reservoirs in 2009 has been improved since participation of indicators classified as "very good" increased and indicators as "bad" decreased compared to previous year. Contrary to improving the quality of surface water reservoirs, it was noticed in 2009 a weaker groundwater quality compared to 2005. because the concentration of nitrate increased, but is still below the maximum allowable concentration of (50 mg/l), which is prescribed in the Regulations on the hygienic quality of drinking water (Official Gazette, SRY no. 42/98).

## Conclusion

In accordance to mentioned data on consumption of mineral fertilizers can be concluded that the consequences which agricultural production in our country leaves on the environment, primarily water and soil, is significantly smoother than the one the agricultural production leaves in economically developed countries of the EU, on what point out also concrete measurements mentioned in this paper. Although, the state of waters in Serbia is not satisfactory, the research on nitrate content in main watercourses in our country, from 2007, has shown that the most loaded are water areas of Morava, Sava and Danube. There is no institutional or legal framework, which would provide tracking nitrates and other nitrogen compounds emission, which derive from agricultural production, as well as their effect on waters, soil and air. In regard to the significance which agriculture has in the local economy, such researches should be a guideline of further agriculture development in our country.

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## POTROŠNJA MINERALNIH ĐUBRIVA I KVALITET VODNIH RESURSA U EVROPSKOJ UNIJI I REPUBLICI SRBIJI

***Svetlana Roljević[9], Aleksandra Nikolić[10], Rajko Tepavac[11]***

### Rezime

*Cilj rada je da ukaže na značaj praćenja emisije nitrata iz poljoprivredne proizvodnje čime se stvaraju osnove za preduzimanje adekvatnih mera zaštite voda i drugih prirodnih resursa od uticaja poljoprivrede. Težište rada čini analiza potrošnje mineralnih, tačnije azotnih đubriva i njihov efekat na okruženje, odnosno površinske vode. Desk metodom istraživanja prikupljeni su podaci relevantnih institucija u Evropskoj uniji o potrošnji mineralnih đubriva i opterećnosti voda nitratima poreklom iz poljoprivredne proizvodnje. Podaci o potrošnji mineralnih đubriva u Republici Srbiji za period 1985-2001. godine uzeti su iz godišnjaka zvanične statistike za odabrane godine, dok su za prikaz kvaliteta voda dati podaci istraživanja domaćih autora. Kao opšti zaključak nameće se činjenica da se u našoj zemlji troše značajno manje količine mineralnih đubriva u odnosu na zajednicu 27 zemalja, ali da je ipak prisutan dubok nepovoljni uticaj na životnu sredinu zbog neadekvatnog sprvođenja zakona i nedostatka infrastrukture u oblasti ekologije.*

***Ključne reči**: poljoprivreda, vodni resursi, mineralna đubriva, nitrati.*

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# STATISTICAL FARM REGISTER IN THE EU ACCEDING COUNTRIES - A CONCEPTUAL APPROACH

***Crina Turtoi[1], Oguzhan Akyildirim[2], Plamen Petkov[3]***

**Summary**

*This paper is primarily dealing with the methodological concerns needed to be taken into consideration for the elaboration of the Statistical Farm Register. Core objectives of the Statistical Farm Register are identified and considerations with regard to the place of the Statistical Farm Register in the frame of the General System of Registers are presented. Basic terminology of the registers is spotted and methodological differences between the Statistical Farm Register and Administrative Farm Register were delineated. A general model of the Statistical Farm Register was elaborated and main updating principles were emphasised.*

***Key words****: Statistical farm register, agricultural husbandries.*

**JEL:** *C10, C44, Q10*

## 1. Introduction

Currently, accession negotiations are under way with several states. The process of enlargement is sometimes referred to a European Integration. One of the basic topics on the road to EU accession is the gradual harmonisation with the standard requirements in the field of agricultural statistics. In order to produce harmonised and comparable statistics, one of the core recommendations of Eurostat is to define and set-up a *Statistical Farm Register* (SFR). The SFR is a key element for the Agricultural Statistical System, being generally recognized that a good and up-to-date register is the basis for setting-up a coherent system of sample based agricultural statistics.

The main objectives of the SFR are:

- To maintain high-quality sampling frames for current statistical surveys conducted in agriculture;

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- To update the census data in between two censuses;
- To ensure a more efficient use of existing administrative data;
- To build in the longer term a more integrated and harmonised EU system of agricultural statistics.

Designing a *register for statistical purposes* is the core task for a *sample based system of statistical surveys*. For carrying out a sample survey the first step is to determine the population and the parameters to be estimated. This in turn determines the character of the survey with regard to sample design and estimation. Thus the definitions of the population and parameters are determining the way of the data collection. As a rule one survey at a time is to be considered, with a limited number of parameters.

From available registers it is to be done a selection of objects and variables that are relevant to the issue addressed by the statistical survey. In some cases, on the basis of available registers, new variables - and possibly new objects as well - can be derived. Thus, the data are at hand first, and then they must be adjusted by register-statistical methodological work in order to be used when producing relevant statistics.

By its core objective of serving as reliable sampling frame, setting up of the SFR answers to the following immediate objectives of the acceding countries:

- To ensure the necessary backup for the data collected during the Agricultural Census (round 2010) as a standpoint for substantiation a more complete and coherent range of statistical agricultural surveys, based on EU norms and standards (improvement of the methods and practices);
- To compile data related to the national agriculture comparable with those internationally applied, particularly by EU Member States agricultural statistics;
- To monitor the integration of the national agricultural statistics into the European statistical system through capitalization of an extensive and qualitative stock of harmonized data needed for negotiation process during accession, as well as for satisfying the needs of national users of agricultural statistical data;
- To provide timely and reliable agricultural statistics needed in the enlargement process.

Under the study there were identified the potentially useful administrative registers, their data availability and the possibility to set up linkages with the SFR.

## 2. Research Methodology

When constructing the SFR it had to be taken into account the possibilities of connection with other related registers by relevant linkage variables (usually the unique organisation or personal identification numbers). Usually other related registers are constructed on the basis of information about farmers or farm enterprises applying for subsidies (Farm Register), animal health (Bovine register), land owners (Cadastre), branch of activity (Business Register) etc. Accordingly, the methodological work

is very important when defining the new object "agricultural holding", which may encounter different definitions and coverage, according to the objectives of each of the registers mentioned above, that might not be the same with the ones covered by SFR. This work also may include surveys among farmers/owners who cannot be identified as belonging to a certain farm, or farmers/owners for whom is not possible to decide whether they are working together on the same farm or not. It is also very important to follow up what has happened from one year to another to obtain complete coverage of the population in the SFR.

Another important feature is to decide which time (day, month or year) the information is to bear reference to. For structure variables the information should bear reference to some certain day(s) while the information on payments on aid and premiums should bear reference to a whole year. Usually the information in the subsidy registers is up to date. On the other hand the information in the registers for specialized farms may be too old, why it is important to collect new information for the objects in these registers.

For acquiring comprehensive and topical information on the situation of statistical farm registers in the EU countries and for properly address the further development of the SFR there was scrutinized the available documentation, with regard to:

- Goals of the SFR,
- Content of registers,
- Links with other registers,
- Objectives of the SFR,
- Main challenges.

Also there were identified and analysed the potential steps needed to be approached for setting up a reliable and accurate SFR:

- Which are be the main sources that can be used in SFR updating process,
- How data coming from other sources can be used for updating SFR,
- The significance of potential risks,
- Integration criteria for updating process.

Agricultural policy changes from time to time. The register system for agricultural statistics needs to be "self-sustaining" and independent, with use of information coming from other registers, but with control over the variables not found in these registers.

### 2.1 Statistical registers - basic terminology

***The concept of agricultural holding***

- The Commission Regulation (EC) No 1444/2002 regarding the surveys on the structure of agricultural holdings defines agricultural holding as: *A single unit both technically and economically, which has single management and which produces agricultural products. The holding may also provide other supplementary (non-agricultural) products and services.* The "Holder of the

farm" is a person(s) who has (have) the legal and economical responsibility for the operations. That means under a single management.

- The Proposal for a Regulation (EC) No. 1166/2008 of the European Parliament and of the Council on farm structure surveys and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88 defines an agricultural holding as: *Agricultural holding means a single unit, both technically and economically, which has a single management and which undertakes agricultural activities within the economic territory of the European Union, either as its primary or secondary activity.*
- The draft proposal for a Regulation of the European Parliament and of the Council on Farm Registers and Farm Structure Surveys from 2010 to 2018 has the same definition with the addition of services in the first sentence (…produces agricultural products and services).
- The geographical situation of the holding is defined in Regulation 1444/2002 as: *The holding and all the information relating to it is recorded as being in that district and municipality or sub-survey district where the headquarters of the holding is situated. In the case where the holding is only partially located in a certain type of area, it is classified as being within this area if either the greater part of the land belonging to the holding or the headquarters of the holding is located in this area. One of these rules should be chosen and applied for all holdings.*

***Registers, statistical registers, system of registers and metadata***

A *register* may be defined as a complete list of objects belonging to a defined object set. The objects in the register are identified by identification variables, which make it possible to update the register and to link it with other registers.
A *statistical register* may be defined as a data set with identifiers where the object set and variables correspond to the statistical matter.

A *system of registers* consists of a number of registers that are linked to each other by one or more common identification variables or linkage variables. An efficient system requires that the linkage variables are of good quality and that the same linkage variables can be found in different registers. Furthermore, the definitions of the objects and variables in the system must be harmonized so that data from different registers can be used together. Reference times must also be consistent.

***Metadata*** have a more important role when producing statistics from a system of registers than from sample surveys. But, data are meaningless and useless without definitions and information on how the statistics are produced and can be used. Under this activity statistical variables will be meant in accordance with EC requirements, norms and definitions. However, the system should not be isolated from others. Sample surveys can be documented one by one and usually have no connections with other

surveys. Without knowledge about definitions and quality problems, the administrative registers cannot be used for statistical purposes. It is also important that metadata are tailored for register statistics. Sampling errors and design problems arising are core issues in the system of survey statistics, while in register statistics the system approach is fundamental. In improving the quality one cannot look at one register at a time, but to consider the system as a whole and to pay special attention to identification variables used for linking purposes.

The Metadata for Statistical Farm Register has to regulate and describe the ways for update and use of the data contained by the register. There were identified three main groups of data in the Metadata: (i) Sources for update of SFR; (ii) Outputs from SFR; (iii) Users of SFR, and five possible sources for setting up and update of SFR: (i) Agricultural Census (ii) Regular Statistical Surveys conducted in agriculture; (iii) Statistical Business Register; (iv) Farm Register (Ministry of Agriculture); (v) Bovine Register (Ministry of Agriculture).

### 2.2 Designing a register for statistical purposes

Designing a *register for statistical purposes* is the core task for a *sample based system of statistical surveys*. For carrying out a sample survey the first step is to determine the population and the parameters to be estimated. This in turn determines the character of the survey with regard to sample design and estimation. Thus the definitions of the population and parameters are determining the way of the data collection. As a rule one survey at a time is to be considered, with a limited number of parameters.

From available registers it is to be done a selection of objects and variables that are relevant to the issue addressed by the statistical survey. In some cases, on the basis of available registers, new variables - and possibly new objects as well - have to be derived. Thus, the data are at hand first, and then they must be adjusted by register-statistical methodological work in order to be used when producing relevant statistics.

When setting up the SFR it is necessary to define the *basic unit* – register unit. *The basic unit should be* the agricultural holding, defined according to Eurostat and FAO recommendations (as briefly described at point 2.1). If there are various kinds of farms in the country, it is necessary to add indication (status) for each kind (state companies, legal enterprises, family farms, etc.) in SFR.

### 2.3 SFR in the frame of the General System of Registers

The register methodological work is very important when defining the new object "farm", which is usually not the same object in the administrative agricultural registers. This work also may include surveys among farmers/owners who cannot be identified as belonging to a certain farm, or farmers/owners for whom is not possible to decide whether they are working together on the same farm or not. It is also very important to follow up what has happened from one year to another to obtain complete coverage of the population in the Statistical Farm Register.

The Statistical Farm Register can be used:

- For producing statistics,
- As a sampling frame for sample surveys, or
- To complement survey data with register information.

Official statistics shall be of the proper quality, which is to say of sufficiently high quality in respect of the user's needs and of the costs involved. A basic requirement, however, is that good statistical practise shall be maintained, which means that the statistics are to be produced by means of recognized scientific methods, which meet requirements on quality, objectivity and reliability.

Statistical Farm Register is to be related with the Registers in the General System. By using data from different registers with complementary information from statistical surveys the possibilities are increasing to produce relevant statistics about agriculture and other activities (widening agriculture) with fewer burdens on the farmers. As well, integration of information from other administrative sources (ex: Farm Register and Bovine Register, kept by the Ministry of Agriculture) play an important role in SFR updating.

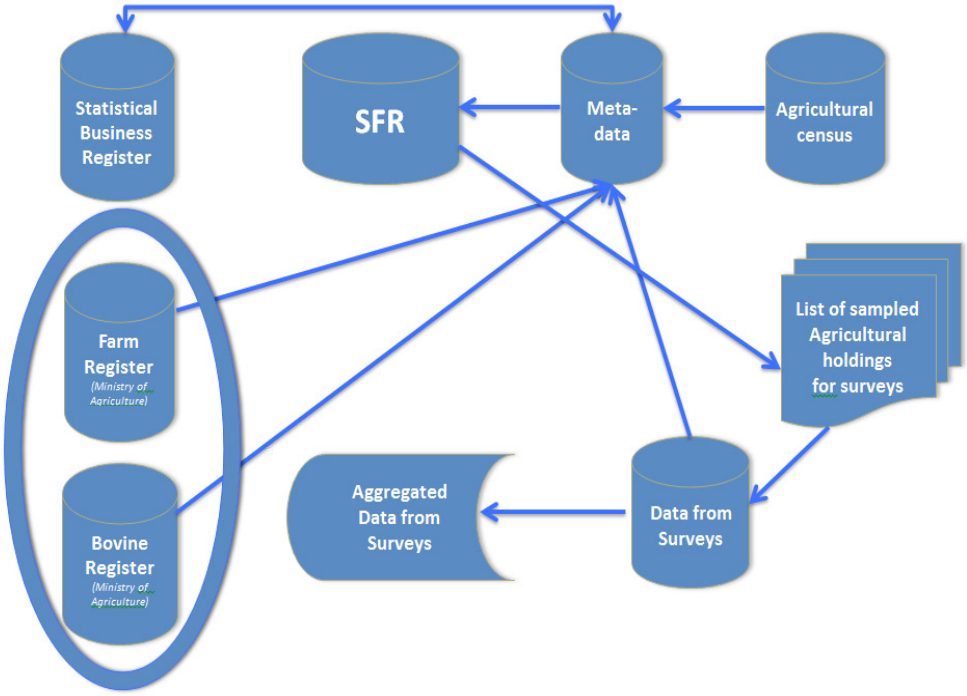
When constructing the Statistical Farm Register, it must be taken into consideration the existence of other registers (statistical or administrative), relevant for SFR updating procedures, which might be linked to SFR by linkage variables (usually the unique number of the unit or personal identification numbers).

1. *Basic registers*: Statistical registers of *objects*[4] of fundamental importance for the system, Statistical Business Register and Statistical Farm Register.
2. *Other registers*: administrative registers (ex: Farm Register and Bovine Register) whose variables are of statistical nature, describing the populations[5] in the basic registers, generally kept by the ministries of agriculture.
3. *Linkages* between the objects in different basic registers and between basic registers and statistical registers.
4. *Standardised variables*: variables of fundamental importance for the system.
5. *Metadata*: definitions of objects, object sets and statistical variables, information about quality and comparability over time should be easily accessible.
6. *Register-statistical methods* including routines for quality assurance.

4 Agricultural holdings.

5 Agricultural holdings.

**Figure 1.** SFR and interference with other Statistical Registers and Administrative Registers




The SFR should contain information necessary for the use of the register. Normally a register shall contain some basic information as:

- Identification,
- Name and addresses,
- Relevant variables for stratification, e.g., size of farm, economic variables, type of production, region the farm belongs to and perhaps also the number of animals.

The following list of general variables for SFR is recommended:

- Name, surname of the owner,
- Registration No./ identity code,
- Name,
- Legal status (natural or legal person's farm),
- Owner's address,
- Telephone numbers, e-mail address for contacts,
- Manager (?),
- Family (household) members (?),

- Farm address,
- Code of the territory,
- Registration number from the Agricultural Household Register of the Ministry of Agriculture, Forestry and Water Management (MAFWM),
- Herd registration number from Animal Register, etc.

### 2.4 SFR updating requirements

Further on it is analysed the relation with the most relevant registers whose data have an important role in SFR updating:

***a) Relation with the Statistical Business Register (SBR)***

Eurostat always discusses how to integrate agricultural statistics into the broad system of business statistics, in order to develop integrated economic statistics. The observation unit (the basic unit for which data is collected) in agricultural statistics is an "agricultural holding" which has similar features to the statistical units used in economic statistics, as defined in the Regulation on Statistical Units (Council Regulation No 696/93). However, "Agricultural Holding" does not have a clear one-to-one relationship directly with any of the units in the SBR and may refer to different units in different cases. On those special cases, country experts on SBR and country experts on SFR should collaborate together to define the statistical unit. However, for the majority of cases:

**Agricultural Holding = Local Unit = Enterprise**

In the SBR the reporting unit is often also the agricultural holding, but for some cases it may be another unit, the legal unit or the enterprise, which has agricultural activity. Any unit having any agricultural activity could, in principle, be considered as an agricultural holding, even if the agricultural activity is marginal to the enterprise as a whole (in terms of income, output etc.).

The IT updating workflow between SBR and SFR has to be clearly defined and explained and internal protocols for data transfer set-up. It may be possible that SBR is kept by an administrative body, external to statistical institute. In this case specific institutional cooperation agreements are to be set-up.

***b) Relation with the Farm Register (FR) and Bovine Register (BoR)***

These two registers are kept for their own administrative reasons. The FR is kept to manage subsidies given for crop production and the BoR is kept for veterinary purposes. FR and BoR can be used for update of administrative variables in SFR **if and only if** the Ministry of Agriculture will use harmonized definitions for agricultural holdings and commonly defined procedures for update. Such an approach asks for clear arrangements and consolidated data-transfer procedures between the administrators involved in both

institutions for matching same statistical units to be kept in FR and BoR with the ones to be kept in SFR.

***Farm register*** (kept by the Ministry of Agriculture) is based on the holder of the land. In order to have a subsidy, each individual holder has to register himself/herself by bringing land ownership documentations from the Cadastre Office. In the register both physical entities and enterprises are recorded. This is why the coverage of the FR will generally differ of the coverage of SFR, being at most asymptotic but theoretically never equal.

***Bovine Register*** keeps individual traceability of cattle, by means of Individual passport for each animal containing data on all movements. This register is animal based. Generally owners/keepers are evidenced in the register with their ID numbers. Each animal may be linked with owners/keepers ID. Companies are also linked with their branches with a link. However each branch has its own number. Main owner/keeper could be defined by those links. There is no clear definition either any company is enterprise or part of it.

The degree of administrative data integration is determined by the following factors:

- Degree of maturity of the country's statistical system.
- The quality and the amount of information available from administrative sources.
- Well-trained and experienced staff.
- Funding
- Cooperation among Governmental Bodies.

## 3. Results

An insightful analysis was done to discover the possibilities of development the unique ID code for the Statistical Farm Register. The assumptions for updates are based on the codes used in the potential registers entering into the updating process and the possible relations between SFR codes and the ones of the related three registers presented above.

*Assumptions for updates with the Business Register*

Update from Business Register: BR contains all administrative data for holdings which are legal entities. In order to identify the units the BR uses a specific coding system for each unit register, generelly comprising a unique number of the legal entity + code of the branch. These data should be collected during agricultural census and registered in the SFR. Using this combination once per year the administrative data for holdings (legal entities) can be updated.

*Assumptions for updates with Bovine Register (BoR)*

The main goal of updates is to allow the track of changes in the holdings using different sources. In order to ensure the right track of changes the SFR has to contain the

identification fields which can be matched with the identification data for holdings in other sources, due to the fact that the update can be only in one direction: from source to SFR. BoR is an animal oriented register, but uses specific codes for holdings. For each holding which has an animal they should have a code containing at least: settlement + internal code generated by the system. Each location where there is found an animal should be registered and receive a specific code. Main assumptions: there has to be rules for update of SFR with data from Bovine register.

*Assumptions for updates with Farm Register (Ministry of Agriculture)*

In order to match the data in the SFR it has to be kept the same code for the holdings in both FR and SFR. The update should be once or twice per year and should concern only the administrative data.

## 4. Discussion

In order to achieve a basic structure of the SFR, which could then be updated from different sources, two important actions are required:

a) First, agreement will need to be reached on a common set of categories to be held in the register, together with their precise definitions.

b) Secondly, a list of identification codes will need to be defined in order to link to an agreed set of data sources.

The main goal of SFR is to support up to date data for agricultural holdings in order to provide a reliable sampling frame for Surveys and Censuses.

From the other side the SFR should keep track of all changes in the registered agricultural holding delivered by different sources.

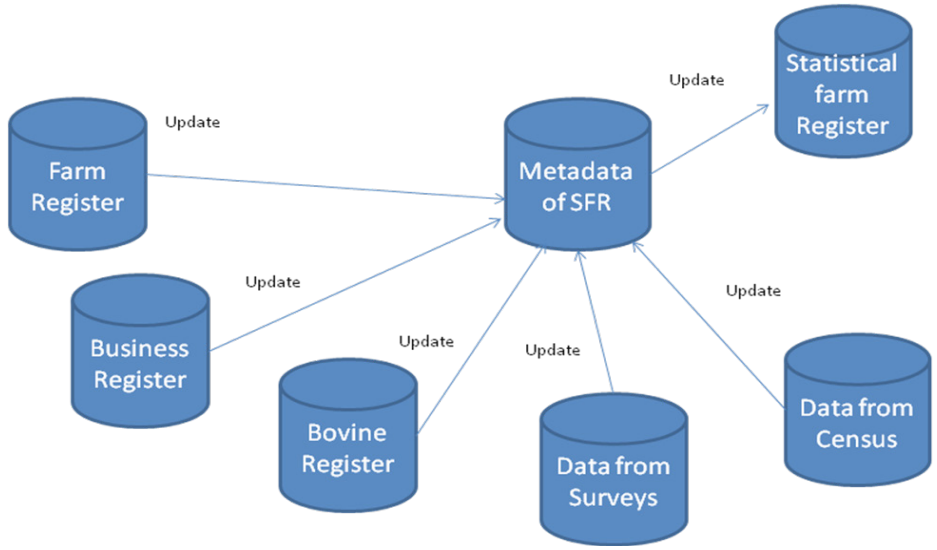
The other registers (Farm register, Bovine register, Statistical Business Register, data base from Surveys and data base from Census of Agriculture) will play a role of updating tools to SFR. The data for updating should be kept in the front end registers and should be passed to the Statistical Farm Register on regular basis. All functionalities of the existing registers should be kept.

In order to keep in the right way all the data the SFR will be developed as Relational database using the existing core Statistical Database Management System. The special procedures for creation, updating and usage have to be created as well as the rules for maintaining and archiving the data.

1. The SFR is to be structured as a relational database.
2. The SFR is be set up on the basis of the outputs of the Agricultural Census.
3. The data from different sources will be checked before the update of the SFR.
4. All variables that will be included in the SFR should be fully harmonized with the European Commission's proposal on the content and structure of SFR for 2010 onwards.

5. SFR has to be only for statistical purposes.
6. Also geographical coordinates for the agricultural holding should be included in the SFR.
7. A strategy for SFR updates (Figure 2.).
    a. The results of the farm structure surveys that will be carried out in agriculture (both sample surveys and full censuses), but also with the results of the on-going regular surveys carried on annual basis for crop production, animal production, and other current statistical surveys carried out in agriculture.
    b. The other registers (Farm register, Bovine register, Statistical Business Register, data base from Surveys and data base from Census of Agriculture) will play a role of updating tools to Statistical Farm Register.
    c. The data for updating will be kept in the front end registers and will be passed to the Statistical Farm Register in the regular basis.

**Figure 2**. SFR - Updating principles




8. All functionalities of the existing registers will be kept
9. Functionality:
    a. To contain the data in line with Eurostat requirements for carrying out current statistical surveys.
    b. Providing sampling frame for statistical surveys.
    c. To keep the history and changes.
    d. To keep the current situation for statistics based on the sources for update.

10. Structure:
    e. The SFR should be a subset of an Integrated Database for Agricultural Statistics.
    f. Levels of metadata.
    g. Variables.
11. Relations
    h. There should be updates from Farm Register kept in the Ministry of Agriculture – administrative data, data for owners, data for production, not for animals.
    i. There should be the updates from Business Register ones per year with cleaned data for active and no active legal units. The update should contain all administrative data about legal entities.

At elaboration of the list of variables for establishment of the SFR, there are to betaken into consideration the number of surveys that are to be carried out according to the regulations foreseen in the **"Statistical Requirements Compendium 2011",** Domain 4: "*Statistics on agriculture, forestry and fishery*", under the fields of activity covered by the following themes:

(i) Crop product statistics;
(ii) Livestock, meat and eggs statistics;
(iii) Milk and dairy product statistics;
(iv) Supply balance sheets;
(v) Vineyard statistics;
(vi) Fruit tree statistics.

Particular criteria that are to be taken into consideration at sample design for each of the above mentioned topics were took into consideration[6].

**Agricultural holding** is to be considered as the *reference unit* for the SFR.

Each record in the SFR has to be identified with holding/family farm that is to be the same as with the source of the delivered data.

## 5. Conclusions

When designing the SFR, there is a need to make it basic and widely acceptable. There is no common approach for a Statistical Farm Register (SFR) defined and recommended by Eurostat yet. At developing the SFR there are to be taken into consideration the best practices in European Member States for setting up a SFR

6 Annex to the final document.

with maximum coverage compliant with European norms and standards in terms of definitions and classifications.

When the SFR will be created and updated, all relevant sources will are to used so that the coverage will be as good as possible. In register-based statistics, the system approach is vital in order to sustain and improve the quality. Hence, we cannot look at only SFR at a time, but we have to consider the system as a whole and pay special attention to identification variables used for linking purposes.

The Agriculture Census Questionnaire should have the necessary inputs for the Statistical Farm Register. The Questionnaire has to be prepared in close collaboration with the Ministry of Agriculture. The questions and indicators should meet both the requirements of the Statistical Institute and the ones of the Ministry of Agriculture and comply with EU and FAO requirements.

In order to create the possibilities for future update of the SFR, a unique coding system for agricultural holding has to be created inside the SFR and also specific codes from other registers have to be gathered during the agricultural census data collection and kept in the SFR.

The structure of the SFR, the rules for update from different sources and the rules for sampling have to be stored and defined in the Metadata of SFR in order to allow easy change and development. Communication protocols between the potential surveys in the Agricultural Area should be elaborated. Update protocols should be elaborated between the Statistical Institute and the Ministry of Agriculture for updating of both registers.

The data for agricultural holdings have to be divided in two parts, according to the content of the variables: administrative variables and statistical variables. The administrative variables can be updated (changed) from all sources (under some conditions) but the statistical variables, will be changed only by regular surveys conducted in agriculture and by Agricultural Census.

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*Monograph Review:*

# INTERNATIONAL MARKETING AS A FACTOR OF EXPORT COMPETITIVENESS

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Institute of Agricultural Economics, Belgrade, 2012.

*Editor:*
Professor Dr Drago Cvijanović, director

The monograph „International marketing as a factor of export competitiveness development“ was published by a renowned scientific-research institution, the Institute of Agricultural Economics, Belgrade, 2012. The authors of the monograph are distinguished analysts and scientists in the field of agrarian economy and market research, Professor Drago Cvijanović, Ph.D. and Branko Mihailović, Ph.D. The monograph is a part of the research results at the project III – 46006 „Sustainable agriculture and rural development in terms of strategic goals implementation of the Republic of Serbia within the Danube region“, funded by the Ministry of Education and Science of Republic of Serbia.

In this monograph, the authors gave numerous theoretical and practical reviews of need and significance in applying marketing activities and techniques, which represent an important factor of international competitiveness' and enterprise/state export activities' strengthening. The monograph is of great significance, as for students on faculties of social sciences and scientists, as well as for companies which deal with export activities.

The monograph was structured in twelve items. In the first three was given a definition, significance, history and environment of international marketing. In the forth item is given a theory presentation and kind of international business: export, licenses, contracts, franchises etc, and in the fifth item are presented some key globalization and international marketing starters. In the sixth item is given a review of business terms and export competitiveness in the Republic of Serbia, and in the seventh, eighth and ninth item are presented techniques of international marketing research, segmentation

of international market and international marketing strategy. The tenth and the twelfth items consider brand and business ethics issues, in the context of international marketing strategies' development, while the eleventh item provides the basic elements and definitions of international industrial management.

The international marketing gets increasing significance in business activities of all sizes companies, but also for consumers and national economies. The firms must contrive and to apply certain strategies, which will ensure them to use completely the key potentials and resources, and, in return, to create and maintain the advantage under their main competitors, if they are willing to survive and develop. The strategy of international marketing is becoming essential component of each firm's international businesses, and a leader position is implementing and retaining as a consequence of continuous and permanent adjustment of the firm to changeable world environment. Therefore, the governments, firms and individuals must react aggressive with innovative and creative marketing strategies.

As the authors point out, a key difference between domestic marketing and international marketing is more dimensions, activities and great complexity of numerous foreign markets on which the firm does business. There are many models of market environment analysis, and for this research purpose was used a SLEPT principle (social, legal, economic, political and technological factors) and were analyzed different aspects and trends which appear on international market, through social/cultural, legal, economic, political and technological dimensions.

An ability of the firm to realize its selected marketing strategy has been determined mostly by goals and expectations of the actors (managers/owners/employees) in the company, who directly or indirectly invest assets/knowledge/work and provide a support necessary for applying the strategies and plans. It is inevitable to determine clearly different groups of actors, to realize their expectations and to evaluate their strength, while the actors are those who provide wider directives within the firm does business. At the same time, the global marketing strategies face increasingly stronger and more complex challenges which require faster and more subtle answers, and most of enterprises are exposed to competitive pressure of global character.

In the monograph is given a review of various methods in which the firms can engage in international business and enter the foreign market. There differ the ways of entry by the level of control, realized over foreign activities. Basically, the business internationalization includes a desire of enterprise to exceed borderlines of growth which result from domestic market, then to pay off easier invested assets in research and development of the products, to achieve size economy, to minimize costs after cheaper inputs in foreign countries. Some of the most often forms of international business are export, licenses, contracts, „turnkey" businesses, franchises, joint ventures, branch offices in total property and strategic alliances.

The authors emphasize that the organizational forms of international business must take into consideration a direction, speed, i.e. a phase in development of the company's business internationalization. The enterprise starts with minor procedure in business internationalization, then enters business which increase its correlation with foreign markets, in order to evolve finally into the globally structured international enterprise, which changes the organizational form of international business and organization character. Hence, in selection of internationalization strategy is necessary to anticipate the phases in development of these businesses, as well as their implications on organizational structure and style of managing the enterprise.

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# ZAPISNIK

## sa IV (četvrte) sednice Skupštine NAUČNOG DRUŠTVA AGRARNIH EKONOMISTA BALKANA (NDAEB) održane 01.12.2011. godine u Banji Vrdnik (na Skupštini NDAEB-a bilo je prisutno 51 član)

Sednicu Skupštine NDAEB-a otvorio je predsednik Društva prof. dr Drago Cvijanović koji je predložio sledeći

**D N E V N I  R E D:**

1. Izbor radnih tela skupštine (predsedništva, verifikacione komisije, zapisničara i overivača zapisnika).
2. Izveštaj o radu NDAEB-a u 2011. god. i prethodne četiri godine (2007-2011) i plan aktivnosti NDAEB-a za 2012. godinu.
3. Razrešenje dosadašnjih članova organa NDAEB-a (predsednika NDAEB-a, sekretara i članova nadzornog odbora).
4. Izbor novih članova organa NDAEB-a (predsednika NDAEB-a, sekretara, članova nadzornog odbora i glavnog i odgovornog urednika međunarodnog časopisa „Ekonomika poljoprivrede“.).
5. Razno

**Ad-1.**

**1.1. Za članove radnog predsedništva Skupštine NDAEB-a, predloženi su:**

- Prof. dr Drago Cvijanović, Srbija
- Prof. dr Radovan Pejanović, Srbija
- Prof. dr Agnieszka Wrzochalska, Poljska
- Prof. dr Dragić Živković, Srbija
- Prof. dr Milan Milanović, Srbija
- Prof. dr Đojo Arsenović, BiH
- Prof. dr Zorica Vasiljvić, Srbija
- Prof. dr Mile Peševski, Makedonija
- Dr Danilo Tomić, Srbija

**1.2. Za članove verifikacione komisije Skupštine NDAEB-a, predloženi su:**

- *Doc. dr Ferhat Ćejvanović, i*
- *Prof. dr Savo Ivančević.*

**1.3. Za zapisničare Skupštine NDAEB-a, predloženi su:**

- *Mr Anton Puškarić i*
- *Bojana Bekić*

**1.4. Za overivača zapisnika Skupštine NDAEB-a, predloženi su:**

- *Prof. dr Branka Kalanović – Bulatović, i*
- *Prof. dr Stanislav Zekić*

Svi predlozi su jednoglasno usvojeni.

**Ad-2.**

***2.1. Izveštaj o radu NDAEB-a u 2011. godini***

Predsednik Naučnog društva agrarnih ekonomista Balkana (NDAEB-a) prof. dr Drago Cvijanović podneo je izveštaj o radu Društva (izveštaj za 2011. god., kao i sve prethodne četiri godine od osnivanja 2007. pa zaključno sa 2011. godinom.) (svi zapisnici podeljeni prisutnim članovima Skupštine NDAEB-a).

Istaknuto je da je dana 09.05.2011. godine Agencija za privredne registre Republike Srbije izdala REŠENjE o upisu NAUČNOG DRUŠTVA AGRARNIH EKONOMISTA BALKANA (BROJ: BU 8176/2011) u Registar udruženja, pri čemu je prihvaćen Statut NDAEB-a sa svim izmenama i dopunama koje su usvojene na Skupštini NDAEB-a koja je održana 03.12.2010. godine u Banji Vrujci. To znači da je društvo registrovano po Zakonu o udruženjima Republike Srbije (Sl. Glasnik RS br. 51/09). Statut NDAEB-a na engleskom jeziku objavljen je u prvom broju časopisa Ekonomika poljoprivrede za 2011.godinu, UDC 338.43:63, YU ISSN 0352-3462; EP 2011(58)1(147-161).

U toku 2011. godine, urađeno je sledeće:

- Časopis „Ekonomika poljoprivrede“ je i dalje na nivou međunarodnog časopisa M-24,
- U 2011. godini, (do sada) su objavljena 3 (tri) redovna broja časopisa „Ekonomika poljoprivrede“, četvrti redovni broj je u pripremi, 1 (jedan) specijalni broj sa ovog skupa i to u dva toma, i 2 (drugi) specijalni broj će biti odštampan do kraja godine,
- Društvo je i dalje suizdavač časopisa „Tranzicija“,

- U 2011. godini, NDAEB-a bilo je suorganizator 2 (dva) međunarodna naučna skupa i Interkatedarskog sastanka Agrarnih ekonomista koji je održan u Zagrebu.

### *2.2. Plan rada za 2012.godinu*

- Da se po potrebi a u granicama finansijskih sredstava održavaju sastanci Predsedništva NDAEB-a,
- Za hitne odluke, važiće odluke koje se donose telefonski ili E-mejlom, koje će biti potvrđene na prvom narednom sastanku Predsedništva NDAEB-a,
- Četiri redovna broja časopisa EP (od toga najmanje 2 na engleskom),
- Jačanje naučne uticajnosti časopisa,
- Izdavanje monografija.

Izveštaj i plan rada je usvojen jednoglasno uz napomenu da novoizabrano predsedništvo NDAEB-a može da dopuni ovaj plan rada.

**Ad-3.**

**Razrešenje članova organa NDAEB-a (predsednika NDAEB-a, članova predsedništva NDAEB-a, sekretara NDAEB-a, nadzornog odbora NDAEB-a, i Glavnog i odgovornog urednika časopisa «Ekonomika poljoprivrede»**

Dosadašnji predsednik NDAEB-a prof. dr Drago Cvijanović, saopštio je, da po Statutu NDAEB-a mandat svim organima NDAEB-a (predsedniku, članovima predsedništva, sekretaru, članovima nadzornog odbora i glavnom i odgovornom uredniku časopisa „Ekonomika poljoprivrede“ traje četiri godine. Posebno je istakao da treba izabrati nove organe NDAEB-a kako bi svi članovi Društva imali šansu u rukovođenju Društvom.

Posle kraće diskusije, Skupština NDAEB-a jednoglasno je razrešila sve organe društva: Predsednika NDAEB-a, članove predsedništva, sekretara, članove nadzornog odbora i glavnog i odgovornog uredniku časopisa „Ekonomika poljoprivrede“, koji su izabrani na sednici Skupštine NDAEB-a od 07. decembra 2007. godine. **(Prilog br. 1).**

**Ad-4**

**Izbor novih organa NDAEB-a (predsednika NDAEB-a, članova predsedništva NDAEB-a, sekretara NDAEB-a, nadzornog odbora NDAEB-a, i Glavnog i odgovornog urednika časopisa «Ekonomika poljoprivrede»**

Prof. dr Drago Cvijanović, pozvao je sve prisutne da predlože nove kandidate za sve organe NDAEB-a.

Prof. dr Zoran Njegovan, predložio je prof. dr Radovana Pejanovića za novog predsednika NDAEB-a.

Potom se za reč javio prof. Pejanović i zamolio da ga ne predlažu, ali uz podršku i predlog još nekoliko članova Skupštine NDAEB-a prof. Pejanović je prihvatio kandidaturu.

Potom je prof. dr Đojo Arsenović predložio prof. dr Dragu Cvijanovića za novog glavnog i odgovornog urednika časopisa Ekonomika poljoprivrede u naredne četiri godine.

Posle kraćih diskusija, dogovoreno je da se prvo izabere PredsednikNDAEB-a, a potom da predsednik predloži ostale organe NDAEB-a.

Prof. dr Drago Cvijanović je stavio predlog na glasanje, da u naredne četiri godine predsednik NDAEB-a bude prof. dr Radovan Pejanović. Predlog je jednoglasno usvojen.

Prof. Cvijanović je čestitao prof. dr Radovanu Pejanoviću na izboru za predsednika NDAEB-a i poželeo mu uspešan rad a svim članovima organa NDAEB-a, koji su do sada bili, zahvalio se na saradnji.

Potom je mr Velimir Radojević predložio pauzu, kako bi predsednik NDAEB-a pedložio ostale organe NDAEB-a.

Posle kraće pauze, predsednik NDAEB-a prof. dr Radovan Pejanović, predložio je:

**Za nove članove predsedništva predloženi su sledeći kandidati:**

- Prof. dr Drago Cvijanović,
- Prof. dr Milan Milanović,
- Prof. dr Koviljko Lovre,
- Prof. dr Dragić Živković,
- Prof. dr Nedeljko Tica,
- Prof. dr Viktor Manole,
- Prof. dr Mile Peševski,
- Prof. dr Đojo Arsenović,
- Prof. dr Aleksandra Despotović,
- Doc. dr Ferhat Ćejvanović i
- Dr Vesna Popović.

Predlog je jednoglasno usvojen.

Za novog sekretara NDAEB-a predložena je Dr Zorica Vasiljević.

Predlog je jednoglasno usvojen.

Za nove članove nadzornog odbora predloženi su sledeći kandidati:

- Prof. dr Vesna Rodić,
- Prof. Dr Vladislav Zekić,
- Prof. dr Branka Bulatović Kalanović,
- Doc. dr Jonel Subić i
- Prof. dr Stanislav Zekić.

Predlog je jednoglasno usvojen.

Za glavnog i odgovornog urednika časopisa „Ekonomika poljoprivrede“ predložen je Prof. dr Drago Cvijanović.

Predlog je jednoglasno prihvaćen.

Dogovoreno je da prethodni organi NDAEB-a završe kalendarsku i obračunsku godinu i da Glavni i odgovorni urednik časopisa Ekonomika poljoprivrede prof. dr Milan Milanović uredi i četvrti broj časopisa za 2011.godinu. Znači mandat novoizabranim organioma počinje sa 01.01.2011.godine.

Predloženo je da časopis „Ekonomika poljoprivrede“ ako je moguće da izlazi na engleskom jeziku, zbog mogućnosti za veću citiranost radova objavljenih u časopisu. Takođe je predloženo da časopis uđe u baze podataka, iz istog razloga. Da bi časopis bio međunarodnog karaktera recenzenti radova moraju biti inostrani stručnjaci. Uređivački odbor i izdavački savet izabraće novoizabrano predsedništvo NDAEB-a na prvoj svojoj sednici. Zadatak novog glavnog urednika biće obezbeđivanje URL-a časopisa.

**AD-5.**

**Razno**

Pod tačkom razno preloženo je da članovi NDAEB-a redovno plaćaju članarinu s obzirom da je Društvo samofinansirajuća organizacija. Članarina se plaća u iznosu od 1.500,00 dinara ili 15 EVRA godišnje.

*U Beogradu, decembra 2011.godine*

**Zapisničari:**
Bojana Bekić
Anton Puškarić

**Overivači zapisnika:**
Prof. dr Branka Kalanović – Bulatović, i
Prof. dr Stanislav Zekić

# 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.

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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.

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**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.

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## 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.

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## PRIMERI NAVOĐENJA KORIŠĆENE LITERATURE

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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**

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**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**

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