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CONTENT

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A SIMPLE METHOD ESTIMATES AND ECONOMIC INDICATORS OF PHOTOVOLTAIC SYSTEMS FOR DRIP IRRIGATION

Boško Gajić[1], Zorica Tomić[2], Zorica Sredojević[3]

Summary

Renewable, environment friendly, photovoltaic (PV) solar energy have been one of the most attractive means for pumping the water needed to irrigate crops. However, since at the present time PV systems still suffer from high investment costs it is necessary to accurately dimension the installations. This study presents a simple but accurate a process to estimate the required dimension of a photovoltaic installation designed to power a pumping system for the drip irrigation of a raspberry plantation in W Serbia. The methodology is based on systematic approach to the problem, taking into account all relevant elements, from PV pumping system, local climate, soil properties, depth of well, characteristics of the crop, to irrigation system. With an array of 579 Wp it was found that the system is able to irrigate, without deficit of water, 1.0 ha raspberry plantation. The methodology presented here is applicable for a range of crop areas, and a variety of crop types in regions of similar climate, soil and latitude. Besides the advantages for the environment, since it uses a renewable energy, a study on the economic viability of a photovoltaic system shows that it is similar to conventional systems which use a generator unit. Moreover, the high price of fossil fuels guarantees a progressive advantage of photovoltaic systems.

Key words: *PV-pumping, Irrigation, Raspberry, Investments, Economic Indicators.*

JEL: *Q24, Q25, D42*

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Introduction

Photovoltaic technology can be used for different purposes, from PV cells in watches and calculators, to solar modules in telecommunications equipment and emergency traffic applications, to PV arrays for water pumping and generation of electricity in agricultural and rural areas. Water pumping applications include, but are not limited to domestic water, irrigation, livestock watering, and village water supplies. In combining irrigation and solar energy, a small PV system can be used to power a water pump for small-scale irrigation. The use of such a system is first appropriate since there is a natural relationship between the availability of solar energy and the water requirement. That is, the water requirement increases with increasing solar radiation level. Solar water pumping systems have some distinct advantages in electrical power production such as, being environmentally friendly, requiring no fuel cost, operating with no noise and wear due to absence of moving parts, and also requiring little maintenance. Using PV array to drive water pumping units for irrigation and drinking water in remote areas, where other sources of power not available, are found to be the most feasible and economically viable design configuration (Posorski, 1996).

The major barriers of using PV systems, in general, are the high market prices of photon capture devices, and installation costs and low energy conversion efficiency of PV cells available in the market (Cuadros et al., 2004; van Campen et al.; 2000, Firatoglu and Yesilata, 2004; Sredojević et al., 2008, Golusin et al., 2010). Significant cost penalties therefore result from oversizing a PV system since the cost is mostly dependent on the PV array area (Landridge et al., 1996). Therefore it is necessary to correctly dimension PV solar power installations before initiating any subsequent study of their performance in a given application. i.e., one must determine the power requirements for a specific application accurately in order to make the cost of the installation profitable in as short a time scale as possible (Cuadros et al., 2004). The previous optimizing of PV water pumping systems, which have been the subject of numerous papers, mainly dealt with improvement of effectiveness of various system components, as well as their better mutual adjustment, with the aim of total cost reduction of the PV pumping system (EC, 1997; Ghoneim, 2006).

On the other hand, optimal sizing of the PV pumping system is basically reduced to calculation of the required hydraulic energy at the output of the system and its relation to monthly average daily solar irradiation. Hydraulic energy for PV pumping systems for irrigation is estimated based on required water quantity data, calculated by agronomist, and total head of water rise (Kenna and Gillett, 1985; Hamidat et al., 2003). There is a dearth of research information on studies connecting both technologies. Cuadros et al., (2004) reported a procedure to estimate the required dimension of a PV installation designed to power a pumping system for drip irrigation of an olive orchard in semi-arid climate (SW Spain). Hence, in this study we present simple procedure to estimate the design requirements of a PV system to power the drip irrigation of a raspberry plantation in a hilly-mountainous area, in W Serbia. This is based on the separate existing knowledge on PV pumping and on the water requirements of the crop. We have specifically addressed the requirements of raspberry plantations in the region of Arilja.

This study was developed taking as a basis the climatic and soil properties of raspberry plantations in the Arilje raspberry producing area. The Arilje raspberry producing area (349 km^2) is located in the W Serbia (Photo 1). This is a hilly-mountainous area at an altitude of 330 to 1382 meters. Raspberry production plays a major role in the wealth of the Arilje region not only in the farming sector, but also socially, environmentally, etc. The area of the region devoted to raspberry is around 4000 ha. Serbia is one of the largest raspberry producing and exporting countries in the world. With annual production of 76 991 tons Serbia occupies second place in the world raspberry production (FAOSTAT, 2007).

Raspberry producing areas are in general socially and environmentally very sensitive. Raspberry plantations represent one of the few viable options for generating wealth in Serbia and reducing rural depopulation. Raspberry is grown mostly under rain-fed conditions in the Arilje region. However, global climate change is the cause of increasingly frequent and long-standing draughts, reduction in precipitation amounts, soil moisture and water resources capacity, prolonged vegetative growth, increased solar radiation, temperature and evaporation and gravely intensifying problems in waterpower engineering and food production. Due to above mentioned, Arilje raspberry growing region that yields 20,000 tons of raspberry crop accounting for 1/3 of national and 1/20 of the world fresh raspberry crop production, 40-50 million Euros worth, has undergone the decline in yields from a record of 33–28 t/ha to an average of 7–8 t/ha, tending to a further drop.

The owners of raspberry plantations are increasingly facing a challenging question: How to cope with a draught and maintain the level of production with limited water resources and electrical energy to power a pumping system? In solving the problem, the option of utilizing solar energy seems to be especially attractive. Evaluated through photovoltaic potential, depending on geographical latitude and the season, it is the largest natural renewable source of energy available to each individual plantation.

The mentioned option is attractive for at least three reasons more: (i) Increasingly limited, costly and difficult of access at any place non-renewable conventional energy sources (oil, natural gas, coal, water-electrical energy). (ii) Sufficiently high solar potential of Arilje raspberry growing area to power a pumping system for the drip irrigation of raspberry plants. Energy requirements of this type of system are lesser by 3–12 times, simultaneously saving water requirements by 40-60% compared to other irrigation methods (gravitation, sprinkler systems), but still constitute a little-known technical option, especially in the agricultural sector. (iii) Maintenance of profitability and achievements of "Arilje-Serbian" raspberry, which has become synonymous in the world with being good quality, developed by highly-disciplined technology of growing in an "Arilje way" by hand harvest on small-sized plantations (average size 0.36 ha), suited to the capacity of a rural patriarchal family engaging 2-3 seasonal workers for raspberry harvest campaign.

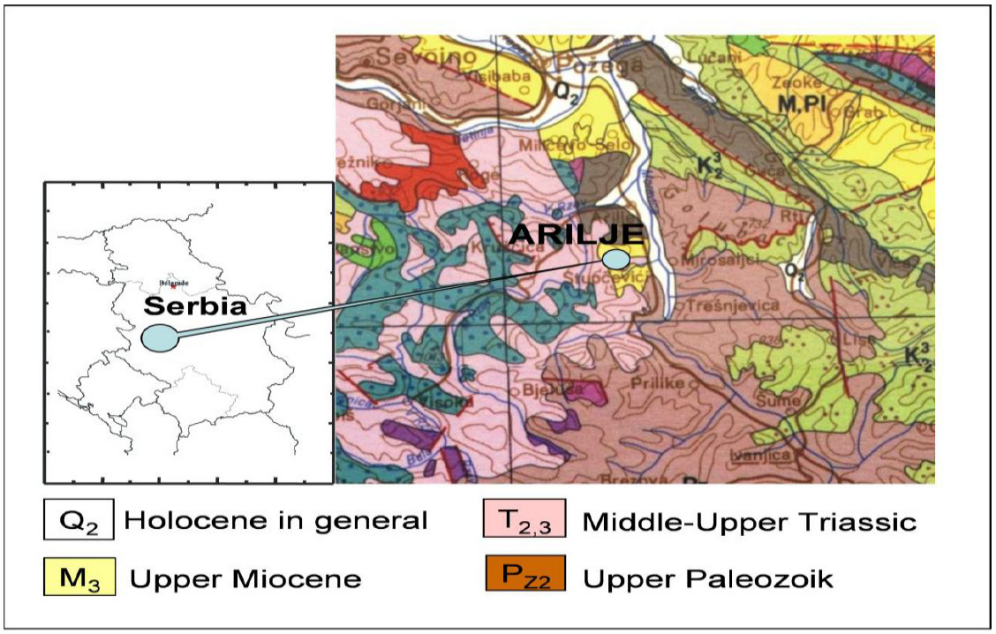
Several experiments have shown that raspberry plantations irrigation, even at rates which are relatively small compared to those used for other crops, may enhance the productivity of the raspberry ≈ 2.5–3 times, compared to that under rain-fed situations (farmer's statements). There is, therefore, a tendency to bring raspberry cultivation under irrigation during the dry

season (May – July). The aim of introducing irrigation with PV water pumping system into raspberry plantations of the Arilje raspberry producing area is to increase their productivity, and hence to allow the economic development of extensive rural areas of this Region, avoiding migration from these territory to the cities. Also, the FAO and EU vigorously encourage and support the use of renewable, non-contaminating energy resources in achieving sustainable agriculture and rural development (van Campen et al., 2000, Commission of the European Communities, 2006, Milić et al., 2008). The use of drip irrigation powered by solar energy could contribute to the necessary long-term reduction of energy and water consumption in the agricultural sector. The procedure presented here is likely being applicable to other berry-like fruits (blackberry, blueberry, etc.) and crops and other regions of the world.

Material and methods

Site description. The study was conducted on noncarbonate silt loam soils classified as Fluvisols (FAO, 2006), at the experimental farm of Specialized Agricultural Cooperative of raspberry producers, berry-like fruits and other fruits "RUBUS ARILJE", located in the village of Stupčević, 6 km south of the city of Arilje (43°45' N, 20°05' E, 354 m a.s.l.) in W Serbia (Picture 1).

Picture 1. Locations of analyzed areas

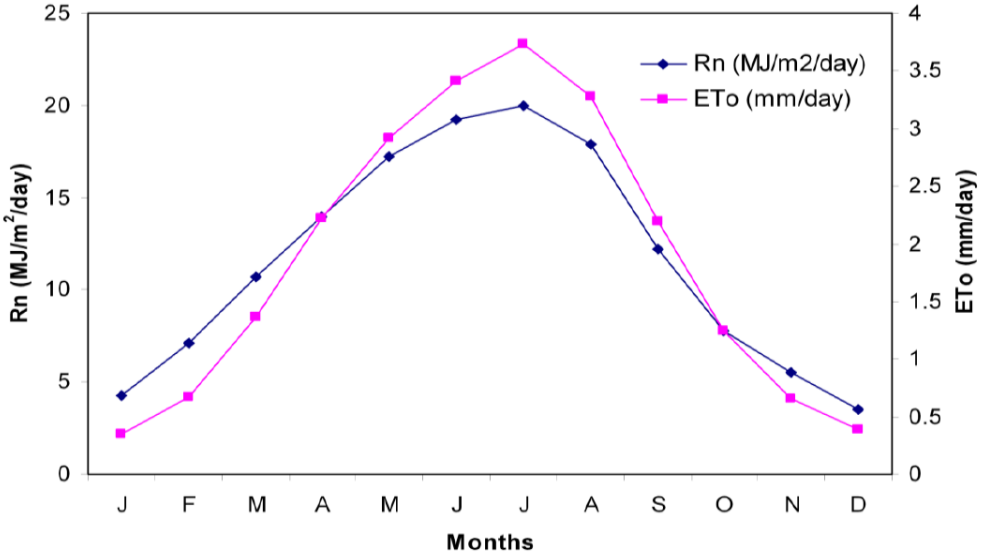


The Fluvisols were formed over a poorly carbonated alluvium of the Moravica River and are one of the most fertile soils found in Serbia and large areas of south eastern Europe. The soil has the water retention ($cm^3\ cm^{-3}$) 0.31 at –33 kPa (field capacity, *FC*), 0.10 at –1500 kPa (permanent wilting point, *PWP*) and a plant-available water capacity (*PAWC*) of 147

mm in the top 0.7 m. Infiltration rates are very high when the soil is dry and cracked. Such soils are well suited for raspberry growing, since they are deep, clayey, with no coarse elements on the surface, and well drained.

Climatological characteristics. Climate of the region is continental. Rainfall in the region is highly variable with an annual coefficient of variation of 50%. Over the 20-year period (1988–2008) annual rainfall varied between 538 and 975 mm with a mean of 740 mm, 60% falling in September–April. Summer rainfall is characterised by intense convective storms and long dry periods with high temperatures and evaporative demand. The mean annual daily temperature is around 10ºC, with maximum and minimum temperatures in August (28.2ºC) and in January (–4.7ºC), respectively. Average annual evaporation (Class A pan) is 685 mm (1971–2000) with maximum daily values commonly reaching 3.7 mm. A summary of the recorded mean monthly solar radiation and reference evapotranspiration is presented in Figure 1.

Figure 1. Recorded mean daily net radiation (*Rn*) at the surface of the crop and reference evapotranspiration (ET_o) at the site of Arilje



Field measurements were taken during the productive cycle of a 3 years old raspberry (*Rubus idaeus* L.), variety "Willamette" on a 0.5 hectares. This variety is perfectly adapted to the climate and the quality of the soils. The raspberry plants had an average height of 1.7 m, spaced of 2.5 m between rows by 0.2 m between plants.

Results and discussion

Estimation of crop water requirements. The soil and its properties determine water retention capacity and conditions/processes of water flow from surface into deeper layers (infiltration) and from soil into the atmosphere (evapotranspiration). Soil moisture is the key decision variable that determines the conditions within the system and water requirements. If the

soil water content is insufficient to compensate the transpiration losses from the plants, the crop will be subjected to a water deficit that will alter a series of processes with negative repercussions on production. Similarly, there is a main water loss by evaporation from the surface of the soil, depending mostly on meteorological factors and soil properties. The sum of the water consumed by the plant in transpiration and evaporated from the soil is called the evapotranspiration of the crop, *ET*, and it must be wholly satisfied by rainfall and/or irrigation for the crop production potential not to be affected. *ET* constitutes the most important variable to be considered when designing in irrigation strategy for a particular crop in a specific soil and under a climatic regime (Allen et al., 1998, Gajić and Sredojević, 2006b). The calculation of *ET* is the first step in order to estimate the annual crop water requirement, *ACWR*. Estimation of *ET* is essential for computing the soil water balance and irrigation scheduling. *ET* is governed by weather and crop condition. According to Doorenbos and Pruitt (2007), mathematically, *ET* in *i* period can be expressed as:

$$ET = ET_o \cdot K_c \qquad (1)$$

wher ET_o is the reference crop evapotranspiration and K_c is the crop coefficient. Real evapotranspiration (*ET*) is actual water consumption of a crop per area unit. Reference evapotranspiration represents the potential evaporation of a well-watered grass crop. The water needs of other crops are directly linked to this climatic parameter. The reference crop evapotranspiration, which depends on meteorological parameters and soil characteristics, is calculated by the FAO–Penman–Monteith equation (Allen et al., 1998):

$$ET_0 = \frac{0.408\Delta(Rn - G) + \gamma \frac{900}{T + 273} u_2 (e_s - e_a)}{\Delta + \gamma(1 + 0.34u_2)} \qquad (2)$$

where *ETo* = reference evapotranspiration (mm day^{-1}), *Rn* = net radiation at the crop surface (MJ m^{-2} day^{-1}), *G* = soil heat flux density (MJ m^{-2} day^{-1}), *T* = mean daily air temperature at 2 m height (^{o}C), u_2 = wind speed at 2 m height (m s^{-1}), e_s = saturation vapour pressure (kPa), e_a = actual vapour pressure (kPa), $e_s - e_a$ = saturation vapour pressure deficit (kPa), Δ = slope of vapour pressure curve slope vapour pressure curve (kPa ^{o}C^{-1}) and γ = psychrometric constant (kPa ^{o}C^{-1}).

Meteorological parameters were obtained from an automated weather station, located in the vicinity of the experimental area (≈1 km). The second step is to account the coefficients, K_c. The value of the K_c varies with the development stages of the crop, and depends on degree of water supply of crops during vegetation period and on climate conditions of the area. For the values of K_c, we use those obtained from experiments carried out in the Arilje raspberry producing area (Kljajić, 2012).

Table 1 The irrigation schedule for the raspberry plantations of the Arilje raspberry producing area

Months	Decade (d)	P_e (mmd^{-1})	ETo (mm d^{-1})	K_c	ET (mm d^{-1})	ET – P_e (mm d^{-1})	$W_{(i-1)}$ (mm)	$W_{(i)}$ (mm)	Q_{NIR} (m^{3}ha^{-1}d^{-1})	Q_{GIR} (m^{3}ha^{-1}d^{-1})
May	V1	11.1	28.0	0.86	24.1	13.0	147.0	146.8	128	142
	V2	14.5	31.0	0.96	29.8	15.3	146.8	144.3	128	142
	V3	14.6	32.0	1.00	32.0	17.4	144.3	139.7	128	142
June	VI1	13.6	33.0	1.03	34.0	20.4	139.7	132.1	128	142
	VI2	16.1	35.0	1.04	36.4	20.3	132.1	124.6	128	142
	VI3	13.0	38.0	1.05	39.9	26.9	124.6	110.5	128	142
July	VII1	12.4	38.0	1.04	39.5	27.1	110.5	96.2	128	142
	VII2	14.2	38.0	1.03	39.1	24.9	96.2	84.1	128	142
	VII3	14.7	38.0	1.00	38.0	23.3	84.1	73.6	128	142
Total	-	*124.2*	*311.0*	-	*312.8*	*188.6*	-	-	-	-

Note: *P_e, effective rainfall; ETo, reference evapotranspiration; K_c, crop coefficient; ET, crop's evapotranspiration; $W_{(i-1)}$, soil moisture values at the beginning of certain decades (e.g. $W_{(i-1)}$ is soil moisture at the beginning of stage i); W_i, soil moisture at the end of stage i; Q_{NIR}, net decadal irrigation (e.g. decadal required water amount for irrigation*

The accurate determination of K_c for different crops is an important task, for which in-depth research is required (Cuadros et al., 2004, Gajić et al., 2006a), given the importance of these parameter in the irrigation schedule and the size of the PV installations, and therefore, the cost. During the rainy season, the effective precipitation, P_e, is higher than the *ET* and, therefore, water reserves are important. The P_e is the water quantity that could be used by the plant. The decadal reserve of soil water, R_d, (mm decade^{-1}), is determined by means of the water balance equation:

$$R_d = P_e - ET \qquad (3)$$

The water reserves accumulated during the rainy season determines the quantity of water at the beginning of the dry season. The initial value of soil moisture, $W_{(i=0),}$ at the beginning of the dry season can be expressed:

$$W_{(i=0)} = FC \qquad (4)$$

Only a portion, R_e, of this water content is available to the plants, and it cannot exceed a threshold level, the so-called allowable water depletion, *AWD*. The *AWD* is a portion of the *PAWC* which constitutes the difference between the *FC*, and the *PWP*. In other words, *AWD* is the amount of water stored in the plant's root zone that is readily available to the plant. To prevent plant water stress an allowable depletion factor is used to calculate the manageable allowable depletion. This factor varies but is usually around 50%. In the case of raspberry, *AWD* is estimated by the following expression:

$$AWD = 0.50 \cdot PAWC = 0.50 \cdot D_r \cdot (FC - PWP) \qquad (5)$$

where D_r effective rooting depth of crops, for raspberry estimated at 700 mm. In this

case, the AWD = 73.5 mm = 735 m^3 ha^{-1}. In order to avoid the plant water stress and optimal crop yield is achieved, the minimum amount of water stored in the soil can be set within the values:

$$AWD \leq R_e \leq FC \qquad (6)$$

One approach followed in many irrigation schedules is to apply a quantity of water equivalent to the difference $ET - P_e$ during dry periods, when $ET > P_e$ (Hamidat et al., 2003; Vilela et al., 2007). This procedure does not consider the water stored in the soil during the wet months of water surplus. It has the advantage of exceeding any underestimate of $ET - P_e$ but disadvantages are greater, such as wasting water and the need for higher water flows. Another, a more reasonable approach consists of using water reserves accumulated during the wet season to complement the water provided by irrigation, which will minimize the irrigation water flow per hectare, with the corresponding decrease in power requirements (Cuadros et al., 2004). This will allow the irrigation of a larger surface area for the available water supply. Thus, the annual (vegetative) crop water requirement, $ACWR$ would be:

$$ACWR = \Sigma\,(ET - P_e) - AWD \qquad (7)$$

where $\Sigma\,(ET - P_e)$ is the difference between ET and P_e during the vegetative cycle, and AWD is the amount of water at the beginning of the dry season, i.e. readily available water. The $ACWR$ is obtained as mm decade^{-1}, but may also be expressed in m^3 ha^{-1} decade^{-1} (1 mm = 10 m^3 ha^{-1}). If these requirements are divided between the numbers of decades in which irrigation is necessary (for example, from the first decade in May until the third decade in July in hilly-mountainous region of W Serbia), the net irrigation requirement is obtained, Q_{NIR}. Taking into account the efficiency of a drip irrigation system, η_s = 90%, the gross irrigation requirement, Q_{GIR}, will be:

$$Q_{GIR} = \frac{Q_{NIR}}{\eta_s} \qquad (8)$$

Table 1 show the values of $\Sigma\,(ET - P_e)$ = 188.6 mm, and of AWD = 73.5 mm. Thus $ACWR$ = 115.1 mm. The irrigation requirements for the raspberry plantations in the Arilje region are therefore 1151 m^3 ha^{-1} year^{-1}. If we divide these $ACWR$ by the number of decades in which irrigation is necessary (May to July, as seen from Table 1), we find that the Q_{NIR}, are ≈12.8 mm decade^{-1} = 128 m^3 ha^{-1} decade^{-1}. For the active root zone, the soil moisture content ($W_{(i)}$, mm) at the end of any decade (i) was obtained by the decadal soil water balance equation for this layer given by:

$$W_{(i)} = W_{i-1} + P_{e(i)} + Q_{NIR(i)} - ET_{(i)} \qquad (9)$$

where W_{i-1} soil moisture in time stage i–1 (mm) and $Q_{NIR(i)}$ is water from PV pumping system which is, by irrigation, added to soil in time stage i (m^3). From the summary of the results for the scheduling of the raspberry plantations in Arilje region in Table 1, the soil moisture content, $W_{(i)}$, at the end of any decade (i), is higher than the AWD.

Design of the photovoltaic pumping irrigation system. Solar photovoltaic water pumping system for irrigation in remote locations consists of at least three basic components: a PV panels (array), a motor, and a pump. Depending on the design, a system may use storage batteries and a charge regulator. Water can be stored into an elevated tank and then gravity-fed irrigation systems. The tank serves as an energy store and supplies the pressure needed for the irrigation system. The stored water can bridge periods of low insolation and supplies the pressure needed for the irrigation system. Pilot plants equipped with a water tank operate at considerably low system pressures, compared to conventional diesel or petrol pumps.

This presumes, of course, that all components of the irrigation system have been designed for such low pressures. The motor must be chosen according to the power requirements and the type of current to operate. If the motor needs, alternating current inverter will need to be installed. The selection of pump in a solar water pumping is solely application dependent, such as water requirement, water height, and water quality.

A pumping system demand is defined as the product of the mean depth from which the water must be raised and the daily flow that is needed. The unit of measurement is m^4day^{-1}. Considering that solar radiation fluctuates during the day, the efficiency of the PV pumping system components in exploitation are lower than would be in optimal operating conditions. Taking into account: (i) energy losses caused by the water friction in the pipes irrigation system (local and linear losses), R; (ii) the fraction of the day when the solar radiation is below the threshold at which the pump starts to work $G_d(> G_{threshold})$; (iii) the efficiency of the photovoltaic generator, η_G; (iv) the efficiency of the inverter, η_I; and (v) the efficiency of the motor in exploitation, η_{MB}; the maximum energy required from the PV generator, E_{PG}, will be:

$$E_{PG} = \frac{E_H + R}{G_d(> G_{Threshold})\eta_G\eta_I\eta_{MB}} \qquad (10)$$

where the hydraulic energy, E_H (kW h day^{-1}), required for lifting a volume of water Q (mean daily water flow) to a height H, is:

$$E_H = 2.725 \cdot 10^{-3} QH \qquad (11)$$

H is the total height to which the water is pumped, being the sum of the depth of the well and the necessary height to establish the pressure at the irrigation heads. The energy losses (or head loss) R in pipes due to water flow (friction) are around 10% of E_H. With respect to the efficiencies, Lorenzo, according to Cuadros *et al*., (2004), suggested $Gd\ (>G_{threshold}) = 0.95$; $\eta_G = 0.85$; $\eta_I = 0.90$; $\eta_{MB} = 0.43$.

Therefore, the overall efficiency of the generator-pump connection is approximately 31%. The power of the PV generator, P_{el}, is calculated according to the method of the peak sun hours (Cuadros *et al*., 2004). It is the most used methodology and all field and laboratory experiments on PV panels are usually carried out considering one peak Sun

intensity (1 kW m^{-2}). Consequently, the nominal power of a panel is expressed as kW or peak W. Thus:

$$P_{PG} = \frac{E_{PG}}{h_s} \qquad (12)$$

where h_s is the number of effective hours of sun per day (the number of hours per day above the standard level of radiation of 1 kW m^{-2}). The value of h_s coincides numerically with the data for solar radiation expressed in kWh m^{-2}.

At least, the power loss produced when the solar cells are operating at temperatures above 25°C must be considered. These losses are approximately 10% of the P_{PG} (Cuadros *et al*., 2004). Therefore, the peak PV power, P (kWp), will need to be:

$$P = P_{PG}(1 + 0.1) \qquad (13)$$

Table 2 shows the values of all the variables that are involved in the connection between the pumping and PV systems. The results show that the optimal nominal electric power, for reference parameters in the Arilje area, that would satisfy the consumer demands throughout the entire observed period, is P_{PG} = 579 W.

Table 2. Design characteristics of the drip irrigation and photovoltaic system

Months	Decades	h (h day^{-1})	H (m)	Q (m^3 day^{-1})	E_H (kWh day^{-1})	R (kW h day^{-1})	E_{PG} (kWh day^{-1})	P_{PG} (W)	P (W)
	V1	4.9	19	14.2	0.735	0.074	2.587	526	579
May	V2	5.2	19	14.2	0.735	0.074	2.587	498	547
	V3	5.5	19	14.2	0.735	0.074	2.587	470	517
	VI1	5.0	19	14.2	0.735	0.074	2.587	517	569
June	VI2	5.1	19	14.2	0.735	0.074	2.587	507	558
	VI3	6.2	19	14.2	0.735	0.074	2.587	417	459
	VII1	5.9	19	14.2	0.735	0.074	2.587	438	482
July	VII2	5.5	19	14.2	0.735	0.074	2.587	470	517
	VII3	6.4	19	14.2	0.735	0.074	2.587	404	445

Note: *h, daily effective hours of sun during the irrigation months; H, total pumping elevation; Q, gross daily irrigation rate; E_H, hydraulic energy; R, friction losses in the conduit system; E_{PG}, electrical energy required in pumping; P_{PG}, electrical power required in pumping; P, peak required photovoltaic power.*

Analysis of economic viability. To ascertain what would be the most profitable installation, two options are proposed to be compared: a) electric energy supplied by a generator unit; b) electric energy supplied by a photovoltaic installation. Thus, if a generator unit is used, its power should be 1.5 kW at least, taking into account the requirements to start the pump. However, it should be taken into account that, as well as the purchase of the unit and the fuel costs, there are other costs of lubricating oil and equipment maintenance. Furthermore,

these motors suffer breakdowns, which contribute to increase the price of water unit that is pumped. In Table 3 are shown the economic variables for an average project life of 25 years, as the time period without efficiency losses and 6% annual interest rate.

Table 3. Economic and power variables assumied in the study for the electric and photovoltaic generators

Variables	Electric generator	Photovoltaic generator
Total capital investment (€)	4,500	14,500
Average diesel consumption (Lh^{-1})	0.80	-
Diesel oil price ($€L^{-1}$)	1.40	-
Maintenance cost (€)	450	-
Pump power (kW)	0.80	0.80
System power (kW)	4.2	1.8

Table 4 shows the economic indices, for the electric generator or the alternative photovoltaic generator, calculated from the variables of Table 3.

Table 4. Economic indicators for the electric and photovoltaic generators

Economic indicators		Amount	
		Electric generator	Photovoltaic generator
CI_0	Total capital investment (€)	4,500	14,500
NPVo	Net present value (€)	20,800	42,000
IRR	International rate of return (%)	38	28
PBT	Payback time (year)	3.00	3.40

According to Table 4, the net present value, *NPV*, is higher, and the internal rate of return, *IRR*, is lower for the photovoltaic generator, being similar the payback time, PBT, for both alternatives, which determines that the photovoltaic installation is more profitable than the electric generator. The profitability achieved through the integration of irrigation technology and photovoltaic pumping, optimizing the efficiency of both systems, is finally demonstrated.

Conclusions

We here present a multi-step optimization methodology to sizing photovoltaic water pumping irrigation system. The method developed here includes a systematic approach to the problem, taking into account all relevant elements, from PV pumping system, local climate, soil properties, depth of well, characteristics of the crop, to irrigation system. The result of such approach is a new a simple, fast, and reasonably accurate mathematical model for defining optimal nominal electric power of the PV generator. The procedures reported above have shown that the optimal nominal electric power of the PV generator, for reference parameters in the Arilje region, with decade average daily water requirements of 12.8 m^3 ha^{-1} day^{-1}, that would satisfy the raspberry demands throughout the entire irrigation observed period, is P_{PG} = 579 W.

The methodology described here could be of greatest use in scheduling irrigation strategies

and in improving the production of raspberry in the hilly-mountainous continental region of the W Serbia. The main aim will be the creation of wealth in economically poor regions, reducing rural depopulation, the avoidance of erosion and use of fossil fuels, etc. Besides the advantages for the environment, since it uses a renewable energy, a study on the economic viability of a photovoltaic system shows that it is similar to conventional systems which use a generator unit (twice the net present value for the photovoltaic system). Moreover, the high price of fossil fuels guarantees a progressive advantage of photovoltaic systems.

The procedure presented in this paper for raspberry can be applicable to any other berry-like fruits (blackberry, blueberry, etc.) and site in the world with similar environment conditions.

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Appendix

FC	field capacity	D_r	effective rooting depth of crops
PWP	permanent wilting point	R_e	portion of water content is available to plants
$PAWC$	plant-available water capacity	Q_{NIR}	net irrigation requirement is obtained
ET	evapotranspiration	Q_{GIR}	gross irrigation requirement
$ACWR$	annual crop water requirement	η_s	irrigation efficiency
ET_o	reference crop evapotranspiration	$W_{(i)}$	soil moisture in time stage i
K_c	crop coefficient	W_{i-1}	soil moisture in time stage i–1
Rn	net radiation at the crop surface	R	energy linear losses
G	soil heat flux density	η_G	efficiency of PV generator
T	mean daily air temperature	η_I	efficiency of inverter
u_2	wind speed	η_{MB}	efficiency of motor
e_s	saturation vapour pressure	E_{PG}	max energy required from the PV generator
e_a	actual vapour pressure	E_H	hydraulic energy
$e_s - e_a$	saturation vapour pressure deficit	H	total head
Δ	slope of vapour pressure curve	Q	mean daily water flow
γ	psychrometric constant	P_{PG}	nominal power of a panel
P_e	effective precipitation	h_s	number of effective hours of sun per day
R_d	decadal reserve of soil water		
$W_{(i=0)}$	initial soil moistures		
AWD	allowable water depletion		

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JEDNOSTAVNI METOD PROCENE I EKONOMSKI POKAZATELJI FOTONAPONSKIH SISTEMA ZA NAVODNJAVANJE KAP PO KAP

Boško Gajić[4], Zorica Tomić[5], Zorica Sredojević[6]

Rezime

Obnovljiva, ekološka, fotonaponska (FN) solarna energija je jedan od najatraktivnijih načina za pumpanje vode potrebne za navodnjavanje useva. Međutim, pošto su u ovom trenutku FN sistemi još uvek iziskuju visoka investicionim ulaganjima, neophodna je precizna procena veličine odgovarajuće instalacije. U ovom radu je predstavljen jednostavan, ali precizan metod za procenu potrebne fotonaponske instalacije za pumpanje sistema za navodnjavanje kap po kap na porodičnoj plantaži maline u zapadnom delu Srbije. Metodologija se zasniva na sistematskom pristupu problemu, uzimajući u obzir sve relevantne elemente FN pumpnog sistema, lokalnih klimatskih osobina zemljišta, karakteristike useva, kao i potrebe za sistemom za navodnjavanje. Uz niz od 579 Wp utvrđeno je da je ovakav sistem sposoban za navodnjavanje, bez deficita vode, za 1 hektar maline. Ovaj način je primenljiv i za druge useve u regionima slične klime, zemljišta i geografske širine. Pored prednosti za životnu sredinu, jer koristi obnovljivu energiju, analiza o ekonomskoj opravdanosti pokazuje da je fotonaponski sistem sličan konvencionalnim sistemima koji koriste druge generatore. Štaviše, visoka cena fosilnih goriva garantuje progresivnu prednost fotonaponskih sistema.

***Ključne reči**: FN-pumpanje, navodnjavanje, malina, investicije, ekonomski pokazatelji*

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ACCOUNTING CONSOLIDATION OF THE BALANCE BY THE ACQUISITION METHOD

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Summary

The emergence and need for making the consolidated calculations is a significant issue in a modern financial reporting. For the consolidation needs is important to determine theoretically a group of enterprises, in its narrower and broader sense, and connections among enterprises within a group. Adducting a collective balance weakness is necessary to point out to a necessity of the following elements elimination: internal share in capital and the capital, internal receivables and liabilities, internal inter-results and internal incomes and expenditures.

The main part of the paper refers to a method of subsidiary companies' capital consolidation, by the acquisition method. Harmonized with the IFRS 3 Business Combinations were defined and also analysed the basic requirements for conduction of the acquisition method. There were also analysed the examples which refer to an initial consolidation and the consolidation termination.

Key words: *balance, consolidation, accounting, enterprise.*

JEL: *M41, M40*

Introduction

The consolidation problem belongs to the most complex field of theory, analysis and balance policy. Although the first consolidated reports have appeared more than hundred years ago, as a response to a need for information on financial, income and proprietary position of a group, on their legal and professional regulatory rules has been waited for many years. The legislators have authorized a lack of regulatory rules by desire not to impose strict and rigid rules to the

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consolidation field, and representatives of the accounting profession by a dominant opinion that legal independence of the group members has been more important than economic unity of the group. First countries which had legally regulated the consolidation were USA and Great Britain, and then followed the Continental Europe countries, led by Germany.

Nowadays a practice of making the consolidated calculations has been customary in economies in which have been groups of enterprises. Making the consolidated financial statements has become its significance in last few decades. With increasing correlation of enterprises into groups, and then more and more comprehensive correlation of small and medium enterprises, beyond the national border, has also increasing a need for unifying the national legislatures concerning the consolidation field.

In response to it, the ex-European Economic Community, and today the European Union, was issuing the Seventh Directive in 1983 in Luxemburg. The Seventh Directive includes clauses by which define a goal and a content of the consolidated statement, a content of business report and obligation to announce the report, as well as a revision obligation[4]. The International Accounting Standards Board [5] deals with the consolidation problem in even 5 international accounting standards. Thereby has significantly contributed to harmonization of the regulations in Europe and approaching to the Anglo-American consolidation practice[6].

In practice form the groups of enterprises with equality relations and supremacy and subordination relations. Therefore, the holders for making the consolidated calculation are the group of enterprises with supremacy and subordination relations.

Accounting determination of the group of enterprises

According to the IAS 27 *Consolidated and Separated Financial Statements* we can observe the group of enterprises in narrower and broader sense. The group in its narrow sense makes the parent company and subsidiary companies which belong to the group. The subsidiary companies are those which exert a dominant influence, i.e. the parent company has a controlling influence on business and financial policy of the subsidiary company. A control is a power to manage with financial and business policies of an entity, aiming to benefit from its activities.[7] The group in its broader sense comprises, besides the parent company and the subsidiary companies, also joint (joint ventures) and associated enterprises (associates). The associates are those which exert significant influence on the parent company, but have no control. The important influence implies a power of participating in decision making in financial and business policy of an entity, but not control over those policies.[8] Such influence

4 Radovanović, R., Škarić, J. K. (1998): *Koncepcije bilansa*, Faculty of Economics, Belgrade, p. 39.

5 International Accounting Standards Board.

6 International Accounting Standards and International Financial Reporting Standards represent a compromise of the European and Anglo-American accounting practice.

7 IFRS 3 *Business Combinations*, Enclosure A.

8 IAS 28 *Investments in associates*, Article 2.

ensures to the parent company shares in amount of 20-50% voting rights. The joint enterprises are the enterprises which are under the same management with the enterprise from the group and some enterprise which does not belong to the group. Therefore, the highest degree of correlation is among the parent company and the subsidiary companies, and then the parent company and the associates and the weakest correlation is between the joint ventures. Logical to this descending series, in the sense of correlation degree, have been adopted the International Accounting Standards. The IAS 27 which refers to the parent company and the subsidiary companies, the IAS 28 deals with the associates and the IAS 31 with joint-ventures. Below is example 1, which aims to show the way how establish the relations within the group of enterprises.

Example no. 1 - The company A owns 80% of capital stocks which include the voting rights at the General Shareholders Assembly of the company B. The company B owns 25% of capital stocks which includes the voting rights at the General Shareholders Assembly of the company C and 30% of preference shares of the company C. The company B also has option to buy the shares of the company D, which can use whenever, after a bonus to a market price in time they have been issued, and if used, they could benefit to the company B 10% of share in ownership and voting rights in the company D. The company A owns 5% of capital stocks with the voting rights and 55% of the preference shares of the company D. Make determination of the relations character between the companies!

Solution - The company A is the parent company, the company B is dependent on the company A, because it owns 80% of capital stocks in the company B. The company C is the associated company in regard to the company A, while the company A has indirectly, over its subsidiary company B, 25% of the capital stocks of the company C (does not take into consideration the preference shares while they provide no voting rights). The company D is correlated with the company A after investment in the securities[9], because the company A has only 5% of the capital stocks in the company D. The company D is also correlated to the company B after the investments in the securities, while options on shares which provide 10% of share in the company D, can use at any time. Further issue of the paper is directed to the complete consolidation, for which is relevant the group of enterprises in the narrow sense.

Capital consolidation

Comprehending the group of enterprises as economic unity and respect of the principle of legal entirety fiction[10], especially in terms of form and contents of the group balance, in consolidated calculation should not appear: a) positions of participation in the group enterprise, it is inevitable to balance, from the collective balance, the participation positions with the position of an enterprise's capital assets in which participate, on which those participations refer. This procedure is called the capital consolidation, which is the subject of the paper, b) positions

9 Investment of securities would balance in accordance with IFRS 9 *Financial instruments*.

10 A principle of legal entirety fiction was respected if all positions and their values would be excluded from the collective balance, which would never appear if the group was a unique enterprise, from a legal point of view.

of receivables from the enterprises, the group members, and liabilities to the enterprises, the group members, because it is not harmonized with an assumption that the group as a fictitious legal entirety claims of itself or owes to itself. Therefore those positions mutually clear and the procedure is marked as the consolidation of receivables and liabilities. c) amounts of cross-gain as the consequence of mutual futures of the group members, because the profit from the group point of view cannot appear after internal circulation between the group members. Therefore such profit clears with an appropriate asset which was implicit (stocks) and such procedure is called the internal result consolidation, d) positions of incomes and expenses as a consequence of mutual futures of the group members and mutual receivables and liabilities and positions of incomes from the internal capital relations. All incomes and expenditures on these bases mutually eliminate, which represents the consolidation of incomes and expenditures.[11]

The capital investment of an enterprise in some other enterprise (the parent company into the subsidiary company and among the subsidiary companies), records first in individual balance sheets of enterprises, which participate in the transaction. The enterprise which invests in the other enterprise′s[12] capital records the transaction as a part of assets – share in joint ventures. The enterprise, which invests in, records the transaction as increase in liabilities.[13] In the collective balance of the group of enterprises, which draws up according to individual financial statements of the group members, participation of the parent companies in the subsidiary companies and mutual shares between the subsidiary companies leads to double calculations, both on assets and liabilities sides. The enterprise which invests expresses a capital on assets side, in form of share, and in the enterprise in which invests, a capital is expressed as other assets. On liabilities side, the enterprise which has invested, the invested capital has expressed as a part of the capital assets, and in enterprise in which has been invested – the capital has been expressed as the capital assets. This form of drawing up the collective balance make impossible to understand the real amount of capital from it, which is available to the group as entirety.[14]

Example no. 2 - The assumption is that the parent company A has gained 100% of shares in the subsidiary company B and 60% of share in the subsidiary company C. Individual balances of the mentioned enterprises and calculated collective balance look like:

11 Andrić, M., Vuković, B. (2010): *Obeležja finansijskog i revizorskog izveštavanja o konsolidovanim bilansima u Srbiji*, Računovodstvo, vol. 54, br. 11-12, str. 7-20

12 As stocks and shares, depending on a legal form of the enterprise, which invest in.

13 Milojević, I., Mihajlović, M., Cvijanović, M. (2012): *Impact of organizational failure of relevance consolidated budget*, Ekonomika poljoprivrede, IEP Beograd, Vol. LIX, no 1/2012, str. 63-71.

14 Ranković, J. (1994): *Konsolidovanje godišnjeg zaključka*, Ekonomski fakultet, Beograd, str. 121.

Table 1. Balance sheet of the parent company A

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Share in the associated company B	**18000**	A	Equity capital (A_1+ A_2)	**98000**
A_1	Share in the associated company C	**12000**	A_1	Capital assets	83000
B	Fixed assets	**45000**	A_2	Reserves	15000
C	Working capital	**40000**	B	Liabilities	**17000**
∑	ASSETS	**115000**	∑	LIABILITIES (A+B)	**115000**

Table 2. Balance sheet of the subsidiary company B

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Fixed assets	**13000**	A	Equity capital	**18000**
B	Working capital	**10000**	B	Liabilities	**5000**
∑	ASSETS	**23000**	∑	LIABILITIES	**23000**

Table 3. Balance sheet of the subsidiary company C

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Fixed assets	**18000**	A	Equity capital	**20000**
B	Working capital	**10000**	B	Liabilities	**8000**
∑	ASSETS	**28000**	∑	LIABILITIES	**28000**

Table 4. Collective balance sheet

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Share in companies B and C	**30000**	A	Equity capital	**136000**
B	Fixed assets	**76000**	B	Liabilities	**30000**
C	Working capital	**60000**			
∑	ASSETS	**166000**	∑	LIABILITIES	**166000**

From the collective balance sheet, made by simple addition of „line by line"[15] of connatural balance positions of separate balances, we can conclude that the total equity capital is 136,000, which does not direct to a real conclusion on the equity capital amount. A task of the capital consolidation is to avoid double calculations. According to the article 17 of the Fourth Directive, the shares define as the rights to the other enterprises′ capital, whether they are represented by a certificate or not, which, by making close relationships with the enterprises in which they have their share, aim to contribute to business of the group as entirety.

When the enterprise acquires, by purchasing shares, the share of 100% in some other enterprise, the share then defines as an indirect unilateral share without the involvement of third parties (minority shareholder[16]). If acquired the share of less than 100%, then it is about

15 IAS 27 *Consolidated and Separate Financial Statements*, article 18.

16 According to IFRS 3 *Business Combinations,* a concept of minority shareholders (minority interest) was replaced with the concept of shares, which were not ensuring control (non-controlling interest).

the indirect unilateral share with the involvement of third parties and it is the simplest way of the capital consolidation.

In the situation when some enterprise has its share in the other enterprise, and that enterprise has majority share in the third enterprise, then it is about unilateral multistage share. That is why the first enterprise does not only lay a claim to a part of the capital of the enterprise it participates directly, but also to a part of the capital of the third enterprise in which its share has its subsidiary enterprise. If there are mutual shares in the capital among two enterprises, then such shares are defined as mutual share in the capital of these two enterprises.[17]

In the subsidiary company, capital can also take part the group outsiders. Then the share of the parent company consolidates with the part of the subsidiary company's equity capital. The share of the third parties can see in the consolidated balance liabilities, increasing the equity capital in the consolidated balance, as a position „minority shareholders capital" or „shares which do not provide control".[18]

When there are indirect, multistage and mutual shares, there consolidate all shares between the parent company and subsidiary companies and among the subsidiary companies, but it is not possible to consolidate the shares of the subsidiary company in the parent company. The amount in the consolidated balance enters as a position of „purchased equity shares". The share of the subsidiary companies in the parent company excludes, because from the aspect of the group as economic unity and feigned legal entirety, the shares in the parent company consider by the subsidiary companies as purchased equity shares.

The equity capital of the subsidiary companies, in regard that they can be in form of joint stock companies, partnerships limited by shares [19] and limited liability company, does not consist only from the equity capital, but from reserves [20] and profit in previous and the current year. Neither the Seventh Directive, not the IAS 27 Consolidated and Separate Financial Statements, have not decisively defined the equity capital concept, as it was the subject of consolidation. However, the following balance positions make the capital, which is the consolidation subject:

- Capital assets;
- Capital reserves;
- Reserves from profit;
- Carried over profit/loss;
- Profit/loss in current year.

17 Simić, S. (2008): *Konsolidovani finansijski izveštaji važna pitanja sastavljanja i prezentacije*, Revizor, Vol.11, br. 44, str.73-90.

18 Stojanović, R. (2009): *Informacioni dometi konsolidovanih finansijskih izveštaja*, Računovodstvo, vol. 53, br. 3-4, str.18-32.

19 Partnerships limited by shares is present in German legislature, while Serbian legislature does not regulate these partnerships.

20 Reserves divide into legal, free and statutory.

The acquisition method

According to the IFRS 3 Business Combinations, which was reviewed in 2008, for the capital consolidation can apply the acquisition method. This method requires: a) identification of an acquirer, b) determination of the acquisition date, c) recognition and measurement of acquired recognizable property, overtaken liabilities and every share without control right in acquired entity, and d) recognition and measurement of goodwill or profit from a bargain. Later on will be analysed in more detailed every of the requirements for conduction of the acquisition method.

Identification of the acquirer aims to define clearly who the acquirer in a specific business combination is. The acquirer is the company which has control under the other company, while the acquire is the company under which is achieved control. In most of business combinations simply determines the company-acquirer. The company which provides cash, other resources or take over the liabilities - considers the acquirer. However, in some business combinations can happen that the entity, issuing the securities, to be the acquiree. Such business combination is called „a reversely acquisition" and are rare in practice.[21]

Determination of the acquisition date is a moment when the acquirer really takes control of the company. Only economic criteria takes into consideration, the transaction must not be finished, in legal sense. The acquisition date is easy to determine when actual control acquires at once. It is more difficult to determine the acquisition date in successive purchases. In business combination realized in phases, the acquirer again measures its previous share in capital in the acquired entity, after fair value on the date of acquisition and recognizes resulted profit and loss, if there are any.[22]

The essence of the acquisition method is to make the consolidation on the day when the parent company had gained the actual control. The example 3 refers to determination of the acquisition date.

Example no. 3: The acquisition date - On March 5th, the company A has started negotiations on purchasing the company B. At the meeting of administrative boards of the companies, on June 1st, was arranged that the company A submits for the purchase of the company B a whole amount in cash. Legally, the purchase will be confirmed after signing a purchase contract. Just after August 30th , the company A can make strategic decisions, together with a management of the company B, primarily those which refer to reconstruction of the company B. On July 15th was announced a semi-annual calculation, on July 31st was signed the contract, and on September 20th were adjusted restructuring measures of the company B. Which date should define as the moment of acquisition?

Solution - The essence of the acquisition method is that the parent company, purchasing share, acquires assets and liabilities, i.e. net assets of the subsidiary company. The first consolidation makes on the day of the acquisition, which faces two requirements. The

21 Škarić, J. K. (2005): *Analiza konsolidovanog finansijskog izveštaja*, Računovodstvo, Vol. 49, br.9, str. 42-51.

22 IFRS 3, article 42.

first requirement considers determination of fair value of the parent company share in the subsidiary company capital. The fair value of share represents an acquisition value, i.e. a purchase price of share. According to the IFRS 3 Business Combinations, the acquisition value of share comprises: 1) fair value of resources given on the acquisition date in order to take control, 2) overtaken or provoked liabilities or 3) capital instruments issued by the acquirer in exchange for control of the acquired company. Before alterations of the IFRS 3, in the acquisition value of share were included also all costs, which could directly attributed to business combination. Such costs are: professional services of auditors, accountants, legal advisers, valuators and other professional consultants.[23] However, now these costs treat by expenditures of the period they appeared in. The acquisition date is August 30th, while from this date can adopt measures which implicate existence of control. As already mentioned, there take into consideration only economic, and not legal criterion.

The second requirement refers to determination of fair value of net assets of the subsidiary company. In order to come to the fair value of the subsidiary company's net assets is necessary to make individual evaluation of all assets and liabilities of the company. This requirement is significantly more complex in regard to the prior one. There assess every identified resources and liabilities. The resources assess in compliance with lower value principle.

When we determine these two values we compare them, aiming to determine if the parent company has realized goodwill or profit from the bargain. If the fair value of the parent company's share in the subsidiary company's capital is higher than net assets' fair value of the subsidiary company, there appears the goodwill position[24]. The goodwill acquired in business combination does not amortise[25], but the acquirer tests it on value impairment, at least once a year, harmonized with the IAS 36 *Impairment of Assets*.

If the fair value of the parent company's share in the subsidiary company's capital is less than the net assets' fair value of the subsidiary company, then it is said that the parent company has made a profit from the bargain. In such situation, the income should ascribe to the acquirer-company. In practice, the bargain can happen, if it is about a compulsory sale in which a salesman acts under compulsion.

First consolidation

The first consolidation is right after the acquisition date, therefore the method, by which the capital consolidation procedure carries out, is called the acquisition method. Below are shown two examples during the first consolidation. Due to simplicity and visibility were given simplified descriptions of the balance sheets of the parent and subsidiary companies. In

23 IFRS 3, *Business combinations* (2004).

24 Goodwill is asset representing future economic interests which origin from the other assets gained in business combination, which cannot identify individually and recognize apart.

25 Goodwill used to write off, in accordance with the VII directive, mostly on the five-year period.

the example 4 was described a situation when the parent company has 100% of share in the subsidiary company and the situation when the goodwill occurs.

Example no. 4 - On December 31st were given the balances of the parent company A and the subsidiary company B.

Table 5. Balance sheet of the parent company A

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Share in the subsidiary company B capital	**5000**	A	Equity capital (A_1 +A_2+A_3)	**50000**
B	Equipment	**30000**	A_1	Fixed assets	**35000**
			A_2	Capital reserves	**5000**
C	Other assets	**40000**	A_3	Profit	**10000**
			B	Liabilities	**25000**
∑	ASSETS	**75000**	∑	LIABILITIES (A+B)	**75000**

Table 6. Balance sheet of the subsidiary company B

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Equipment	**3000**	A	Equity capital (A_1 +A_2+A_3)	**3650**
			A_1	Fixed assets	**3500**
			A_2	Capital reserves	**100**
B	Other assets	**4650**	A_3	Profit	**50**
			B	Liabilities	**4000**
∑	ASSETS	**7650**	∑	LIABILITIES (A+B)	**7650**

On the acquisition date, the parent company owns 100% of share in the company B′s capital. The equipment fair value of the company B is 4000, while the liabilities fair value is 4200. Compose the consolidated balance sheet.

Solution:

Table 7. Determination of net assets′ fair value of the subsidiary company B

Positions	Accounting value	Fair value	Difference (potential reserves/latent loss)
1. Equipment	3000	4000	+ 1000
2. Other assets	4650	4650	-
Total assets	7650	8650	+ 1000
- Liabilities	4000	4200	- 200
= Net assets of the subsidiary company B	3650	4450	+ 800

In the table 1 was presented a calculation procedure of the subsidiary company B net assets. The net assets' fair value is higher than the book value of the company B for amount of 800, which is a profit in corrected balance sheet of the company B. While the net assets' fair value of the company B was determined, the amount we compared with the fair value of the parent company's share in the subsidiary company's capital. The fair value of the parent company's share in the subsidiary company capital is 5000, and the net assets' fair value of the subsidiary company is 4450. In regard that the fair value of the parent company's share in the subsidiary company's capital is higher than the net assets' fair value of the subsidiary company B in the consolidated balance appears the goodwill in amount of 550.

Table 8. Consolidation procedure

Positions	Balance sheet of the parent company A		Corrected balance sheet of the subsidiary company B by fair value		Collective balance sheet		Consolidation		Consolidated balance sheet	
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities	Liabilities	Receivables	Assets	Liabilities
Share in capital B	5000		-		5000			5000	-	
Equipment	30000		4000		34000				34000	
Other assets	40000		4650		44650				44650	
Goodwill							550		550	
Total assets	75000		8650		83650				79200	
Capital assets		35000		3500		38500	3500			35000
Capital reserves		5000		100		5100	100			5000
Profit		10000		850		10850	850			10000
Liabilities		25000		4200		29200				29200
Total liabilities		75000		8650		83650	5000	5000		79200

In the second column of the table 2 were described data of the parent company, overtaken from the initial balance sheet. The data for the subsidiary company B after the fair value, we had calculated in the previous table, is in third column. Adding up the data from the second and the third column, row by row, we get the column – a collective balance sheet. The consolidation procedure is described in the next column. Claiming the share in amount of 550, owing the goodwill in amount of 550, the capital assets 3500, the capital reserves 100, and the profit in amount of 850. In the last column is described the consolidated balance sheet.

In the next example is described a situation when the parent company has share less than 100% in the subsidiary company's capital. In that case appears the position share which

does not provide control, which expresses separately from the subsidiary company's equity capital. The share that does not provide control, i.e. the minority share is a part of profit or loss and the subsidiary company's net assets, which can ascribe to shares in capital, not owned by the parent company, neither directly, or indirectly, through the subsidiary companies[26]. In this example will be taken into consideration also the situation in which appears the profit in the consolidated balance sheet, i.e. the profit from the bargain.

Example no. 5 - On December 31st were given the balance sheets of the parent company A and the subsidiary company B.

Table 9. Balance sheet of the parent company A

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Share in capital of the subsidiary company B	**9000**	A	Equity capital ($A_1 + A_2$)	**42000**
B	Other fixed assets	**42000**	A_1	Fixed assets	**32000**
C	Working assets	**15000**	A_2	Capital reserves	**10000**
			B	Liabilities	**24000**
∑	ASSETS	**66000**	∑	LIABILITIES (A+B)	**66000**

Table 10. Balance sheet of the subsidiary company B

Ord. No.	Position	Amount	Ord. No.	Position	Amount
A	Fixed capital	**15000**	A	Capital assets	**12400**
B	Working assets	**10000**	B	Reservations	**600**
			C	Liabilities	**12000**
∑	ASSETS	**25000**	∑	LIABILITIES	**25000**

On the acquisition date, the parent company owns 80% of share in the company B capital. The fair value of the company B's fixed assets is 13000, the fair value of working assets is 10400, the fair value of reservations 0 and the fair value of liabilities 10500.

Solution:

Table 11. Determination of net assets′ fair value of the subsidiary company B

Positions	Accounting value	Fair value	Differences		
			Total	PC 80%	20% NCIS[27]
1. Fixed assets	15000	13000	- 2000	- 1600	- 400
2. Working assets	10000	10400	+ 400	+ 320	+ 80
- Total assets	25000	23400	- 1600	- 1280	- 320
- Reservations	600	-	- 600	- 480	- 120
- Liabilities	12000	10500	- 1500	- 1200	- 300
= Net assets of the subsidiary company B	12400	12900	+ 500	+ 400	+ 100

26 IAS 27, *Consolidated and Separate Financial Statements*, article 4

27 Non-controlling interest share.

The amount in the table 3 of 500 represents the profit in the corrected balance sheet, where 400 refer to the parent company, and the rest 100 belong to the shareholders who have no control. As in the previous example, compares the fair value of the parent company's share in the subsidiary company's capital and the fair value of the subsidiary company's net assets. Taking into consideration that there is no 100% of the parent company share, the fair value of the subsidiary company's net assets calculates in a way that the fair value of the subsidiary company's net assets multiply with the parent company's share in its capital.

In this example are the following data 12900 * 80% = 10320, and the fair value of the parent company's share in the subsidiary company's capital is 9000, which is less for 1320. The amount of 1320 represents the profit in the consolidated balance sheet.

Table 12. Consolidation procedure

Positions	Balance sheet of the parent company A		Corrected BS of the subsidiary company B, by fair value		Collective balance sheet		Consolidation MP 80% 20%			Consolidated balance sheet	
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities	Liabilities	Receivables	NCIS	Assets	Liabilities
Share of the parent company	9000		-		9000			9000		-	
Fixed assets	42000		13000		55000					55000	
Working assets	15000		10400		25400					25400	
Total assets	66000		23400		89400					80400	
Capital assets		32000		12400		44400	9920		2480		32000
Capital reserves		10000		-		10000					10000
Profit		-		500		500	400	1320	100		1320
NCIS											2580
Reservations		-		-		-					-
Liabilities		24000		10500		34500					34500
Total liabilities		66000		23400		89400	10320	10320	2580		80400

The consolidation procedure in the table 4 was carried out in a similar way as in the previous example. In the column consolidation appears also the position share, which does not provide control, because the parent company has no 100% of share in the subsidiary company's capital. The amount of 2580, which represents the amount of share which does not provide control and gets when 10320 deducts of 12900.

Next consolidation and consolidation termination

In the first consolidation, during the re-assessment of the subsidiary company, determines the fair value of all separated assets and liabilities. As a difference between higher fair value of assets in regard to value, after which the assets are kept in accounting books (book value), occur potential reserves[28] The potential reserves increase active balance positions, and decrease debit balance positions. There can also appear latent losses as a difference between the assets value in the books in regard to the fair values. Uncovered potential reserves, i.e. latent losses, will be objectified in the future capital consolidations. If the uncovered potential reserves are in a position land, they will not be objectified up to their sale, because there is no land amortization. The potential reserves in fixed assets will be written off in the remaining life-time of the assets, while the potential reserves in working assets will be objectified in the first year after the consolidation.[29]

Every next consolidation is carried out in the same way, until the parent company does not decide to sell its share in some of the subsidiary companies. This is the moment of the consolidation termination. The sale of the parent company's share in the subsidiary company's capital records in the separated balance of the parent company, in a way that the share turns into cash. The sale results, realized profit or loss represents a difference between a sales value and the book value.[30] After the sale of share, the parent company, during drawing up the consolidated balance, will omit all assets and liabilities which had referred to the sold subsidiary company. Below is an example which refers to the capital consolidation determination.

Example no. 6 - The parent company had sold the share in capital of the subsidiary company for 250 million RSD. The acquisition value of share had amounted 120 million RSD. In the moment of acquisition were uncovered the potential reserves in amount of 35 million RSD and the business value, i.e. the goodwill in amount of 30 million RSD. The potential reserves and the business value have been, during next consolidations, carried over to expenses, i.e. losses. Determine the results of the sale!

Solution - If we would take as a result a difference between the sales and the acquisition value of share, we would get: 250-120=130. If the result of 130 million RSD would be overtaken into the consolidated balance, then the group result would be double reduced, due to the

28 Vukša, S., Milojević, I. (2007): *Balance analysis*, BK University, Belgrade, p. 290.

29 Škarić, J. K. (2000): *Ciljevi i instrumenti bilansne politike holding kompanije*, Četvrti simpozijum računovođa i revizora Republike Srpske, Teslić, Zbornik radova, str. 281.

30 Zakić, V., Vasiljević, Z., Zarić, V. (2012): *Relevance of dividend policy for food industry corporations in Serbia*, Ekonomika poljoprivrede, Vol. LIX, no. 4/2012, str. 809-822.

potential reserves and the business value. The first time, within the following consolidations, when the potential reserves and the business value were written off, and the second time - during the sale results determination. Therefore the sales result gets as: 250 – (120 – 65) = 195. The amount of 195 million RSD represents the result of share sale.

Conclusion

Depending on control degree and influence of the parent company on other companies, the group members, there apply different consolidation methods. Full consolidation implies the capital consolidation between the parent and subsidiary companies. In the full consolidation uses the acquisition method. During the consolidation of the associates′ capital applies an equity method, while for the consolidation of the joint ventures capital uses a quota consolidation[31].

Reviewing the IFRS 3 Business Combinations in 2008 has introduced innovations in the field of the capital consolidation. In theory and practice of consolidation there were several methods of the capital consolidation: German, Anglo-Saxon, the interest pooling method, the acquisition method in its two variants, the equity method, also in two variants. The mentioned methods have differed by a size of capital, as a subject of the consolidation, by use of an appropriate concept of value and by possibility of objectification of the potential reserves. A step toward an order in professional literature and practice was adoption of, already mentioned, the Seventh Directive. In other words, German and Anglo-Saxon consolidation methods were not applied according to the Directive, so there were not actual until then. The Seventh Directive did not explicitly forbid the interest pooling method, but did not also recommend it. Until the moment of the IFRS 3 review, the acquisition method had its two variants. Today, the acquisition method is only in one variant. Thereby was made easier the situation for practitioners and composers of the consolidated calculation. The company′s management and the balance policy′s creators lost their room for manoeuvre, so on the balance policy in the field of full consolidation of the capital cannot be spoken about.[32]. Regulating one method of the full capital consolidation also contributes to comparability of the consolidated financial statement.

31 In IAS 31 *Participation in mutual projects* as an alternative to a quota consolidation is an equity method.

32 While, for example, the balance policy can pursue in internal result consolidation, while during the internal result determination can use a method of individual futures, a method of average annual rate of supplier’s internal success or a method of average annual rate of the internal result of the group, as entirety.

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RAČUNOVODSTVENO KONSOLIDOVANJE BILANSA METODOM STICANJA

Ivan Milojević[33], Aleksandra Vukoje[34], Milan Mihajlović[35]

Rezime

Nastanak i potreba za sastavljanjem konsolidovanih obračuna predstavlja značajno pitanje u savremenom finansijskom izveštavanju. Za potrebe konsolidovanja važno je teorijski odrediti grupu preduzeća u užem i širem smislu i veze između preduzeća unutar grupe. Navođenjem slabosti zbirnog bilansa potrebno je uputiti na neophodnost eliminisanja sledećih elemenata: internih učešća u kapitalu i kapital, interna potraživanja i obaveze, interni međurezultati i interni prihodi i rashodi.

Glavni deo ovog rada odnosi se na metod konsolidovanja kapitala zavisnih preduzeća, metodom sticanja. U skladu sa MSFI 3 Poslovne kombinacije definisani su i analizirani osnovni zahtevi za sprovođenje metode sticanja. Obrađeni su primeri vezani za početno konsolidovanje i prestanak konsolidovanja.

Ključne reči: *bilans, konsolidovanje, računovodstvo, preduzeće.*

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ABOUT THE CAUSES OF AGRICULTURE CRISIS IN THE REPUBLIC OF SERBIA

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Summary

Agriculture of the Republic of Serbia is in the long-term and the multiple crisis: crisis of management, organization crisis, financial crisis, crisis of competitiveness, investment crisis, market crisis, crisis of agricultural policy, crisis of confidence and other forms of crisis. The aim of this paper is to investigate many causes of the limitations of agricultural development of the Republic of Serbia, where the authors specifically point out the following: unfavourable agrarian structure and the lack of organization of farmers; unregulated market of agricultural products; lack of competitiveness; inadequate role of the state; deagrarisation and depopulation of villages. A qualitative method of analysis, synthesis and comparison, as well as supporting quantitative statistical methods were used. Authors concluded that systematic and radical measures and actions are needed at the macro and micro level, in order to overcome a difficult situation in which our agriculture is, as a strategic activity of the Republic of Serbia.

Key words: *Crisis of Agriculture, the Republic of Serbia, Causes, Consequences, Measures and Actions.*

JEL: *Q19, D78*

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Introduction

The crisis of agriculture in the Republic of Serbia takes a very long time. Historical roots of our agrarian crisis date back to the period between the two world wars, where we had the problem of agrarian overpopulation, then after World War II the problem of deagrarisation (due to industrialization strategy). Inflation, hyperinflation, sanctions, wars, bombings, which have happened in nineties, have left disastrous **consequences** on agriculture and agricultural sector. The first decade of this century was marked by drought and floods (climate change), the unfavourable economic position of agriculture and at the end the global economic and financial crisis (Pejanović et al., 2005).

The global economic and financial crisis had negative impact and still has negative impact on the (agricultural) economy of the Republic of Serbia. Agriculture, unfortunately, suffers the most, because it has not recovered even after a long cycle of crisis in the 90's of the last century. A striking indication of the crisis is **the crisis of animal husbandry,** which gets worrying (For instance: after the collapse of the former Yugoslavia, Serbia had about a million sows and now has, according to experts estimation, around 350,000 breeding animals).

The aim of this paper is to investigate many causes of the crisis of agriculture of the Republic of Serbia. Numerous causes of the crisis are reduced to **the permanent unfavourable economic situation of agriculture. Wrong strategic macroeconomic concept** causes that this branch of agriculture, with exceptional comparative advantages, is inadequately treated and is inappropriately positioned. **Climate change** is also an important cause of the crisis.[4]

Complex and numerous factors of the crisis of Serbian agriculture can be classified into several, in our opinion, **the key groups of problems:** unfavourable agrarian structure and disorganization of commodity producers, unregulated market of agricultural products, un-competitiveness, inadequate role of the state, deagrarisation and rural depopulation.

A qualitative method of analysis, synthesis and comparison, as well as supporting quantitative statistical methods were used.

Unfavourable agrarian structure and disorganization of farmers

The economic structure of agriculture of the Republic of Serbia has long been dominated by **small commodity production** (an average of about three hectares compared to more than 20 hectares in the EU) on our small farms. The transition has not managed to solve this big problem.[5]

4 According to the estimations of the Serbian Chamber of Commerce climate change (drought) led to the yield losses in 2012 from 10 to 50 per cent of economically important crops such as corn, soybeans, sunflowers, sugar beets, vegetables and fruits.

5 According to the Census of agriculture in 2012 the average farm in Serbia uses 4.5 hectares of agricultural land, has one tractor, one cow, four pigs, three sheep, 26 poultry and one bees colony.

Medium-sized farms (from 1-5 ha), which are in Serbia 76.8% (Census 2002), has character of **semi-subsistence farms**: non-specialized, "mixed" farms; renting a small land, with few employees; having outdated machinery, with small economic power; lack of investments; credit debt; low level of irrigation use; unfavourable age structure; unfavourable educational structure; lack of entrepreneurial ideas and initiatives; low yield; low market surplus (Pejanović et al., 2007).

As for the **large farms,** they have gone through and still go through the process of privatization. In many cases, privatization has been a failure, with enormous negative consequences, and in terms of production and in terms of employment (e.g. "PIK Bečej").

There are, however, very successful examples of privatization (e.g. "Delta Agrar"). These companies should be accepted as a positive example of our agricultural companies, not see them with prejudice, stereotypes or even with ideological signs.

Disorganization in our agriculture is reflected in the lack of organization of farmers (associations, cooperatives, clusters): cooperation and contract production are underdeveloped; unregulated conditions of purchase and purchase prices (mainly at the expense of primary producers); buyers (usually) do not have HACCP certification; demand is unstable (oscillatory) and adapted to their own needs at the expense of primary producers; payment system is unregulated (long, uncertain and at the expense of primary producers); high participation of dealers (especially in the purchase of cattle); abandonment of commodity producers to the cruel market rules and the uncertain fate of the business.

Business networking of commodity producers could have a significant positive effect: cheaper purchasing of inputs, easier and more secure placement, exchange of knowledge and experience, access to better credits, cheaper and faster certification, branding, better education and training, legal protection and so on. In one word, greater competitiveness of commodity producers could be achieved in this way.

Unregulated markets of agricultural products

The transition of the Serbian economy has left **a negative impact** on agriculture (Pejanović et al., 2005). Administrative management model has been replaced by a liberal market economy. Also, **market**, as a key institution of modern democratic society, **is not regulated,** which had and still has negative effect on business entities in agriculture. The market **is not developed or efficient,** even when it comes to the commodities market, futures market, money market, capital market, labour market, rental and trade land market (outdated land register and cadastre system, the unresolved issue of public property in cooperatives, unfinished registration, etc.), (Pejanović et al., 2007).

Unregulated market of agricultural products is reflected in:

- **Monopolization of demand** (Market is dominated by a few processors (oligopoly) that have deal through the cartel, especially regarding to the purchase prices of agricultural products);
- **Atomization of offer** (Large number of relatively low associated small agricultural producers on the supply side - a convenience for monopoly);
- A large percentage of the market is in **unregulated flows** of purchase and payment (e.g. high participation of "dealers" in the purchase of cattle, etc.);
- **Volatility in prices** of agricultural products, followed by price disparity, especially in animal husbandry;
- **Administration of market** ("Regulation on restrictions of margins..."");
- Inefficient market **inspection authorities** (veterinary, sanitary, phytosanitary and other agricultural inspections);
- Lack in **purchasing and distribution** centres and cooperatives in the function of purchase and distribution;
- Underdeveloped **commodity-stock market** (undeveloped conditions for commodity-stock business and futures trading of agricultural products);
- Inefficient system of **commodity reserves**;
- The domestic market is **small-scaled and with low purchasing power**,
- **The foreign market** is demanding, slowly and insufficiently occupied**.**

Uncompetitiveness

Competitiveness is the imperative of the modern market economy. In developed economies everything is subordinated to the competitiveness at the micro and macro level. Unfortunately, the transition in Serbia hasn`t made of agriculture modern, efficient and profitable economic activity (Pejanović et al., 2009). Economic entities in agriculture are not transformed into economically strong and capable commodities, which equally are able to respond to the growing needs on the world market. Surplus in foreign trade exchange of agricultural products, which Serbia has since 2004, is more an indicator of our potential options, then our real competitiveness (Pejanović, 2013).

Uncompetitiveness of agriculture, farmers and agricultural products in Serbia is reflected in the following:

- Our agricultural production is **expensive and inefficient** (costs and prices);
- **Extensiveness** of total agricultural production (0.25 conditional units of cattle per hectare, compared to 0.98 in the EU). Extensiveness is the consequence of relatively **low productivity,** inefficient land policy, old technical-technological equipment, low level of business connections (Jefferson Insitute, 2003);
- Underdeveloped and insufficient use of **irrigation system** (small percentage of

irrigated land);

- **Unfavourable business environment** (a relatively high index of business and political instability, high levels of corruption, administration, etc.);
- **The quality** of the products does not meet the EU standards (slow implementation of quality standards, slow development of the quality through knowledge and innovations, slow implementation of the HACCP program - independent or integrated with ISO 9001, slow implementation of GLOBALGAP);
- Most of our exported agricultural products contain a large proportion of primary production factors (corn, raspberries, fruit, livestock) and **a small proportion of the added value** (knowledge applied through technology and marketing);
- **Agro-industrial chain** is disrupted and "torn" (production, processing, trade, logistics);
- We do not have **integrated offer** and we have lack of knowledge of export markets;
- Underdeveloped **distribution** phase**, promotion** phase and other marketing activities related to agricultural products;
- In unstable and uncertain economic conditions **entrepreneurship** and entrepreneurial spirit are underdeveloped (slow development of small and medium-sized enterprises in the agribusiness);
- Underdeveloped and weak lobbying system (**agrarian lobby**).

Entry into force of the Stabilization and Association Agreement (as of 1 January 2013) could be a serious problem to our uncompetitive agrarian commodity producers.

Inadequate role of the state

Neither other important economic institutions, the state, in transition period in Serbia did experience adequate transformation. On the one hand, in the "head" of commodity producers is still desire for paternalistic role of the state, on the other hand the state has proved powerless and still shows its undefined role in creation and implementation of the "rules of the game".

Inadequate government's role in agriculture is reflected in the following:

- The lack of a **national strategy** for the whole economy, as well as the action program for agriculture and rural development;
- Inexplicable and unacceptable **low agricultural budget** (approximately three per cent of the total budget in these last few years; in 2012. amounted only 2.4 per cent of the total budget).
- Insufficient and uncertain **incentives** for agricultural production and rural development through:
- Direct incentives - premiums, incentives for production, regression, support of non-commercial farms,

- Market incentives - export incentives, the cost of storage, credit support,
- Structural incentives - rural development measures, improvement of protection and quality of agricultural land, a measure of institutional support;
- Agriculture is treated as a **"social shock absorber"** of society;
- Unresolved system of agricultural **financing** and **investments** in agribusiness sector;
- Undeveloped **register** of farms;
- Undeveloped network of **advisory services**;
- Unwillingness to **climate changes**, which take their "tribute";
- Undeveloped system of **recording and reporting** in agriculture:
- Undeveloped system of agricultural **accounting data evidence** (for evidence of incomes and costs of farms),
- Undeveloped integrated agricultural **information system**;
- Inefficient **measures of agricultural and rural policies** (insufficient **protection** of domestic agricultural production, including campaign "Buy Domestic"; **unsolved** issue of agricultural pensions, farm debts, etc.);
- The problem of **agrarian legislation,** which is incomplete and under-used;
- Inadequate **land policy** (which is reflected in the existing law on agricultural land, which leads to serious problems in the application);
- Lack of **institutions** (e.g. Development Bank, Agricultural Commerce, Food Agency, etc.);
- Non-regulated **property relations** (privatization, restitution);
- Lack of **planning function** (neo-liberal concept of agriculture, which is mostly abandoned but here is still in use);
- Lack of adequate and long-term policy of **state intervention** on the market of agricultural products.

Deagrarisation and depopulation of villages

Deagrarisation and depopulation of villages in the Republic of Serbia are serious **problems** of agricultural and social development (Bogdanov, 2003).

Deagrarisation is a process of migration from the countryside to the cities. In Serbia it is the process of mass abandonment of individual agriculture and transition into so-called "social economy", including previous social agriculture and various civil services (Pejanović, 2009). It is a common phenomenon of modern society, but it is extremely strong in our case. In SFR Yugoslavia since the war till census in 1981 about six million people moved from agricultural to non-agricultural status. Since the mid-fifties of the last century scope of the migration was higher than the population growth (Pejanović, 2011). Qualitative changes in the development of agriculture and rural areas are happening in our country. In fact, since then there is a massive collapse of natural production in the countryside, a mass involvement of the farmers in the social

division of labour through the market and their employment in the social economy. However, the other side of this process is the phenomena of **population aging in the villages** (senilization) and the devitalisation of the villages, with the all other negative socio-economic consequences. One of the side effects in Serbia is village decay and number reduction, which is best illustrated by the fact that of 4,600 villages in Serbia one of four (about 1,200 in total) is in the process of disappearing (more than 86 per cent of them recorded a population decline). In our villages, more than 50,000 houses are abandoned, about 500,000 hectares of arable land is neglected. Vojvodina has 425 villages. Not one of them has a growth, but the decline in the number of residents, with process of village's disappearance (Pejanović, Njegovan, 2009).

In villages throughout Serbia live around 260,000 single men and around 100,000 single women under the age of 40 (Pejanović, Njegovan, 2009). According to data of the Republic Statistical Office among 164,884 people are illiterate, 82.1 per cent are women who mostly live in rural areas, they are housewives and have an average of 71.5 years. Only a tenth of the rural households are women-owned, 84 per cent of them do not own land, 93 per cent of them do not pay pension and disability insurance and 17 per cent of them have no health insurance (because they have no money). In Serbia only 14 per cent of rural children, aged three to five years, go to kindergarten (Census 2002). The problem is that rural schools are worse equipped than those in urban areas, students achieve lower results than their peers in the city, and kindergartens are almost gone.

Deagrarisation is a **modern phenomenon** related to structural changes in the economic and social development of countries. In developed countries, deagrarisation is a side effect of building a modern economic structure, where the secondary sector dominates instead of the primary, and then goes tertiary sector (services sector). Today, analogous process takes place in developing countries, but often in **deformed** form. The deformed form of deagrarisation is manifested through the rapid transfer of labour and uncontrolled "escape" from agriculture and the countryside, which is a worrying phenomenon. And instead of the positive, we have a **negative effect,** which has multiple manifests: **(1)** deagrarisation **didn't build a modern economic structure** (since 1986 till 2000 primary sector participation in the GDP of Serbia shows exceptional growth trend and the tertiary sector declining trend); **(2) we made villages empty** and without a quality labour; **(3)** we overcrowded towns and created a new problem - instead agrarian overpopulation we got **urban (city) overcrowding,** followed by mass unemployment and impoverishment, with a range of supplementary (additional) problems.

Therefore, deagrarisation in Serbia appears as **a limiting factor of agricultural and rural development.** In fact, deagrarisation has mostly **negative consequences** for our country: **(1)** demographic consequences (aging of the agricultural population, feminization, devitalisation); **(2)** social consequences (vulnerable socio-cultural heterogeneity of the villages, reduction of rural families and weakening of internal connections in comparison with previous family communities; **(3)** the consequences of the agrarian structure (marginalization and shutdown of individual properties, changes in the perspective of social reproduction of individual properties).

The causes of this phenomenon are numerous and can be grouped into social and economic factors. In our opinion, primary causes are **economic factors of deagrarisation.** Among the numerous factors the most important factors of deagrarisation are: a strategy of industrial development of economy; unfavourable economic situation of agriculture; low incomes in agriculture and low motivation; employment policy (in cities); technical changes in agriculture; others (social) factors of deagrarisation.

Instead of a conclusion: the proposal of measures and actions

Agricultural production is heavily influenced by the global economic and financial crisis, the demographic crisis and climate and other global changes, with the dramatic rise in food and oil prices (Pejanović, 2010). In such circumstances, Serbia must **redefine** the place and role of agriculture in economic development and take appropriate measures and actions aimed at overcoming the crisis situation in which there is agriculture.

The importance of agriculture for development of the Republic of Serbia is a huge and irreplaceable, which is evidenced by the fact that one of four households in Serbia is engaged with agriculture (Census, 2012).

Numerous **measures and actions** are necessity to mitigate the impact of the global economic crisis and **to stop the negative trends of the crisis** in agriculture of the Republic of Serbia which follow the transition:

- The adoption and consistent implementation of **national development strategy** and **development programs** (or action program of development) for **agriculture, food industry and rural development**. The modern, conventional and organic farming and food industry (agro-industry) should be **the basis of development of the economy** and should contribute significantly to the rapid development of other sectors of the Serbian economy, and thus help the economy to overcome the economic crisis.
- The global economic crisis requires **adjustments** in all areas, including agribusiness. Rationality, efficiency and productivity are imperatives at the micro and macro level. For a faster crisis overcome it is necessary **to stimulate the development of agriculture** with subsidies and loans as well as investments in irrigation systems. Parallel with this, to develop modern **agro-industry,** as leading sectors of Serbian economy.
- **Climate change,** which is obvious, requires a system of long-term measures and actions to mitigate this natural phenomenon.
- What is also required is **a change of management concept in agriculture.** The liberal concept with his famous principle: "Let things go their own course" (laisse faire) has experienced and is experiencing meltdown in developed countries. In agriculture it revealed itself through the message to farmers: "You know best what to do" and due to the uncontrolled import of everything and disorganized export. What is necessary is a new concept based on a partnership (not paternalistic) role

of the state and the regulated market, protected from the impact of monopoly, in which free competition is "engine" of progress. Firm "rules of the game" are necessary, which will be strictly and consistently followed by all participants. The state is responsible for establishing the rules, for the creation of conditions for their application, as well as for the stability of the business (business environment). Planning function should be reaffirmed, based on the modern economic principles and according to developed countries. It is necessary to establish a commodity-stock spot and futures trading of agricultural products.

- **Comprehensive reform**s must provide a satisfactory level and quality of agricultural production, with **harmonization** with EU standards and principles. It is necessary to reduce the cumbersome administration, to develop advisory services, to introduce the register of agricultural land, to provide transparent government spending and control the expenditure of agricultural funds.
- **Rebalance of the budget** should allocate a significantly larger amount of funds to the agricultural budget, in order to stop the negative trends, particularly in animal husbandry and to revive agriculture and the villages, as well as realization of EU competitiveness and rural development projects. Selective approach is required for spending budget, with clearly defined criteria (creation of a law on incentives). Investing in well designed and profitable projects (e.g. irrigation, new techniques and technologies, etc.).
- **Subsidies and incentives** in agriculture should include the following system of measures: premiums for certain agricultural products; regressions for the use of biological growth factors and other production costs; subsidized interest rates; export subsidies (up to joining to the WTO). Funds for this purpose should be provided from the budget of the Republic of Serbia.
- **A new agricultural policy** is necessary, which will be the carrier of agricultural development and will indicate registered **commercial farms**, including (equally) family and large farms. **According to the new EU agricultural policy** (CAP) for the period 2014-2020, the new agricultural policy implies a greater involvement of the state in agricultural and rural development promotion, in regulation of the market of agricultural products, in foreign trade policy of agricultural products and so on. Among the most important innovations of the EU agricultural policy to be followed are: harmonization of subsidies (reduction of subsidies for large producers and enhancement of production and direct payments to small producers), with a mandatory compliance of the prescribed standards of product quality. Additional investments are planned, if at least seven per cent of arable land is used for organic production, with the maintenance of permanent pasture at the farm and crop diversification. More EU funds will be available for investments in rural development and investments in research, innovation creation and knowledge transfer.
- It is necessary to conduct an adequate and consistent **land policy**, as a set of measures by which influence to the rational and sustainable use of agricultural

land could be made, as well as rare and valuable resources available in our country. **Land management policy** must be conduct, because the small demesne is serious limiting factor to the modern, market-oriented development of agricultural production.

- Encourage and provide modern **business networking of companies in agribusiness**, through associations, cooperatives, clusters, agricultural commerce, lobbying associations, non-governmental organizations. Situation with cooperatives and current problem with social ownership of cooperatives should be solved with a new law on cooperatives. Reaffirm **cooperation**, particularly between large, small and medium-sized farms, as well as within the agricultural industry.
- **Quality competitiveness** can be achieved with: standardization, investment in new technologies and knowledge. Food safety must be the imperative of quality.
- Encourage the development of **entrepreneurship in agribusiness**, through the implementation of the concept of integrated rural development to develop **multifunctional agriculture**, and through the new concept of regional development to make faster local economic development.
- Investments in science, research, education and extension. In one word, in **the knowledge**, that is the only factor that is not subject to the law of diminishing returns, but on the contrary to the law of increasing returns. This is confirmed by the experience of some EU countries, but also of our country, where the agronomic sciences and profession gave and gives good results.

Therefore, the development of agriculture in Serbia should be focused on modernizing and changing production structure towards bigger market organization and improvement of overall efficiency. Production and technological restructuring and productivity growth in agriculture, as well as greater competition in the domestic and international markets, should be based on economic, energy and environmental criteria.

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O UZROCIMA KRIZE POLJOPRIVREDE REPUBLIKE SRBIJE

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Rezime

Poljoprivreda Republike Srbije nalazi se u dugoročnoj i višestrukoj krizi: krizi upravljanja, krizi organizovanja, finansijskoj krizi, krizi konkurentnosti, krizi investiranja, krizi tržišta, krizi agrarne politike, krizi poverenja, i drugim oblicima krize. Cilj rada je da se istraže mnogobrojni uzroci ograničenja razvoja poljoprivrede Republike Srbije, pri čemu autori posebno ističu sledeće: nepovoljna agrarna struktura i neorganizovanost poljoprivrednih proizvođača; neuređenost tržišta agrarnih proizvoda; nekonkurentnost; neadekvatna uloga države; deagrarizacija i demografsko pražnjenje sela. Korišćene su kvalitativne metode analize, sinteze i komparacije, kao i pomoćne kvantitativne statističke metode. Autori zaključuju da su potrebne sistemske i radikalne mere i akcije na makro i mikro nivou, kako bi se prevazišlo teško stanje u kome se nalazi naša poljoprivreda, kao strateška delatnost Republike Srbije.

Ključne reči: *kriza poljoprivrede, Republika Srbija, uzroci, posledice, mere i akcije.*

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Rad je deo istraživanja u okviru dva projekta finansirana od strane Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije: Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru Dunavskog regiona, broj projekta III46006, kao i Proizvodnja tvrdog sira sa dodatnom vrednošću od mleka proizvedenog u organskim i samoodrživim sistemima, broj projekta TR31095.

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PROFITABILITY OF PRODUCTION OF PASTA FROM SPELT FLOUR[1]

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Summary

This paper analyzes the most important parameters for profitability of production of pasta made from spelt flour produced in an organic farming system. Research pertains to plant of medium capacity which is also suitable for construction on family agricultural households. In order to obtain a more reliable assessment of profitability, the comparison is performed with the production of wheat flour pasta. Comparative analysis of the profitability level is based on analytical calculations of production and additional derived indicators.

The main raw material, spelt flour, dominates the total costs with 59.4% (whereas for wheat flour it is 37.5%). As expected, significant share of cost is assigned to labor (12.9%), as well as fixed costs (12.4), while energy has a relatively small share (4.6%). Assuming that the high level of productivity is achieved, the average wholesale price of about € 2.11 per kilo provides an annual income of € 30,766.00 (whereas annual income for wheat is € 12,260.00). Taking into account a solid economy ratio (1.32) and payback period of investment (6.9 years), it is evident that this can be a very profitable business.

***Key words**: pasta, profitability, spelt, wheat, organic production*

JEL: Q12

Introduction

Grain crops which are botanically not a part of cereals (buckwheat, pigweed) and archaic forms of wheat (single grain, two grain, spelt and kamut) have been increasingly introduced into the production process worldwide. They are used as raw materials in baking or manufacturing of specialty products (Bognar and Kellermann, 1993; Bojnanska and Francakova, 2002).

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Spelt is used in many areas of food industry, both in human and animal nutrition (Rozenberg et al., 2003). Obtaining various end products, particularly in the baking industry (bread, pasta, etc.) represents its significant potential (Abdel-Aal and Hucl, 2005). Therefore, it is essential to master ecological production and produce new, functional, non-traditional products with high added value, such as pasta from spelt flour.

The content and quality of proteins are the main factors that determine pasta quality (Marchylo et al., 1998). Pasta is a product rich in starch but lacking in protein. In literature, numerous studies have noted the possibilities of enriching wheat pasta in order to improve its nutritional quality and functional properties (Bahnassey et al., 1986; Rayas-Duarte et al., 1996; Shogren et al., 2006). One of the raw materials suitable for enriching traditional wheat pasta with significant nutritional and functional profile is spelt flour.

Replacement of white or whole-wheat flour with flour made from spelt improves the nutritional and functional value of the product. A positive effect on human health is made by regularly consuming the product. The grain of spelt, in ideal ratios, consists of: proteins, carbohydrates, fats, minerals, vitamins, and cellulose. Dietary fibers of spelt are very soluble in water, which promotes good absorption of nutrients in the body while containing significantly more protein, fat and dietary fiber than other grains.

Since they are not seasonal goods, the sales of pasta remain consistent throughout the year. Research shows that about 88% percent of consumers in Serbia eat pasta. A third of respondents consume pasta at least once a week, about 20% consume it two to three times a month, while the same percentage of people use it more than once per week. Our market consists of about 45 domestic manufacturers of pasta, which offer roughly the same number of brands. Of those, six main manufacturers hold the major share of the market (73%), while others have a relatively small market share. Of course, foreign brands are also represented, most notably the Italian brands: Barilla, Riscossa and Buitoni.

The competition in the market does not only exist between the manufacturers that produce the same products or perform the same services, but there is also a so-called generic competition that exists between the products and services that meet the same needs of consumers, and as such the competition is prevented through detailed analysis of the market and significantly more secure long-term business is ensured (Kuzman, Cvijanovic, and Subić, 2007).

Currently, spelt pastry of undefined composition and non-standard quality appears sporadically on the domestic market. Production of pasta from spelt flour is a novelty in terms of defining formulations, nutritional quality and functionality of the final product.

In our country there are no awareness about organic food and organic products. The market is not sufficiently developed. Most of the respondents (40%) have confidence in domestic products of organic farming, which are usually bought at markets (40%), while decreasing the importance of specialist shops. It is necessary to expand the

range of products from organic agriculture, and have a continuous supply and proper marketing. With good information and consumer education spending of organic food can be raised to a higher level (Vlahović et al., 2011).

Material and work methods

The analysis focuses on the main economic indicators of production of pasta from spelt flour. In order to gain a clearer understanding of the level of profitability of production, the comparison is drawn with the production of pasta made from wheat flour. Comparative economic analysis is based on calculations of production, performed on the basis of real data from a particular company "A" from the region of southern Banat which manufactures pasta. It is a medium-sized business (producing about 60 tons of pasta a year) built on an own agricultural household, which, in conjunction with a partial reconstruction of existing facilities and the use of other, previously built infrastructure (roads, electricity, gas, transport, etc.), significantly reduces the total amount of investment (about € 260,000).

The calculations and further analyses use profit as the primary form of financial result whereby full utilization of capacity is assumed. Costs are also divided into fixed and variable which allow the results to be expressed in the form of cover margins or changes in the results at different levels of capacity utilization. For a reliable assessment of viability, it is necessary to identify additional indicators of success (cover margin, income, economy co-efficient, the rate of accumulation of production, payback period of investment). By utilizing the method of sensitive analysis, changes in obtained results are considered in relation to the change in market price of flour as the main raw material and / or finished products.

Research needs to examine whether production of spelt flour pasta can be a profitable business, considering the level of development of the domestic market or the possibility of exporting these products.

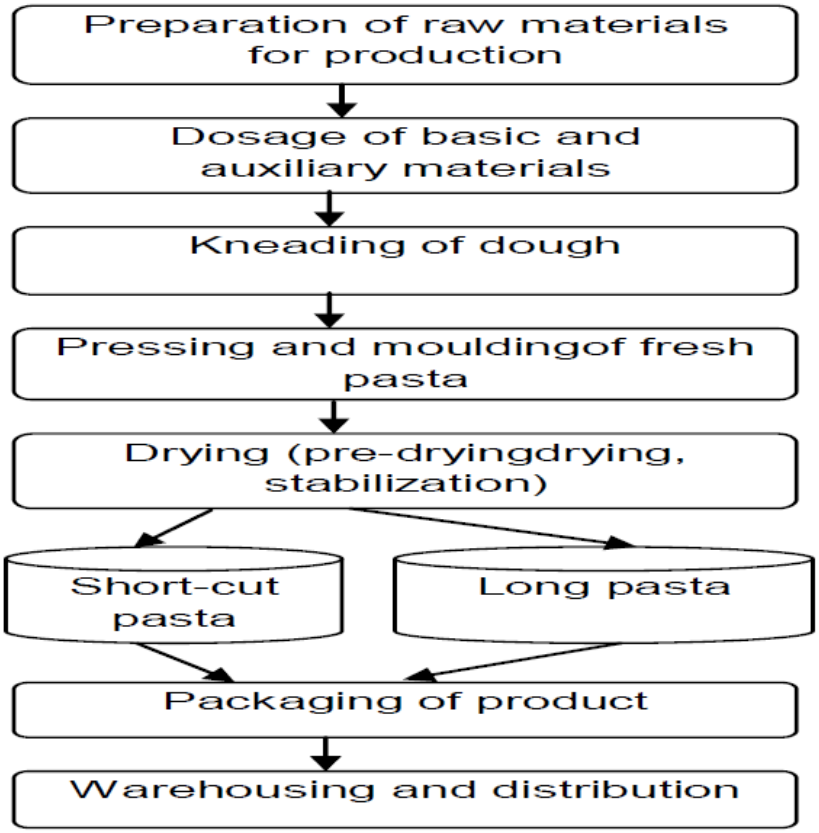
Results of research

Taking into account that economic calculations are based on the specific technical-technological and production-organizational conditions, it is necessary to first briefly describe these aspects of production. Company "A" has established and applies a HACCP system, which is an indicator of ongoing efforts to enhance product quality and an interest for product placement into foreign markets. Special attention is paid to the selection of raw materials which are procured only from well-known suppliers according to established procedure and with rigorous quality control. Maximum standardization is strived for in the entire chain, from the procurement of raw materials to the sale of finished products. Analysis of the quality and safety of raw materials is regularly conducted.

Pastry is produced with cutting-edge Italian technology, using machines featuring latest technological advances. It is a highly automated process consisting of 7 basic technological stages *(Figure1)*.

Required daily quantities of raw materials are shipped from the warehouse to the plant where pasta is produced. Preparation of raw materials involves their weighing, with additional sifting of flour.

Figure 1. Diagram of technological process for production of pasta



Dosing of all raw materials is automated using appropriate metering devices (for dosing of flour, water and water-soluble additives). Kneading of dough is performed using dough mixer which is an integral part of the machine for making pasta. Pressing and molding of fresh pasta. Depending on the type of pasta, the corresponding designing mould or a system for cutting and sorting of raw pasta is used. After formation, the pasta goes through a series of operations aimed at stabilizing the product.

Pasta is dried in a discontinuous dryer using electrical energy. Dried pasta is automatically packed in packing units (polypropylene, polythene or duplex bags) of different masses. Finished products (short-cut and long-cut pasta) are stored in a warehouse that fulfills all requirements for maintenance of quality and easy manipulation. The distribution is performed through a developed system of dispatch.

The entire process virtually does not have any negative impact on the environment and health of employees. Natural gas is used in production of hot water and heating of spaces. Dry cleaning of floors in the facility is provided, which means there are not any waste waters. Water for washing of the mold may exert a certain load on the sewerage network but only in the part of the central collector.The estimate of individual elements of calculation is based on real expenditures (material, labor, energy, etc.) as well as current market prices of inputs and finished products *(Table 1)*. Prices of inputs and finished products exclude VAT fco household, all amounts are also stated in Euros and the average exchange rate for 1 Euro is 113 dinars. Calculation is primarily compiled for the monthly production (5000 kg of dry pasta), and if necessary, the indicators are shown on an annual basis or per unit of product.

Analysis of expenses

The total cost structure is dominated by the costs of whole-wheat spelt flour as the main raw material, with 59.4%. In wheat, the share of these costs is significantly less (37.5%), due to the significantly lower price of wheat flour. Total difference in production costs of € 2794 between spelt and wheat originates mostly from the higher cost of flour. Given that this is the same production technology, the rest of the expenses are identical but the percentage share of expenses in spelt is significantly lower than that in wheat.

Labor cost (12.9%) is a significant item, despite relatively well developed automation systems. There is an indication of the low share of energy costs (4.6%), contributed significantly by the low cost of electricity in the country. The cost of € 0.10 per kw/h (which can be regarded as the average in comparable EU countries), raises the cost of energy to still acceptable 7.7%, i.e. increases production costs by 3.3%.

Fixed costs account for 12.4% of the total production cost of spelt pastry flour, which is within the acceptable limits. This percentage is applicable, of course, only for the observed level of capacity utilization (5 t/month, or 60 t/year). Any reduction in the volume of production causes a proportional increase in the share of fixed costs and increase in the cost per unit of production, thereby reducing the financial result (profit). Most of the fixed costs consist of depreciation of facilities and equipment (about 75%) while others include the cost of maintenance, interest on investment loans and working capital, as well as general expenses. General expenses are a relatively heterogeneous group made up of mostly company overheads (stationery and supplies, postal fees, administrative fees, travel expenses, insurance, various taxes, property taxes, benefits, potential cost of sales, representations, etc.).

This production is related whereby, as a result of a single technological process or common costs, two different products are created (short cut pasta - macaroni and long pasta - fida). Therefore, it is necessary to separate the total cost of certain products or determine their cost per unit of measurement (1 kg) using a separate accounting procedure. Since these are “equal” market products, this is performed in proportion to wholesale prices of each product. The average cost of spelled pasta flour (RSD 180.1/kg) is larger by about 54% compared to the cost of wheat pasta (116.9).

Analysis of obtained results

By adding commercial margins (20%) and VAT (20%) to wholesale prices, retail prices of RSD 367.2/kg of macaroni and 306 din/kg feed for pasta are obtained. The market prices of these products from wheat flour are lower by about 70% (macaroni: 216 din/kg, fida pasta: 180 din/kg). It is about 10% below average prices of imported (mostly Italian) pasta of similar quality.

The value of final production of pasta from spelt also increased by 70% compared to wheat *(Table 1)*. Since the production of spelt pasta increases the total cost by 54%, the annual amount of profit provided by this production (€ 30,766) increased by 51% compared to the production of pasta made from wheat flour (€ 12,260). It is obvious that a very significant difference is in favor of spelt.

To gain a more complete picture and provide a more precise assessment of profitability, it is necessary to consider other indicators. Cover margin is more appropriate in certain cases as an indicator for assessing the viability of individual production, compared to profit *(Table 2)*. Using cover margins eliminates the impact of increase/decrease of fixed costs on the result in case of reduction/increase in the degree of capacity utilization, which in this type of production is not rare. Reduction in the level of capacity utilization and production volume for spelt pasta by, for example, 30% causes a decline in the cover margin at the same rate, while profit decreases by 41.5%. Therefore, profit changes (increases or decreases) 1.38 times faster than the volume of production and margin coverage. Yet, there is a significant reserve given that the result becomes negative only with a reduction in the level of capacity utilization by about 70% *(for wheat: by about 50%)*.

The domestic market for products from organic production, and generally the market for functional and safe food are not well developed. These products are still not adequately priced, that is they are more expensive compared to conventional products. Certain products from conventional production of spelt have relatively high prices, close to those of products from organic production (Vukoje et al., 2011). In our conditions, however, it is probable that the same plant is used to produce both types of pasta (from spelt and wheat) as confirmed by the observed practices of companies.

Table 1. Calculation of production of pasta from spelt and wheat flour (€ 1=113RSD)

The calculation refers to a one month production in the plant, approximately 5000 kg of dry pasta

Row no.	TYPE OF COST	U.M.	Quantity	SPELT				WHEAT				DIFFERENCE (€)
				Price	RSD	€	%	Price	RSD	€	%	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13 (7-11)*
1	Wheat flour	kg	5500	97.2	534722	4732.1	59.4	39.8	218981	1937.9	37.5	*2794*
2	Eggs	pcs	5500	9.5	52381	463.5	5.8	9.5	52381	463.5	9.0	*0*
3	Additives	1	5.5	2875.0	15813	139.9	1.8	2875.0	15813	139.9	2.7	*0*
4	Water	1	17760	0.094	1672	14.8	0.2	0.094	1672	14.8	0.3	*0*
5	Packaging				23750	210.2	2.6		23750	210.2	4.1	*0*
6	Other				3208	28.4	0.4		3208	28.4	0.5	*0*
I	**Material**				**631546**	**5588.9**	**70.1**		**315806**	**2794.7**	**54.0**	***2794***
7	Electricity	Kw/h	7150	5.81	41530	367.5	4.6	5.81	41530	367.5	7.1	*0*
8	Labor	hrs	3.0	35650	115950	1026.1	12.9	38650	115950	1026.1	19.8	*0*
A)	VARIABLE COSTS (1 to 8)				**789026**	**6983**	**87.6**		**473285**	**4188**	**81.0**	***2794***
9	Fixed costs				111264	984.6	12.4		111264	984.6	19.0	*0*
B)	**TOTAL COSTS (1 to 9)**				**900289**	**7967**	**100.0**		**584549**	**5173**	**100.0**	***2794***

	ACHIEVED RESULTS	U.M.	Quantity	Price	AMOUNT RSD	AMOUNT €	Cost price (RSD)	Price	AMOUNT RSD	AMOUNT €	Cost price (RSD)	
10	Long pasta	kg	3000	255	765000	6770	**192.9**	150	450000	3982	**125.3**	
11	Short cut pasta	kg	2000	213	425000	3761	**160.8**	125	250000	2212	**104.4**	
C)	**PRODUCTION VALUE (10+11)**				**1190000**	**10531**			**700000**	**6195**		***4336***
D)	**GROSS PROFIT (C - B)**				**289711**	**2564**			**115451**	**1022**		***1542***

Table 2. Additional indicators of success

No.	Type of indicator	Spelt	Wheat	*Difference*
		(€/year)	(€/year)	(€/year)
1	Cover margin (C - A)*	42581	24076	*1542*
2	Income (D + 2/3 of labor costs)**	38975	20469	*1542*
3	Economy of production (C / B)	1.32	1.20	*0.12*
4	Accumulation of production (D / C)	24.3%	16.5%	*7.8%*
5	Investment value	260000	260000	*0.0*
6	Annual financial flow (D x 12 - 10% tax on result + Depreciation)	37753	21098	*16655*
7	Payback period of investment (5 / 6)	6.9	12.3	*-5.4*

* *Marks refer to the data from the Table no. 1*
** *The assumption is that 2/3 of labor force consists of members of the family*

For the purposes of analysis, it is important to consider the most important economic parameters and these (target-specialized) types of pasta manufacturing. Assuming that the production of pasta from spelt wheat is equally represented (50%:50%), the company achieves an annual income of € 21,513, economy ratio is 1.27 and investment is to be repaid in about 8.8 years. It is clear that this is also a very profitable business.

If the plant is being built, that is the production takes place on an agricultural household, the result can be expressed as household income *(Table 2).* In such case, it is possible to obtain significant additional benefit (€ 684/year) through the employment of two members of the family, which is a realistic assumption.

Economy and accumulation (profitability) of production allow efficient comparison between different productions, given that they are expressed as a ratio/percentage. For every 100 dinars incurred in the production of spelt pasta, a profit of 32 dinars is obtained. The rate of return shows that the value of production represents 24.3% of profits. This can be considered a good indicator of the value for this type of production. Production of wheat pasta recorded much lower values, but within satisfactory limits (economy:1.20; profitability:16.5%).

Payback Period of Investment is one of the primary indicators for justification of an investment. In this case, the investment is repaid in 6.9 years, which is a relatively reasonable period of time *(for wheat it is 12.3 years)*.

Sensitive analysis shows changes in profit depending on the changes in average market prices of pasta and / or flour by + /- 20% *(Table 3)*.

Table 3. Sensitive analysis (in RSD)

Spelt				Wheat			
Spelt flour (+/- 20%)	Dry pasta (+/- 20%)			Wheat flour (+/-20%)	Dry pasta (+/- 20%)		
	190	**238***	286		112	**140**	168
77.8	158655	396655	634655	31.9	40248	159248	299248
97.2	51711	**289711**	527711	**39.8**	-3549	**115451**	255451
116.7	-55234	182766	420766	47.8	-47345	71655	211655

** Average prices of products were determined as a weighted average of short- and long-cut pasta.*

The financial result is significantly more sensitive to the fall in prices of finished products (pasta) than on the increase in price of raw material (flour). In the production of spelt pasta, the result becomes negative with an increase in flour prices of about 65% (RSD 150/kg) or a reduction in the average price of pasta of 44% (RSD 157/kg). In wheat, this reserve is significantly lower, but large enough. Financial loss occurs when the price of flour increases by 53% (RSD 61/kg) or when the average price of pasta decreases by 17% (RSD 116/kg).

Conclusion

Products made from spelt are of high quality, there is a significant and stable domestic demand for them, but also a very serious potential for exporting. Production of spelt has long been neglected in our country, which is one of the main reasons for insufficient supply of spelt products in the domestic market. Spelt has higher protein content than regular wheat, which makes it suitable for the production of a wide range of high quality food products, including the production of different types of pasta. Lately, spelt has increasingly been grown in the system of organic production. However, even the products from conventional production of spelt reach relatively high prices, close to those of products made by way of organic production.

The analysis of economic parameters shows that production of whole-wheat pasta made from spelt can be very profitable. The observed production volume at the medium-sized plant (about 60 t/year) brings in a profit of € 30,766. Considering other relevant indicators (economy ratio: 1.32; rate of return: 24.3%; payback period of investment: 6.4 years), it can be concluded that it is a very profitable business.

Higher market prices of pasta made from spelt flour are the key factors to much higher levels of profitability in relation to the production of wheat pasta, which provides about 2.5 times lower returns (€ 12,260/year).

Construction of plants for production of pasta on family households, which can supply some of their own raw materials (flour), makes this production even more profitable. An additional benefit for the household can be obtained by hiring family members. Benefits to the community are numerous and are reflected in increasing levels of employment in rural areas, further development of agricultural sector, export growth and rural development in general.

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ISPLATIVOST PROIZVODNJE TESTENINA OD SPELTINOG BRAŠNA

Veljko Vukoje[4], Đorđe Psodorov[5], Jasmina Živković[2]

Rezime

U radu se analiziraju najvažniji parametri isplativosti proizvodnje testenina od brašna spelte, proizvedene u organskom sistemu gajenja. Istraživanja se odnose na pogon srednjeg kapaciteta, koji je pogodan za izgradnju i na porodičnim poljoprivrednim gazdinstvima. U cilju dobijanja pouzdanije ocene profitabilnosti, vrši se poređenje sa proizvodnjom testenina od pšeničnog brašna. Uporedna analiza stepena profitabilnosti zasniva se na analitičkim kalkulacijama proizvodnje, odnosno dodatnim izvedenim indikatorima.

U strukturi ukupnih troškova dominira osnovna sirovina, brašno spelte sa 59,4% (kod pšenice: 37,5%). Očekivan je i značajan udeo troškova rada (12,9%), i fiksnih troškova (12,4), dok energija predstavlja relativno skromnu stavku (4,6%). Prosečna veleprodajna cena od oko 2,11 €/kg omogućuje godišnju dobit od 30.766 € (kod pšenice: 12.260 €), uz pretpostavku ostvarenja visokog stepena iskorišćenosti proizvodnih kapaciteta. Ako se uzmu u obzir i solidan koeficijent ekonomičnosti (1,32), odnosno period povraćaja investicionih ulaganja (6,9 godina), jasno je da ovo može biti vrlo isplativ biznis.

Ključne reči: *testenine, isplativost, spelta, pšenica, organska proizvodnja.*

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MODELS OF PARTNERSHIPS AND ORGANISATIONAL FORMS IN SHORT FOOD SUPPLY CHAINS IN THE SLOVENIAN MOUNTAINS

Andreja Borec[1], Jernej Prišenk[2]

Summary

An important condition for the efficient production and marketing of local food products in mountainous regions is broadly recognised in cooperation between different partners along the food supply chain. Cooperation between different actors, organisational forms and sectors is especially important in mountains and less favoured areas characterised by limited conditions for agriculture and, consequently, where few raw materials are produced. This article presents a study aimed at identifying the positive effects of cooperation between actors, organisational forms and sectors in the production and marketing system of local food products in the Slovenian mountains. Ten products were included in the study. The results indicate that the presence of the private sector both in the production and marketing system is an important condition for creating a successful and solid food supply chain.

Key words: *mountain food product, short food supply chain, actors' partnership*

JEL: *Q1, Q19*

Introduction

The mountains in Slovenia cover 72.5% of the total surface area and are characterised by high altitudes, steep slopes, low population density and an economy dominated by forestry and agriculture. Mountain agriculture in Slovenia is extensive, with low input and output farming systems. The farms are small compared to the national average, in terms of utilised agricultural area (UAA), mostly pluriactive, with an inconvenient socio-economic structure and are decreasing especially in the most remote and less favoured areas. Perpar (2002) outlined the following important reasons for the decline in the number of mountain farms: Young farmers do not see a future in farming, agricultural income is low, farms are small and agricultural land is spread out, the natural conditions for agriculture production are inconvenient and there is a deficiency of farm successors. Regardless of the unpopular image of mountain agriculture and farming, agricultural production still plays an important role in maintaining the cultural

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landscape and preservation of the population in rural areas. Furthermore, agriculture very often represents the basis of the local economy and is closely inter-related to other economic sectors, such as the food industry and tourism. The food production in mountainous regions is generally oriented towards high quality local food production. According to the EuroMARC (2010) project, mountain food products are perceived as pure, traditional and quality food closely linked to the local area, its cultural identity and local employment. In Slovenia, mountain food is generally included in short food supply chains. The term short food supply chain (hereafter referred to as SFSC) refers to the places where direct contact between producers and consumers occurs, producing advantages like confidence, maintaining integrity and consumer trust. SFSCs also play a central role in encouraging food production on small farms, in supporting local food networks and in contributing to healthy local economies (according to USDA, 2010). Marsden et al. (2000) stated that a key characteristic of SFSCs is their capacity to re-socialise food, thereby allowing the consumer to make value judgements about the relative desirability of foods on the basis of their own knowledge, experience or perceptions. The three main types of SFSCs are as follows:

- Face-to-face – consumers purchase products directly from the producer/processor on a face-to-face basis;
- Spatial proximity – products are produced and sold in the region of production, and consumers are made aware of the local nature of the products at the point of retail;
- Spatially extended – value and meaning laden information about the place of production and those producing the food is translated to consumers who are outside of the region of production.

The above-described types of SFSCs are not equally represented in Slovenia; in general, the majority of the SFSCs in the mountains are face-to-face and only few have spatially extended characteristics.

Parallel to an increased number of SFSCs is the establishment of different market channels, especially in the context of spatial proximity and spatially extended SFSCs. Irrespective, different partnerships, especially between the public and private sectors, is still a rather uncommon trend. Indeed, the most common public-private partnerships (PPP) appear almost only within projects supported by LEADER funds and via Local Action Groups (LAGs). The effects and achievements of LAG food linked projects and PPPs in the Slovenian mountains are diverse and depend on several, and above all, local factors: general development level, geographical position, presence of different institutions and associations in the area, and local individuals.

The aim of this paper is to establish which organisational forms are most common by examining local food marketing projects and which combinations of sectors (public, civil, private) are involved in collaborating on and carrying out these projects. In addition, we attempt to determine which combination has the most positive impact on supporting the SFSC and which contributes the most to the effective marketing of mountain food.

Material and methods

The survey area was limited on the Alpine region, although the mountains in Slovenia also spread into every bio-geographical region. In the Alpine region, the analysis was focused on nine LAG areas. The selection of LAGs was based on the production of local foods and the presence of SFSCs in the area, as well on the implementation of different local food marketing projects. Ten different local food products were examined and their supply chains were analysed. The selection of each food product was more linked to their existing marketing projects than to their ingredients or quality characteristics.

For the analysed SFSCs of the selected mountain food products shown in first and second column in Table 3, different actors along the supply chain, LAG representatives and marketing project leaders were interwoven. We developed a questionnaire comprising open and closed questions designed to obtain information about each local food product, the food project plan and development, the realisation and the outcomes of the projects. Although interviews with the different actors constituted the main information source, for a complete assessment of the mountain food and food chains, we also considered the historical, social and spatial background in each case. The interviews were carried out by well qualified examiners between July 2011 and September 2011.

Methodologically, the study was organised into three linked and co-related sections divided into three main steps. Step 1 include interviewing of representatives of the LAGs, actors along the food chain and project managers as well gathering of historical, social and spatial background data of mountain food products. Step 2 was intended to analysis of interest of different actors in SFSCs for the production and marketing of mountain food products. With the use of multi-criteria decision analysis (MCDA) developed for previously researches on mountain food products we acquired evaluations of production and marketing system efficiency of analyzed mountain food products. Step 3 was designed for identification of SFSC types and different sectors in the production and marketing process of each analysed food product and for analyzing the involvement of different sectors in the production and/or marketing of local food products.

For the research, it was important to ascertain the main production characteristics and the extent of the product's success on the market; thus, we examined the efficiency of production and marketing separately. To assess the production (in particular the production size) and marketing efficiency of the local food products, the DEX model was used. DEX as multi-criteria decision analysis (MCDA) model was chosen on the basis of our previous research, where MCDA proved to have good applicability to similar research subjects (Tojnko et al., 2011); in addition, it is relative easy to use and the results are highly transparent (Alphonce, 1997; Bohanec and Rajkovič, 1990; Galli et al., 2011; Rozman et al., 2009; Pažek et al., 2010; Hyde and Maier, 2006; Tiwari et al., 1999; Saaty, 1980). Although the DEX model was not the main focus of the research, the DEX results were very important for further steps. The input data for the model were provided by the previously mentioned questionnaire. After assessing the production size and marketing system efficiency, the comparison between the DEX results and different types of SFSCs, successful marketing of local food products and

different types of partnerships along the SFSC were applied for further analysis. Different types of SFSCs in the research were adopted on the basis of Marsden et al. (2000) and are represented in Table 1. One local food product could represent one, two or even all three types of SFSCs. Indeed, three of the examined food products (meat product 1, dairy product 1, cooked product) corresponded to all three types of SFSCs; they are mostly marketed on the farm, in the local markets and local shops (dry meat in the local butchery), some restaurants (local or high ranked restaurants out of the region) and even in mega markets around Slovenia.

Table 1. Identification of different types of SFSCs in the examined region based on the location where the local food products are sold

Location where local food products are sold	Type of short food supply chain
On the farm	Face-to-face
Tourist farms / farmhouses	Face-to-face
Local markets	Spatial proximity
Local events	Spatial proximity
Special local shops	Spatial proximity
Restaurants outside of production region	Spatial extended
Supermarkets, Mega markets	Spatial extended

Further, the interest of different actors in the production and/or marketing system of the mountain food products was examined. The actors are associated and are part of different organisational forms, which are manifested in tree types of sectors (see Table 2).

Table 2. Actors, organisational forms and sectors involved in the production and/or marketing system of mountain food

Actors	Organisational forms	Sector
Local producers, processors, retailers	Local companies, SMEs, local shops, etc.	Private sector
Representatives of LAGs and local policy	Public institutions, Municipalities, Development agencies, etc.	Public sector
Representatives of different local associations (e.g. association of dry meat producers), Cooperatives	Non-profit associations and unions, local NGOs, etc.	Civil sector

Between the sectors, different partnerships were recognised:
- public-private partnership – pure PPP,
- public-civil partnership – non-PPP,
- private-civil partnership – conditional PPP,
- partnership between public, private and civil sectors

Results and discussion

The first part of section 3 focuses on interpreting the results shown in Table 3, and the second part focuses on interpreting the results displayed in Table 4. Both tables are compilations of different results and analyses derived from the questionnaire, observations in the mountain area and the characteristics of the analysed food chains.

Table 3 presents the collection of DEX model results, identification of SFSC types and identification of different sectors in the production and marketing processes for each analysed food product. The results are categorised as large, average, average to small and small, demonstrating the wide variety in the production size of all analysed local food products. The qualitative assessments used for the marketing systems of the local food products are also varied: unsuccessful, partially successful and successful. Column 5 of Table 3 displays the different sectors involved in the food chains which are recognised as partners in the production process or marketing of the products. The partnership combinations between sectors are diverse, but the pure PPPs appear only in cases where the private and public sectors are involved. In cases where only the civil or/and public sector are recognised as partners, are defined as non-PPP. According to Table 3, we can consider that pure PPPs appear only in three cases (meat product 1, dairy product 1 and cooked product). All of these PPPs are partnerships supported by the LEADER programme and realised in the frame of LAG food projects. These are also the products which represent all three food chain types and where the marketing is successful and the production large, except in the case of cooked products. The production of cooked products (Pohorje pot) is small, but we could consider this as method faultiness; the final product many contain different ingredients and the production quantity was stated for each ingredient separately. Except food chains supported by the LEADER programme and with the partnership of LAGs, no other pure PPPs were identified. However, often, more than two different types of sectors are involved in the food chain, and the most frequent combination is the partnership between the public and civil sectors. This public/civil combination can be understood by the fact that these are mostly projects with a relatively low budget and profit; thus, they are of little interest to private investors. The next reason for the lack of pure PPPs is that pure PPPs are not yet well recognised and present in the local food projects. If we look separately at food production and marketing, the impact of the private sector is almost equally distributed between the production and marketing of mountain food products.

Most of the mountain food products are marketed inside the region itself. Hence, the most common types of SFSCs are face-to-face and spatial proximity for all analysed food products. Due to the generally small agricultural production, the marketing of these local products is exclusively and successfully performed at the local level. Outside of the local environment, the products are marketed in small quantities and are mostly seasonally available. The products in the spatially extended food chain type are more attractive for the private sector, although the offer is limited. These products are also best evaluated according to their production and marketing systems (grey in Table 3).

Table 3. Introduction of DEX model results, SFSC types and different sectors involved in production and/or marketing for the analysed mountain food products

Food product		Short food supply chain			Sectors involved in production and marketing	Final assessment of production process (DEX model results)	Final assessment of marketing system (DEX model results)
		Face-to-face	Spatial proximity	Spatially extended			
Meat product 1	Zgornjesavinjski zelodec (dry meat)	Yes	Yes	Yes	Private and civil sectors	Large	Successful
Meat product 2	Jetrnica (sausage)	Yes	Yes	No	Civil sector	Average	Unsuccessful
Bakery product 1	Tarragon cake	Yes	Yes	No	Public sector	Small	Partially successful
Bakery product 2	Rye bread	Yes	Yes	No	Public sector	Average to small	Partially successful
Dairy product 1	Tolminc (cow cheese)	Yes	Yes	Yes	Private, civil and public sectors	Large	Successful
Dairy product 2	Bovški cheese (sheep cheese)	Yes	Yes	No	Civil and public sectors	Average	Unsuccessful
Dairy product 3	Solčavski sirnek (dairy product from fresh milk)	Yes	Yes	No	Public sector	Small	Partially successful
Cooked product	Pohorje pot	Yes	Yes	Yes	Private, civil and public sectors	Small	Partially successful to successful
Product from fresh fruit	Cider	Yes	Yes	No	Civil and public sectors	Small	Unsuccessful
Dried fruit		Yes	Yes	No	Civil and public sectors	Average to small	Partially successful

In addition to highlighting which sector is involved or has interest in the production and/or marketing of the local food products, Table 4 below shows the grade of involvement of each sector. The grade of involvement reflects the interest level of each sector. For the results (grades 5–0 or from high to no interest), the questionnaire answers were used. The answers of all of the respondents (different actors along the supply chain, LAG representatives and marketing project leaders) concerning the interest/involvement of different sectors in production and marketing were also used.

Table 4. Quantitative grades of interest/involvement of different sectors in the production and marketing systems

Food product	Production	Marketing and promotion
Meat product 1	Civil sector = 3	Civil initiatives = 3
	Public sector = 0	Public sector = 0
	Private sector = 5	Private sector **= 5**
Meat product 2	Civil initiatives = 1	Civil initiatives = 1
	Public sector = 0	Public sector = 0
	Private sector = 0	Private sector = 0
Bakery product 1	Civil initiatives = 0	Civil initiatives = 0
	Public sector = 5	Public sector = 5
	Private sector = 0	Private sector = 0
Bakery product 2	Civil initiatives = 0	Civil initiatives = 0
	Public sector = 2	Public sector = 1
	Private sector = 0	Private sector = 0
Dairy product 1	Civil initiatives = 3	Civil initiatives = 5
	Public sector = 5	Public sector = 5
	Private sector = 5	Private sector = 5
Dairy product 2	Civil initiatives = 1	Civil initiatives = 1
	Public sector = 3	Public sector = 3
	Private sector = 0	Private sector = 0
Dairy product 3	Civil initiatives = 0	Civil initiatives = 0
	Public sector = 3	Public sector = 3
	Private sector = 0	Private sector = 0
Cooked product	Civil initiatives = 1	Civil initiatives = 1
	Public sector = 3	Public sector = 3
	Private sector = 1	Private sector = 5
Product from fresh fruit	Civil initiatives = 1	Civil initiatives = 1
	Public sector = 5	Public sector = 1
	Private sector = 0	Private sector = 0
Dried fruit	Civil initiatives = 1	Civil initiatives = 1
	Public sector = 2	Public sector = 2
	Private sector = 0	Private sector = 0

As Table 4 indicates, the private sector is involved or has interest in three mountain food products (meat product 1, dairy product 1, cooked product); however, the pure PPP could only be recognised for two products (dairy product 1 and cooked product), while meat

product 1 in the private/civil partnership evinced a conditional PPP. For meat and dairy products, the involvement of the private sector in terms of both production and marketing has the same grade; however, for cooked products, the involvement of the private sector is more on the marketing side. Indeed, the interest of the private sector in the production process is very low, as shown in the results reported in Table 3. This outcome is reasonable if we consider that the product contains many ingredients with separate small productions (herbs, vegetable, meat, fungi, etc.). With regard to the interest of other sectors in production or marketing, we could conclude that the public sector is more involved in the production of bakery product 2 and fresh fruit for cider; otherwise, the involvement of the public sector is quite proportional between production and marketing sector. The civil sector is more involved in the marketing of dairy product 1; otherwise, its involvement is distributed between production and marketing. Among the partnerships, the public/civil type is most common (diary product 1, fresh fruit, dried fruit), followed by pure PPP and private/civil partnership (meat product 1). Furthermore, as regards the products where the public sector or public/civil partnership predominate both in terms of production and marketing, the supply chains are characterised as the face-to-face or/and spatial proximity type. Where the food chains are longer, for instance, in cases of the spatially extended type, the involvement of the private sector is present both in the production and marketing systems. An interesting finding is also that if the grade of sector involvement is low (e.g. meat product 2), a partnership is not evident (i.e. only one sector present), the assessment of the production is small to average and the marketing is deemed unsuccessful or partially successful.

Conclusion

The analysis of these mountain food products and food chains highlights one vital problem - the limited conditions for agriculture and, therefore, for high yield production, which further results in small quantities of food products. The results also reveal the low interest of all sectors recognised in these products, especially the private sector (only three products). The private sector, with partnerships with the public and/or civil sector, is involved with products with spatially extended SFSCs. Furthermore, from a broader perspective, these products arise from the tourism industry in the most developed areas; thus, different marketing opportunities exist. What is surprising is the lack of private interest is in these food products, irrespective of whether they have efficient production or marketing. Indeed, the civil sector is involved in seven of the examined products and the public sector, eight, with equal involvement in production and marketing.

Some of the products with no private interest also come from the same tourist region. The reasons for the lack of private interest are very diverse: from individual reasons (actors are not willing to collaborate, financial profit of individuals is in average low) to more sophisticated reasons connected to local policy, and last but not least, reasons connected to the special taste of these products (e.g. diary product 3).

In terms of the food chains, it was recognised that only one model of pure PPP exists, namely, the partnership between small local SMEs and LAGs via LEADER funds. Other PPP models are uncommon. Much more common are public-civil partnerships or

even a combination of all three sectors (public, private and civil). The results show that collaboration between more sectors and actors is also not indicative of the successful marketing of the product.

All analysed food products reveal face-to-face or spatial proximity supply chains and three food products, in addition to the spatially extended type of SFSC. Spatially extended means that the food products are sold in and outside of the region where they originate, in specialised shops, in highly ranked restaurants, at weekend markets in cities or at festivals. Only one product (dairy product 1) was found in supermarkets and mega markets around Slovenia, although seasonally. This is also the product with the highest production, with the greatest involvement of all three sectors, with a pure PPP model and where the private sector is interested in both the production and marketing of the product. It is interesting that no alternative market channels were identified (e.g. subscription farming, organisational collaboration, home delivered routes, sales online, roadside stands) for the analysed products, although these are not uncommon in the Slovenian mountains. In our opinion, the main reason for this is that the alternative market channels are not commonly linked to LEADER supported projects.

Returning to our findings, the most positive impact on the marketing and sale of the mountain food products could be recognised among the products with a high production, with the longest food chains and with pure PPP both in terms of production and marketing. There is one flaw in the study, however. The study was conducted only on mountain food products which are involved in the food linked projects managed by LAGs and supported by LEADER funds. To overcome this weakness, the study will be broadened in the future to include other mountain food products.

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THE RELEVANCE OF TRACEABILITY IN THE FOOD CHAIN

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Abstract

Traceability is a modern concept that allows following a product's route from raw materials to the selling stage, taking into consideration its complete flow by means of identifying and tracking procedures and documents.

Recently, food traceability has gained significant importance as it allows efficient identification, correction or removal of risk factors throughout the food chain in order to deliver only safe and quality products to consumers.

The paper aims to outline the main food traceability conceptual approaches and to highlight traceability key-elements and objectives in order to emphasize the significance of a traceability system for the food chain.

Key words: *traceability, traceability system, food chain*

JEL: *Q18*

Traceability – concepts and objectives

The notion of "*traceability*" first originated in different fields related to health, space and arming activities, but it has also extended to industrial sectors, including the food industry sector.

In the past decades, the need for information regarding animal health and food quality and safety has significantly increased for governments, regulators, businesses and consumers, as a result of several crises. Encountered issues underlined the need to develop instruments that could guarantee reliable information throughout the food chain and could enhance food safety.

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Concepts - As a concept, traceability developed in the context of the quality system preoccupations. Although it can be traced back to the 90s, interest in food traceability has intensified, especially in the last two decades, due to the various food crises that severely affected many countries, especially the European ones.

The first international definition of traceability was given in ISO 8402 standard in 1987 (also assumed later in ISO 8402:1994 edition of the standard) as "*the ability to retrieve history, use or location of an entity by means of recorded identifications*". The entity may designate: an activity, a process, a product, an organization or a person.

Subsequently, the concept of traceability was introduced in ISO 9000 series of standards on quality assurance systems as a key element of any quality management product.

Thus, ISO 9000:2005 defines traceability as the "*ability to trace the history, application or location of that which is under consideration", adding that "when considering product, traceability can relate to the origin of materials and parts; the processing history, and the distribution and location*".

The US Food and Drug Administration (FDA) proposes the following definition: "*the ability to identify by means of paper or electronic records a food product and its producer, from where and when it came, and to where and when it was sent*" [5].

At European level, recommendations of good practices prefer the definition set according to EU General Food Law (Regulation [EC] No. 178/2002, Article 3: "*'traceability' means the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be, incorporated into a food or feed, through all stages of production, processing and distribution.*" [3]

This regulation has promoted the concept "*from farm to fork*", or in other words knowledge of the food chain from primary producer (farmer) up to the consumer, to help identify the cause of an event of major non-compliance related to product safety and to limit the expansion of negative consequences.

According to the Codex Alimentarius Commission (CAC 60-2006) [4], traceability or product tracing means "*the ability to follow the movement route of a food product through specified stage(s) of production, processing and distribution*". Traceability allows thereby the tracking of a product, following its path from raw materials until exposure for selling, including their path to the final consumer.

In Romania, the definition of traceability is found in Law no. 150/2004 [2], indicating the possibility to identify and follow the entire course of all stages of production, processing and distribution of food, feed, animal intended for food production, or a substance which is, or that can be incorporated into food or feed for animals.

As a related concept, according to ISO 22005 standard [7], traceability system means all data and operations able to maintain the desired information about a product and its components during a segment or the whole chain of production and use.

The term "traceability" is often used in close correlation with the concept of "product tracing": while "traceability" is considered a passive process, "product tracing" is an active process [5]. All these approaches are similar, containing elements of common reference. Thus, traceability implies using identification and record systems, and also a system of communication between operators.

Objectives of traceability - The main purpose of traceability development is to increase security and safety throughout the food chain and to establish an acceptable model for raw material supply, food production, marketing and consumption. Traceability systems are likely to detect raw materials or products, identifying them downstream and upstream of the production chain, regardless of the time and place of the technological flow [10].

Food traceability allows total control over the products by individual and group identification (lot or batch), representing a tool for achieving the following *objectives*:

1) to contribute to foodstuff safety, managing risks related to food safety and animal health issues, allowing, if necessary, withdrawal of nonconforming batches and product recall. This means to [5]:

   - identify outbreak or hazard sources;
   - manage safety alerts;
   - withdraw contaminated or dangerous products.

2) to provide reliable information to product users, to guarantee products' authenticity and to ensure consumers that certain production practices have been followed. This means that traceability can be used to [5]:

   - ensure fair practices in trade;
   - protect consumers from fraud;
   - safeguard producers from unfair competition.

3) to improve overall product quality and processes; traceability is an instrument to identify sources of non-compliance and to enhance product flows and stock management.

In order to achieve traceability objectives, the organization must define in particular:

- information to be obtained from suppliers of raw materials, auxiliary materials, packaging, etc.;
- means of identification of supplied products which allow the return of an inadequate lot.

Traceability allows pursuing a product's route by following a product from raw materials to marketing exposure, including its way to the final consumer and thus completing the flow of food through documented identification and tracking, according to the concept "from farm to fork" and reversely, "from plate to source". Regarded as a supply chain process, traceability can be conducted in two distinct *directions*:

- following forward or downward traceability (*tracking*); this is the ability to locate a product based on specific criteria, at any of its locations in the supply chain. This term

defines the present monitoring step, the current position of any given product. Tracking provides real-time data and current information on the status and location of a product;

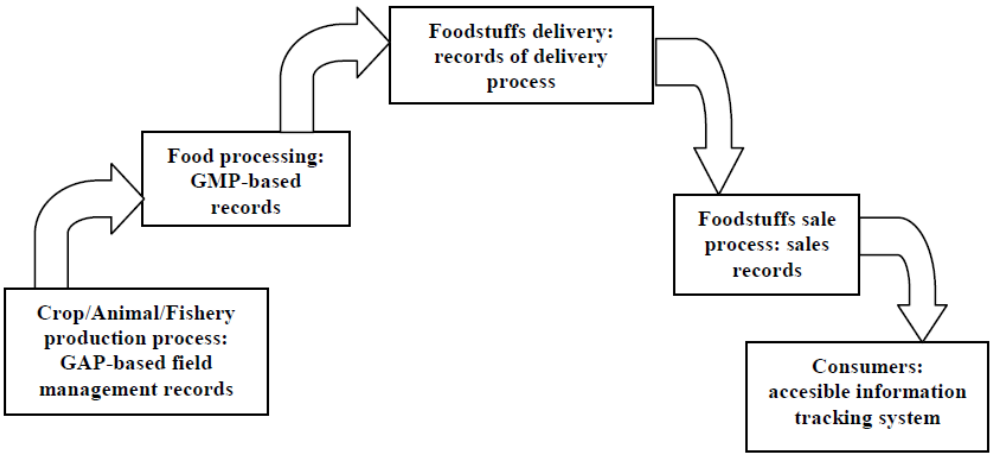
- following backward or upward traceability (*tracing*); this is the ability to identify the origin and characteristics of a product based on criteria established uniformly for all points of the distribution chain. This term defines subsequent visualization of steps taken by recording "tracks". In this approach, traceability becomes the "big picture" that reflects the past.

Types, elements and mechanisms of traceability

Food traceability can be achieved by recording information upstream and downstream related to the physical flow deployed in the production process (see Figure 1).

Traceability systems are able to provide records, according to the nature of the product, production and processing practices, customer specifications, regulatory requirements. In some cases, laboratory tests may serve as support systems for checking traceability.

Figure 1. Main components of a Food Traceability System



Source: adaptation from [8]
Note: GMP - Good Manufacturing Practice; GAP - Good Agricultural Practices

The following subtypes can be distinguished:

1) internal traceability, represented by the information that allows product tracking within an organization; internal traceability occurs when traceability partners receive one or more materials and ingredients that are subject to internal processing (within the organization). The development of an advanced internal traceability system can be stimulated by developing and implementing effective data storage, production process control and quality assurance.
2) external traceability, represented by the information received or provided by the other members of the food chain on a particular product;

3) traceability of the food chain, i.e. traceability of the chain links, with a focus on information accompanying the product from one end to the other in its chain, so that traceability should be extended for any product at all stages of production, processing and distribution.

Traceability *components* can be summarized as follows:

- Provider's traceability - includes all records and documents according to which the source of all raw materials, ingredients and additives can be proven;
- Process traceability - represented by records made during the technological process, which provides the possibility of identifying all raw materials, ingredients, additives etc. used to obtain a certain product and operations that they have suffered during the technological flow.
- Client's traceability that ensures the identification of all customers of the product.

Traceability represents, on the one hand, the ability to restore the food chain from harvesting, transportation, storage, processing, distribution and marketing (external traceability) and on the other hand, the ability to trace the history of the product at any stage in the chain (internal traceability).

There are *six basic elements* of traceability which form an integrated agri-food chain traceability [11]:

Product Traceability - determines the physical location of a product at any level in the food chain, in order to facilitate logistics management, product recall and dissemination of information to consumers and other stakeholders.

Process Traceability - defines the type and sequence of activities affecting product during growing and post-harvest operations.

Genetic traceability - determines the genetic structure of the product, including information about the origin of genetically modified organisms (GMOs) or materials derived from GMOs.

Inputs traceability - determines the type and origin of inputs such as fertilizers, irrigation water, livestock, feed, additives;

Disease and pest traceability - traces the epidemiology of pests and biotic hazards such as bacteria, viruses and other pathogens that may contaminate food and other products derived from agricultural raw materials.

Traceability of measurements - connects individual measurement results within a continuous calibration circuit to accepted reference standards. To achieve this, test and measurement equipment and measurement standards are calibrated using a reference standard whose calibration is certified as traceable to a national or international standard.

The process of ensuring traceability takes place in four *stages* [15]:

1. identification of lots of products that have been subject to the same processes of production and / or processing;
2. recording information on the production process (on electronic or paper support);
3. establishing links between information; each economic operator in the chain - agriculture, manufacturing, distributor, point of sale - must be able to provide documented evidence of the link between batches, suppliers and customers;
4. communication - every economic operator in the chain communicates the identification elements of the lot to enable the continuous implementation of the traceability principles.

The basic characteristics of traceability systems (e.g. identification, information and connection between them) are common to all systems, regardless of the type of product, production and control system applied.

In practice, traceability systems consist of record keeping procedures that show the path of a product unit, a group of products or ingredients from a supplier, through all intermediate steps along the food chain to the final consumer and *helps to*:

- identify units / batches of all ingredients and products;
- provide information about when and how products were sent and processed;
- configure a system that correlates the data.

Simple records, hand-written or printed labels are today quickly replaced by automated identification (e.g. bar codes and radio frequency tags). In this way, the amount of information that can be identified and provided by such systems has increased significantly.

Traceability in the food chain - establishing the information link between different entities - cannot be achieved without an integration based on a vertical approach of information. In this respect, careful planning is required from the early stages of development, taking into account *three essential elements* to the success of any traceability system:

1) compatibility;
2) standardized information;
3) defining the resources that shall be subject to traceability and the traced unity.

All over the world, there are many approaches for unique identification of food [14] using different types of identifiers, hardware and software solutions. Several *means of product identification* are presented below:

- Bar codes (including 2D): originally applied only to products in order to identify them in the marketing chain, have been used for several years for traceability purposes related to raw materials processing [12, 13].
- Radio frequency identification (using RFID technologies):
    - transmitters transmit energy in the form of radio waves through an antenna, so that when waves meet the label, it emits a radio signal that can be picked up by the transmitter and decoded to reveal the contained information;

- electronic tags can be attached to boxes, racks, machines and are used to carry traceability information in a format that can be read remotely;
- edible markers - to be applied directly on/in food, the marking should consist of an edible substance, generally recognized or scientifically proven to be safe for human consumption.

· Individual identification systems:

- DNA tests and iris scanning can be performed on animals at any stage of life;
- optical signatures can be encoded on plastics during manufacturing and can be read anywhere on the package under fluorescent lighting;
- chemical volatile signatures.

Despite the diversity of traceability technical solutions commercially available, there are several *constraints and problems* that drive forward the search for optimal traceability concept that could work globally:

· multi-ingredient foods may include materials from different food chains and countries, importers may have to rely on the traceability systems of other countries up to the point of import [14];
· bulk supply may consist of a heterogeneous mixture of lots, and product lots are not uniform themselves;
· high reliance on business operators capability to maintain adequate records and internal traceability;
· slowness when utilizing traceability for outbreak investigations [14];
· food business operators involved are using different ordering systems;
· difficulties in transmitting information;
· technical issues due to specific characteristics of product, operation and sector [1].

The importance of traceability systems

Traceability schemes must satisfy the need to follow legislative requirements, also contributing to the improvement of the control process and manufacturing practices (GMP). The need for documented traceability systems for the food chain has never been stronger than in the period that began in the 1980s, as issues posed by the dioxin crisis in Belgium, BSE in UK, the current debate on GMOs, and horse meat adulteration scandal in Europe in 2013 highlight concerns about lack of foodstuffs traceability.

Initially, the loss of consumer confidence in beef in the UK due to the BSE crisis has exacerbated this need, especially in the context of the export ban. This problem has focused heavily on the lack of adequate traceability system that governmental authorities should have provided for beef. While BSE was fundamentally a food safety issue, it is now widely accepted that the debate on GMOs is a consumer choice, strongly related to transparency and ethics regarding labeling. In this context, traceability is an essential aspect in order to meet labeling requirements according to EU legislation and to justify labeling of "GMO free" foodstuffs.

Considering how these recent issues affect the food industry, globalization of supply and production, some *key aspects* of traceability systems could be identified:

- compliance with national and international traceability requirements;
- development of schemes for agricultural production for conventional or organic foods, able to meet market demands and health or other requirements.
- ingredients definition and control using complete specifications (including the ability to avoid negative requirements such as allergens);
- improved process control and GMP using complete specifications and standards and minimizing losses; implementation of traceability systems in production may cause changes related to process control systems.
- improved consumer perception by raising transparency, confidence and fidelity.

A traceability system provides useful information for *both* the entire supply chain *and* the end consumer.

For the *food industry*, traceability gained significant importance because some records are ethically and legally essential for producers, distributors and consumers (e.g. consumer information, pricing, optimal processing etc.).

Regarding the food industry and processing sectors of agricultural and livestock products, traceability systems are part of the ability:

- to meet legislative requirements;
- to take immediate collective action by withdrawing products from the market and maintaining the company's reputation (in the case of quality and food safety related incidents);
- to minimize the size and costs of withdrawn lots;
- to minimize the spread of any animal contagious diseases;
- to protect food chain from the effects of emerging diseases in animals;
- to provide products that maintain and increase consumer confidence;
- to provide differentiated products on the market.

For the *retail distributor*, traceability provides information on:

- what is the origin of food and when was it processed;
- which *organizations were involved in the food processing and distribution*

For wholesale distributor, traceability provides information on:

- when to expect the new lots of products at the maximum distribution capacity;
- what are the changes in the requirements of transport, storage etc.

Similar requirements apply to all levels of the food chain: processing, marketing, restaurants, catering etc.

Traceability systems are of special interest also for *governments*, as part of the system that:

- protects public health through food withdrawal when necessary;
- helps prevent fraud when tests can not be used for authentication (e.g. organic food);

- controls zoonotic diseases;
- enables human and animal health control in emergencies (e.g. soil contamination, raw materials contamination);
- facilitates epizootic and enzootic control of livestock diseases through early identification of sources of diseases and dangerous contacts;
- monitors/controls the livestock number related award of subsidies.

Traceability systems are also useful to *consumers* because they help them to avoid specific products and food ingredients that may cause allergies, food intolerances, or those that do not meet a particular lifestyle, enabling the choice between different kinds of food. Moreover, in case of necessity, traceability ensures food safety by helping consumers to recognize the product, and to buy only safe foodstuff that meet their needs.

Conclusions

Traceability is part of the reactive control system for risk management. A traceability system provides answers to the following *questions*:

1) when? where? which type? how much was produced? by whom? who participated and in what production phase of the product?
2) when? where? how much? by whom was it deposited? how long did that product remain in stock?
3) when? where? by whom? to whom? what is the delivered quantity?

Traceability, as it is designed and used in food production practices, is a key element of transparency. The traceability associated with an information flow is a physical process, which consists in tracing food in space and time. Traceability is a simple concept from a cognitive perspective, but it evinces complex features in terms of practical implementation. Traceability is integrated into the quality system.

Traceability is advantageous in the following *ways*:

- Animal health protection - protection of animal health burden is mainly farmers' responsibility, as their interest is to keep animals in a very good state of health in order to avoid economic loss;
- Poultry and animal disease control – as traceability serves to immediately trace the source on the one hand, and on the other hand, to check all links in the processing chain, which excludes transferring animal diseases to humans;
- Protection of human safety - is favored by the traceability system for multiple reasons: exclusion from slaughtering of diseased or animals suspected of infectious and contagious diseases for public consumption; selling meat products and by-products derived from such animals;
- Fraud control – traceability, along with regular records audits can prevent fraud on the products origin, on the species of organisms used to obtain a product and allows verifying the truthfulness of statements about raw materials or products;
- Facilitating withdrawal - traceability allows the determination of control measures to

prevent or reduce an identified hazard, in the event that an incident that endangered the safety of consumers has occurred;

- Promoting the brand - leading to the establishment of trust in consumer loyalty regarding the goods/services provided by the manufacturer, ensuring the originality of goods and/or services for which the mark has been created;
- Developing food contaminants monitoring programs - traceability facilitates the identification of key products in a food chain where product sampling is necessary to monitor the concentration of chemical, microbiological and biological contaminants;
- Risk assessment from exposure to food - can be easily demonstrated by correlating information from traceability records of the system.

Careful planning is essential for ensuring traceability throughout the food chain, taking into consideration the need to create consensus among the food operators and to gain consumers trust, which involves compliance with the set standards. Introducing the system through the food chain and establishing effective connections among all the sub-systems requires both a consistent approach of the food traceability system implemented by each food operator and a common understanding regarding food traceability among all food business operators.

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Review Article

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NEW DEVELOPMENTS IN RUSSIA-EU TRADE WITH AGRICULTURAL GOODS: INFLUENCES OF TRADE INTEGRATION

Vasily Erokhin[1], Anna Ivolga[2]

Summary

Trade of agricultural products in the last decades has become more and more globalized. The global trading system is now both freer and fairer than ever before, boosting global prosperity, making significant contribution to global economic development. Main goal of the paper is to analyze the current state of Russia-EU trade of agricultural products. The period of analysis includes 2001-2011. The analysis involved main exporting and importing countries for each analyzed product group. Sub-goals include an overview of the WTO threats and opportunities for Russian agriculture, and trade with agricultural products globally, as well as comparison of main consequences of WTO accession for such CIS countries as Kazakhstan, Ukraine, Kyrgyzstan, Georgia and Moldova. This is also, related to state support of agricultural production in Russia and CIS and its influence on volumes, directions, structure and effectiveness of international trade with agricultural products.

Key words: *international trade, agricultural products, European Union, World Trade Organization, trade integration, Russia, Commonwealth of Independent States*

JEL: *F13, F15*

Introduction

Currently most of the regulatory functions on the global market of agricultural products are implemented by the World Trade Organization (WTO). This global organization unites the majority of the countries, including the main agricultural producers, exporters and importers. However, international trade with agricultural products is still rather far from full liberalization despite the progress achieved in international trade by agricultural production carried out within the framework of the WTO after many rounds of negotiations. Such issues as state regulation of trade, further perfection of sanitary control rules, decrease of custom duties and administration of tariff quotas on imported agricultural production

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would affect the character, structure, directions and dynamics of trade with agricultural products in future. [10]

Until recently only one of the main global producers of agricultural products – Russia was not among the WTO members. Russia's accession to this global trade system in 2012 and membership of some CIS countries in WTO can change the structure and main tendencies of trade with agricultural products significantly. This is especially related to EU-CIS and USA-CIS trade with agricultural products since agriculture is supposed to be one of the most "sensitive" spheres influenced by trade agreements within CIS and Russian accession to WTO.

Many Russian experts foresee that the majority of Russian agricultural industries cannot equally compete with foreign producers. The dependence on import deliveries is critically high. Local agricultural and food products cannot identify customer in foreign and local Russian markets. Russian experts anticipate the decrease of the share of local agricultural producers on the internal market which, in turn, will affect the employment in related industries. Food processing industries, especially meat and dairy, are expected to be the most impacted.

Additionally, trade integration can bring not only damages, but also advantages. Along with a wide range of disadvantages to Russian agriculture resulted from Russia's accession to the WTO, many experts reasonably observe a series of opportunities, especially in the sphere of agricultural export. Russia is a traditional exporter of agricultural products to CIS, EU and USA, and WTO membership can provide easier access to foreign markets for Russian agricultural producers. Trade integration is also a process actively developed nowadays among Russia, Belarus and Kazakhstan (agreement on customs union) and among Russia and Ukraine - the second biggest CIS agricultural producer. [6] These processes, supported by Russia's membership in WTO, will influence significantly the character of international trade with agricultural products in the region.

Material and Methods

The current state of EU-CIS international trade is analyzed on the example of main goods having the biggest ratio in the structure of bilateral trade turnover. Special attention is paid to agricultural products, since agriculture is one of the most "sensitive" spheres influenced by trade integration, including trade agreements within CIS and membership of some of CIS countries in WTO. The period of analysis was 2001-2011. The analysis involved main exporting and importing countries for all analyzed goods.

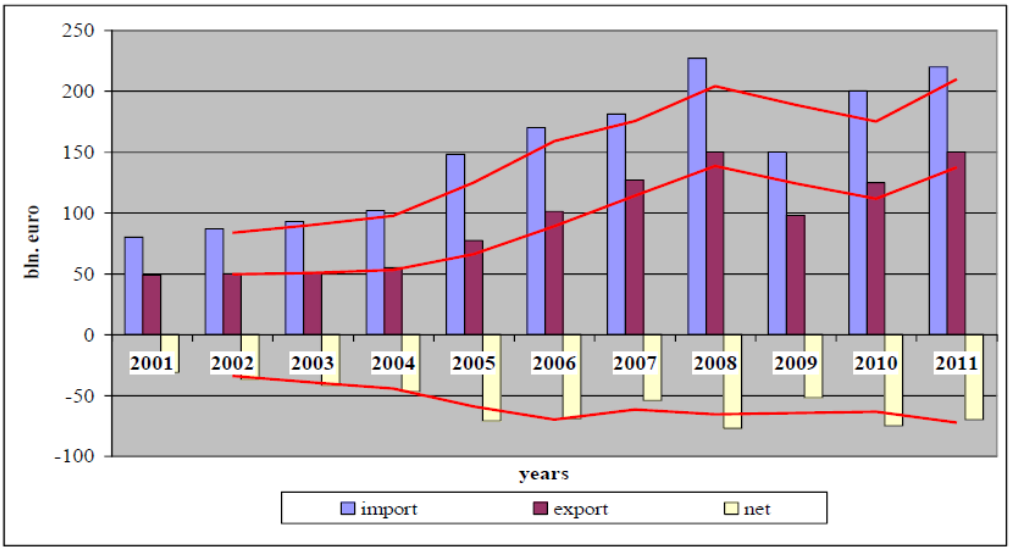
Methods of quantitative and comparative analysis were implemented. The data summarized for 4 CIS countries were compared to EU-27 data. Trade data for this research are from Final Report "International trade and international cargo flows in 2011" by VLANT consulting company. An alternative source is the "Commodity trade between EU-27 and CIS countries, 2000-2010" by Eurostat.

Results and Discussion

International trade during post-crisis 2009-2011 was developing multi-directionally. As a consequence of the significant growth of global prices for raw goods, the increase of global trade monetary value in 2011 was 19%. This was lower than 2010 (22%), when international trade experienced active volume recoveries after the economic crisis of 2008-2009s. However, such significant growth should be primarily explained by the growth of global prices – as the quantum index of international trade in 2011 increased only 5% (14% in 2010). This was substantially lower than the pre-crisis levels when the sustainable growth of international economics volumes was observed – up to 10% annually during the preceding decade.

The indicative trend of the post-crisis international economic development is the advanced growth of interregional trade, observed in 2006-2011, even despite the economic recession. This shows the strengthening differentiation of labor at the macroeconomic level. The highest increase of exports was observed for the regions specialized in raw goods supplies. The best import dynamics were in the developing countries (as a result of global imports appreciation) and again the same "raw" regions – as a result of growth of their revenues on the global market, and enlargement of their effective demand. [11]

Picture 1. Interregional EU-27-CIS trade in 2001-2011 (in bln. €)



Source: International trade and international cargo flows in 2011 (final report), Consulting company VLANT, 2012, access at http://vlant-consult.ru

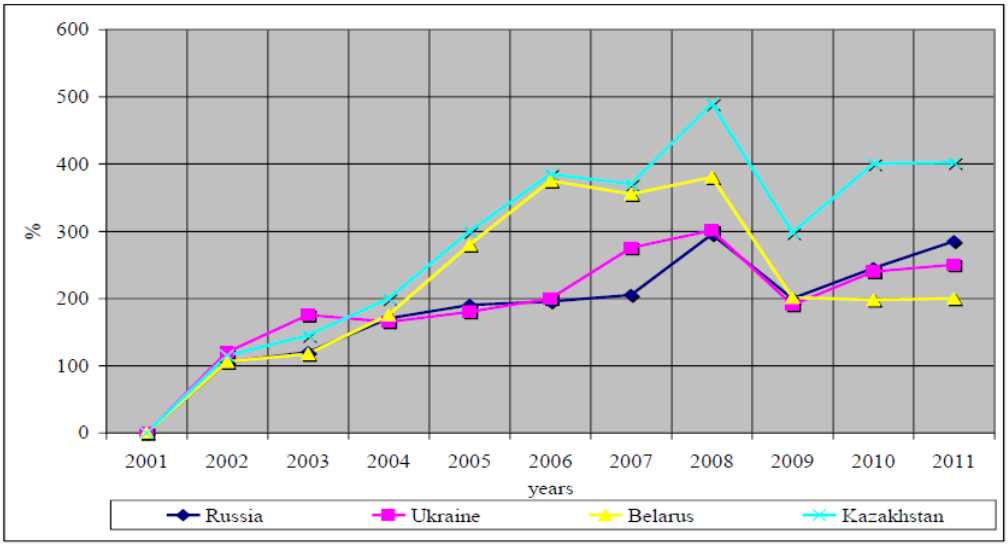
EU-CIS trade flow remained one of the world's biggest from 2009-2011, although South-East Asia – East Asia trade flow, the most dynamic one in last decade, was progressively reaching similar levels [1]. Commonwealth of Independent States is the relevant EU-27 trade partner. The annual volume of interregional trade almost tripled – from €109.7 bln. in 2000 to €330.0 bln. in 2011. However, a significant drop of exports and imports in

2009 was recorded as a result of global economic recession. Following rapid (up to 30% annually) growth of interregional trade volumes in 2009-2011, let us forecast the recovery of export and import volumes at 2008 levels even in 2012, as well as the achievement of a horizon of €250 bln. imports and €170 bln. exports in 2013.

In 2001-2011 (except «crisis» 2008-2009), the annual increase of EU-27 imports from CIS countries was 10.1%. Such a high level can be explained primarily by the growth of imports volume from Russia as well as imports increase from Kazakhstan, Azerbaijan and Ukraine.

Russia's share in the structure of foreign trade turnover between EU-27 and CIS countries remains significant, including the period of global economic recession and considering the non-membership WTO status of Russia until 2012. Russia's share is 79% of EU-27 imports from CIS countries and 71% of EU-27 exports to CIS countries. The structure of Russian exports to the EU is homogenous during the last decades – over 78% of Russian exports to EU-27 is mineral fuel (2011). EU-27 exports to Russia are much more diversified, mainly consisting of machineries, equipment and transport vehicles (44% in 2011).

Picture 2. Dynamics of EU-27 imports from some of the CIS countries in 2001-2011 (in %)



Source: Nilson, A. (2011): *Commodity trade between EU-27 and CIS countries*, 2000-2010, Eurostat, Statistics in focus, Vol. 40, access at http://epp.eurostat.ec.europa.eu

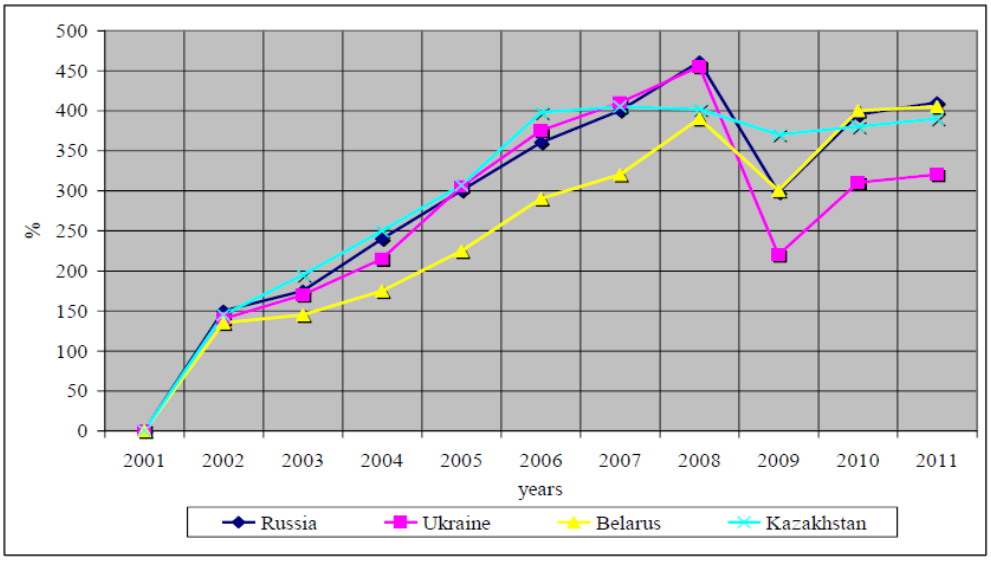
During the same period of 2001-2011, the annual average increase of EU-27 exports to CIS countries was 13.9%. The given increase was provided primarily by the growth of exports to Russia, Ukraine, Belarus and Kazakhstan.

Incomplete recovery of European demand for CIS raw goods (especially fuel), caused by the financial and economic difficulties and growth of international competition on the European market, until now prevents the recovery of "EU-27-CIS" trade flow volumes up to the pre-crisis levels. The highest growth rates can be observed for grain and coal sectors. The significant increase is noticed for non-metallic mineral raw materials and

other fuels. However, despite the general increasing trend, some of the commodity groups demonstrated negative dynamics: pipeline gas, oil and iron ore.

CIS countries after USSR collapse developed multi-directionally, but in general they were primarily oriented to European Union as the largest market for their products. Many partnership trade agreements between CIS and EU countries were concluded during 2001-2011.

Picture 3. Dynamics of EU-27 exports to some of the CIS countries in 2001-2011 (in %)



Source: Nilson, A. (2011): *Commodity trade between EU-27 and CIS countries*, 2000-2010, Eurostat, Statistics in focus, Vol. 40, access at http://epp.eurostat.ec.europa.eu

At the moment, the EU Commission actively supports its partners in trade development, for example, through partnership and collaboration agreements. Most of the Central Asian countries within CIS are the beneficiaries of the Global System of Preferences (trade) of EU-27 countries, as well as active participants of integration in the frameworks of World Trade Organization (WTO) [1].

The WTO membership experience of Kazakhstan can be recognized as one of the most successful amongst CIS countries. Kazakhstan is one of the biggest Russian trade partners in the CIS, which is why the study of its experience can be very valuable. According to World Bank data, investments in agriculture are in second place according to their effectiveness, after oil production in Kazakhstan. The reforms in Kazakhstan started in the same period of the country's WTO accession. The state provides the following privileges to stimulate the development of domestic agricultural production and food processing: cheapening of combustibles and lubricants, lowering of interest rates on credits in second level banks, leasing for special machinery and processing equipment. Purchasing of seeds is subsidized by 40%, their production – from 40% to 100%. The government supports the project related to growing of fruit trees, production of mineral fertilizers and development of pure-strain

stock-breeding. The volume of state support of agriculture had grown 5 times since 2002 and had reached $924 mln., including $146 mln. for subsidies, and $355 mln. for credit programs. Related institutions were also established: JSC "KazAgro", JSC "KazAgroFinance", and JSC "Fund of financial support for agriculture". [8]

It is also necessary to investigate the WTO membership experience of another large post-soviet economy – Ukraine. The main problem for Ukraine is how to support domestic agricultural producers. Liberalization of the trade regime had caused the active interpenetration of the domestic Ukrainian food market with imported agricultural and food products. Since WTO accession, the growth of import volume of agricultural product has reached 11%. The growth of import volume was caused by import deliveries of meat (43% in the structure of increase). Volumes of meat deliveries have grown up to 6.5 times since the country's WTO accession. It is especially necessary to distinguish the growth of import deliveries of grain and sugar – traditional domestic products in Ukraine.

In 2009 Ukraine had introduced extra custom duties to support the national payment balance (13% for 63 goods, including meat, fish and alcohol). As such measures contradicted WTO rules, the Government of Ukraine shortened the list, leaving only industrial products (automobiles and refrigerators). The volume of state support of agriculture decreased twice in 2010, and budget financing was stopped for seven programs.

In 2009 the Decree of the President of Ukraine "About the report of the Government about the results of WTO membership" was accepted. The document contained measures and trade procedures aimed to protect domestic producers on the domestic market from dumping and subsidized imports, as well as activities to stimulate the increase of domestic goods supply on the domestic market.

The excessive liberalization and openness of the Ukrainian domestic market are testified by the data on the GDP structure. During 2000-2004 the total export and import steady exceeded 100% (export exceeded import). [3] Since 2006 the opposite picture had been observing: import exceeded export, i.e. the national economics had transferred to the import-dependent model of foreign trade relations.

Accordingly, the macroeconomic consequences of WTO accession for Ukraine testify that the membership in this international organization has not brought the expected positive results in economics. Agriculture turned out to be exceedingly exposed to the influence of the negative factors of the global crisis because of the high dependency on the external trade.

In 2005-2011 import volume of vegetables and fruits to Ukraine had sharply increased ($860 mln., growth of 4.2 times compared to 2005). Additionally, the volume of import of fruits and vegetables had increased by 77%. It is especially important to note the growth of import of agricultural products traditionally produced in Ukraine. In 2005-2011 import of potatoes, cabbage, onion, carrot, tomatoes and cucumbers increased by 18.5 times (up to 190 thousand tons), apples, pears, cherries and apricots increased nearly fivefold (up to 210 thousand tons). Since January 2011 Ukraine (according to the undertaken WTO obligations) cancelled the

import duties on alcohol beverages. Consequently the domestic production of grape wine decreased for 41.3%. Import volume of pork increased by 2.9 times, the import share of this product on the domestic market reached 40%.

Thus, during three years of WTO membership, Ukraine has lost more than it has gained. This should be the subject of initiation of negotiations on correction of WTO obligations for Ukraine.

Kyrgyzstan's experience of WTO membership can be recognized as one of the most negative. Kyrgyzstan officially entered the WTO on December 20th, 1998. The negotiations lasted about 2.5 years. The first thing attracting attention is the precipitation of Kyrgyzstan's entry. According to experts' estimates the country's rapid entry to this organization remains the single precedent of its kind. It has caused negative consequences because of the insufficient due diligence accession obligations. For example, Kyrgyzstan had not preconditioned the status given to a developing country, thereby losing the related preferences.

Establishing of the equal conditions for domestic and foreign products on the national market became one of the most negative consequences for Kyrgyzstan. This negatively rebounded upon the domestic industry in the period of reconstruction. International experience shows the strict dilemma for such countries as Kyrgyzstan – "goods or investments". Kyrgyzstan's accession to WTO closed the domestic market for investments, opening it for imported products. This led to the growing raw-material orientation of the Kyrgyzstan's economic and prolonged recession in its various sectors, including agriculture (which share in the national economic is 80%). Entering WTO, Kyrgyzstan was obliged to cancel export subsidies for domestic agricultural production, to refuse to implement licensing and quotas for agricultural imports, and to charge import products with no more than 10% custom fee. Currently Kyrgyzstan, in spite of their long membership in WTO, has one of the worst economic indicators throughout the CIS.

Georgia entered to WTO slightly later than Kyrgyzstan (in 2000), and more because of political reasons than out of economic necessity. The haste of which Georgia accepted the offered obligations has led to difficulties in completing undertaken obligations. For example, the sectorial initiatives in agriculture were not implemented because of the contradictions with the International Monetary Fund (IMF), as well as the special custom tariffs for agricultural raw materials and machinery was not introduced.

For Moldova the process of WTO accession became longer than for Georgia and Kyrgyzstan (8 years of negotiations, accession in 2001). However, this long period can be explained by the absence of a clear economic policy of the Government of Moldova, and not the detailed working out of the accession conditions. The state support of agriculture – the main pillar of Moldova's economy – became one of the most difficult. Moldova was able to defend the necessity of subsidies for agriculture, but undertook the obligation to shorten the volume of support on 16% during four years. [5]

During the first years after Moldova's accession to WTO, the situation in agriculture

worsened: growth rates slowed, the production volume decreased by 14%. Starting from 2005, the situation became steadier. The annual growth reached 1-2%. By entering the WTO, Moldova planned to gain wider access to the global market of agricultural production, especially for its main export product – alcoholic beverages. Largely these expectations became true – the export volume increased twofold since WTO accession, especially to no-CIS countries. Processed food products became the main part of import volume.

Membership of some of CIS countries in WTO and recent Russian accession to this global trade system can change the structure and main tendencies of EU-CIS trade significantly. This is especially related to EU-CIS trade with agricultural products, since agriculture is supposed to be one of the most "sensitive" spheres influenced by trade agreements within CIS and Russian accession to WTO. [2]

World trade in agricultural products in 2010 increased 12% compared to 2008 and reached record highs. EU-27 stood as the largest importer of agricultural products in the world. Increased trade in agriculture was due to product demand from major emerging economies compared to previous years. World agricultural trade reached an all-time high, at least 12% (expressed in Euros) above the previous record set in 2008. The impact of the economic crisis led to a contraction of 6% in global agricultural exports in 2009 but they rebounded by 20% in 2010.

The EU as well as other top exporters all benefited from buoyant markets. Following the slump in 2009, the EU, the US and Brazil bounced back with over 20% growth in exports, to reach record levels in 2010. The EU's trade balance improved to the extent that it emerged from recession as a net exporter in 2010, for the first time since 2006. The €6 billion agricultural trade surplus is largely due to expansion in the value of exports, driven by stronger demand for final products, as the EU's key trading partners come out of recession and higher prices for commodities and intermediate goods.

The EU remains by far the world's biggest importer with imports worth €83 billion in 2008-10, well ahead of the US. EU imports grew by 9% in 2010 though they remain 5% below the peak of 2008, when they reached €88 billion. This is a result of the sharp drop of over 12% in 2009 after two years of very strong growth of over 13% per year. The EU's share of global imports was over 19% in 2009. US imports grew strongly by 17% in 2010, having suffered a less severe decline (just 5%) than the EU in 2009.

The EU's trade balance continued to improve in 2010 to the extent that it switched from being a net importer with a trade deficit of €2.5 billion in 2009 to a net exporter, for the first time since 2006, with an agricultural trade surplus of over €6 billion. The surplus is largely due to growth in the value of exports after the contraction of trade in 2009 linked to economic crisis and the drop in commodity prices. The EU and the other top exporters all benefited from buoyant export sales. Following the slump in the value of agricultural exports in 2009, (8% for the EU and 10% for the US), last year they both bounced back with spectacular growth of 21% and 24% respectively. For the past 3 years, the EU and the US have been roughly neck and neck as the world's leading agri-food exporters.

Conclusions

The EU's export profile has changed little in recent years. Final products and other products together account for 69% of the value of EU exports in 2008-10, while intermediate products and commodities represent 20% and 9% respectively. 12 of the top 14 exports were final products, the exceptions being wheat (a commodity), milk and cream and odoriferous substances (other products).

It is possible to forecast that in the mid-term, the structure of EU-27-CIS foreign trade turnover will not get changed significantly. CIS-EU trade flow will primarily consist of raw commodities. Its largest constituent will remain oil. There will be also relevant (but not comparable to oil in their sizes) shares of pipeline gas, coal, petrochemicals and iron ore. CIS deliveries would be mainly formed by Russia. Ukraine and Kazakhstan would also become big suppliers. The main CIS importer among EU-27 countries will be Germany, followed by Italy. The Netherlands and Poland will increase their shares in EU-27 imports from CIS countries. [4]

Export of agricultural products from EU-27 to CIS countries will grow in the mid-term. The growth will be caused by a number of reasons, particularly:

1. Continuing liberalization of inter-regional trade within CIS, as well as a result of multilateral EU-CIS agreements.
2. Russia, which is the largest economy of the region, accessed to WTO.
3. Low competitiveness of CIS domestic agricultural producers comparing to EU and US farmers, supported by their governments (especially in food production and high-level food processing where added value is the largest).
4. Incomparably lower volumes of state support for domestic agricultural producers not only in CIS-countries, but even in Russia, that does not provide sufficient protection of inter-regional market and do not allow to develop effectively high-quality food processing and food production in CIS-countries. [7]

WTO and trade liberalization obviously bring a set of opportunities for an accessing country. WTO is based on an equality of rights and obligations. This means that EU countries are obliged to open their domestic markets for CIS agricultural and food products. However, most of the CIS-countries, including Russia, cannot fully benefit from these opening opportunities. The state is not able to support the massive expansion of domestic farmers to European markets. Transition period can take long time. If CIS and Russia do not use new opportunities today, better times may not come at all.

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Review Article

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CATEGORIZATION OF POVERTY IN THE REPUBLIC OF SERBIA IN THE PERIOD 2006-2010

***Biljana Grujić, Svetlana Roljević, Nataša Kljajić*[1]**

Summary

The aim of this paper is overviewing a real picture of poverty in Serbia in the period 2006-2010, using the data of the Statistical Office of the Republic of Serbia (consumer price index - CPI) and the Social Inclusion and Poverty Reduction Unit (Cabinet of Deputy Prime Minister for European Integration of RS), as well as research results of relevant domestic and foreign literature. The percentage of the poor is categorized by: type of settlements, regional distribution, household type, age and participation of children and adults, level of education, and socio-economic status of the household. Survey results from 2010 pointed out that poverty is widespread among people living in rural area (13.6%), particularly among children under 13 years of age (13.7%), in Central Serbia (12.0%), in multi-member households (16.4%) and in households where the head has a lower educational level (14,2%) or is unemployed (17.9%). The fact that poor live in rural areas should not lead to deterioration of the principle of equality in the rights for all citizens of the Republic of Serbia.

Key words: *poverty, poverty rate, categories of poor.*

JEL: *R00, R51*

Introduction

EU Council of Ministers held in 1975 has defined the poor as *"individuals or families whose resources are so small as to exclude them from the minimum acceptable way of life in the Member State in which they live."* Resources are defined as *"goods, services and cash income from public and private sources" (SPC, 2011).* For purposes of measuring poverty in RS absolute and relative poverty line is used. Below the **absolute poverty line** are adults whose monthly expenditures are lower than the minimum required for food and other expenses, which include clothing, housing, health, education, transport, recreation and culture, and expenditures on other goods and services. Imputed rent and expenses for

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durables are not included in the analysis. **Relative poverty** defines poverty line compared to the national standard of living, and is defined as 60% of median average consumption per adult equivalent.

There was a strategic decision, carried in 2004, to calculate the absolute and relative poverty line on the basis of aggregate consumption from the Household Budget Survey (HBS), which is regularly conducted by SORS. The analyses of poverty in RS is based on household consumption, as a more reliable measure of well-being of the population, because of its stability, comprehensiveness and consistency over a long period, as opposed to household income, which is subject to short-term fluctuations. HBS provides data on income, but is primarily used to provide an appropriate context for getting expenses.

According to HBS, 2010 applying the absolute poverty line, the poor were all households where consumption was below 8,544 dinars per month per consumer unit (9.2%), while the relative poverty line shows that the poor were all households where consumption was below 9,763 dinars per month per consumer unit (14.5%). In this paper, the poverty rate according to the following categories is analysed: type of settlements, regional distribution, household type, age, participation of children and adults, the level of education of the household and the socio-economic status of the household.

Materials and methods

Working method is based on using the data of the Statistical Office of the Republic of Serbia (SORS), the Social Inclusion and Poverty Reduction Unit, and the Office of Deputy Prime Minister for European Integration of Republic of Serbia, as well as research results relevant from domestic and foreign literature. Selected data are then systematized in a tabular display and used for the interpretation of the extent of poverty in the RS by selected categories.

Defining Poverty and Social Exclusion

The definition of poverty is based on the notion of participation. The EU Council of Ministers in 1975, defined poor as *"individuals or families whose resources are so small as to exclude them from the minimum acceptable way of life in the Member State in which they live."* Resources are defined as *"goods, services and cash income from public and private sources."* In this way poverty is defined in relative terms *(SPC, 2011).*

Republic of Serbia signed Stabilization and Association Act applied for EU membership, and the issues of social inclusion and poverty reduction in the future become a mandatory component of the EU integration policies. The Serbian government is committed to meet the requirements defined by the EU within the framework of the new EU development document *Europe 2020,* which was accepted in June 2010. *Kronja et al. (2011)* point out that the *Europe 2020* strategy aims at economic development of the EU, based on knowledge of the environment while maintaining a high level of employment, productivity and social cohesion.

However, the measurement of poverty is considerably more complex, and poverty is analysed in accordance with other dimensions of social exclusion. First, it is necessary to mention that poverty represents only one dimension of economic exclusion and one that points to the exclusion of the material resources distribution and levels of consumption, as meeting the needs below a certain limit.

Measuring Social Exclusion and Poverty

For purposes of **measuring poverty** in the Republic of Serbia the absolute and relative poverty line is used. Below **the absolute poverty line** are adults whose monthly expenditures are lower than the minimum required for food (minimum nutritional – 2.288 calories a day, prescribed by the UN Food and Agriculture Organization - FAO) and other expenses, which include clothing and footwear, housing, health, education, transport, recreation and culture, and expenditures on other goods and services. Imputed rent and expenses for durables are not included in the analysis.

To determine the equivalent size of the household a modified OECD[2] scale is applied, which allows comparison of different households in size and composition. The equivalent size of a household is calculated as a weighted sum of household members, where the first adult in the household counts as 1 unit, any other adult member of the household as 0.5 units, and each child under 14 years of age as 0.3 units. **Relative poverty line** defines poverty compared to the national standard of living, and is defined as 60% of median average consumption per adult equivalent[3].

Household Budget Survey (HBS)

Socio-economic structure of the family farm is an important indicator of overall economic diversification and the situation in Serbia. The transition period was marked by significant changes in the socio-economic structure of households, caused by natural reproduction processes, and the influence of social and economic reforms *(Bozic et al., 2006)*.

Strategic decision dated with 2004th year's statistics are basing poverty on data from the *Household Budget Survey (HBS),* efforts were made to ensure full national ownership and continuity of monitoring data related to poverty. Absolute and relative poverty line is calculated on the basis of aggregate consumption from the HBS, which is regularly conducted by the *Statistical Office of the Republic of Serbia* on the recommendation of the *EU Statistical Office (EUROSTAT)* and the International *Labour Organization (ILO)*. HBS data regarding years 2004/2005 are not sufficiently well-based in methodology and the data for these two years are not published. Aiming to track trends since 2006, SBS has accepted the recommendations of the World Bank to determine the absolute poverty line used by the application method *Consumer Price Index - CPI.*

The absolute poverty line is obtained by calculating the food basket in 2006 which is

2 OECD – The Organisation for Economic Co-operation and Development.

3 http://www.inkluzija.gov.rs/?page_id= 1180&lang=cs

increased by the appropriate amount of inflation (CPI) for each year[4]. Poverty in the RS analyses is based on household consumption, as a more reliable measure of well-being of the population, because of its stability, comprehensiveness and consistency over a long period, as opposed to household income, which is subject to short-term fluctuations. HBS provides data on income, but is primarily used to provide an appropriate context for getting expenses.

Household consumption is defined as the sum of expenditures for food and other current expenditures, which include purchased products, own production and gifts. The main components of *households' expenditure* by COICOP[5] classification are[6]:

1) consumption of food and non-alcoholic beverages,
2) consumption of alcoholic beverages and tobacco,
3) expenditure on clothing and footwear,
4) costs for housing, water, electricity, gas and other fuels
5) household expenditures and routine maintenance,
6) health care expenditures,
7) expenses for transportation,
8) expenditures for communications,
9) costs for recreation and culture,
10) expenditure on education,
11) expenditure for restaurants and hotels,
12) expenditure on other goods and services.

The survey collected is based on data regarding the demographic, economic and social characteristics of the households. HBS is conducted continuously throughout the year on a sample of 4,800 randomly selected households, so that the sample for each year is separately defined, in other words there is no part of the panel sample (households are not repeated). Tracking the same population (panel sample) over a long period of time would allow a comparative analysis of the factors that contribute to changes in their situation, particularly among targeted population groups who are socially excluded or at risk of social exclusion, in order to evaluate the degree to which a given intervention succeeded to improve their situation.

Poverty Statistics in the Republic of Serbia (2006 - 2010)

According to *Cvejić et al. (2010),* Serbia is a low urbanized country in European terms, not only by the low share of urban population, but also at a low qualitative urban development (weak territorial capital, particularly infrastructure), which many rural areas make less attractive for economic investment (economic capital) and housing (contrary to tendencies in highly developed countries).

4 Ibid.

5 COICOP classification - Classification Of Individual Consumption by Purpose.

6 http://www.inkluzija.gov.rs/?page_id=3376&lang=cs

About 45% of the total population lives in rural areas, which cover three quarters of the country. According to the *Living Standards Measurement Survey (LSMS)*, carried out in May / June 2002, approximately 58% of the poor population in Serbia lives in rural areas. The share of the poor among the rural population is 14.2%. That is more than the percentage of the poor at the total population, which amounts to 10.6%, almost double compared to urban poverty, which is 7.8%. This means that one in seven rural residents is poor *(Popovic et al., 2008)*. LSMS, which was implemented in 2002/2003, showed that 14% of the population, or approximately one million people are living in the Republic of Serbia below the absolute poverty line and the poverty line was 4,970 dinars per month per household.

The absolute poverty line indicates that poverty rate in the period 2006 - 2008 fell by 2.7 percentage points, and in 2010 compared to 2008 (minimum rate of poverty) increased by 3.1 pp. So, from 2006 to 2010 the incidence of poverty increased by 0.4% pp., although the absolute poverty line is higher for 2323 dinars, i.e. 37%. Overall, the five-year period, the absolute poverty line has steadily increased, while the poverty rate varies (decreases and increases), (Table 1).

Table 1. Percentage of the poor – Absolute poverty line

2006	2007	2008	2009	2010
Poverty line = 6,221dinars / month/consumer unit	Poverty line = 6,625 dinars / month/consumer unit	Poverty line = 7,401 dinars / month/consumer unit	Poverty line = 8,022 dinars / month/consumer unit	Poverty line = 8,544 dinars / month/consumer unit
8.8	**8.3**	**6.1**	**6.9**	**9.2**

Source: SORS, retrieved from http://www.inkluzija.gov.rs/?page_id=3179&lang=cs

The relative poverty line, which is defined as 60% of median personal consumption per adult equivalent, shows that in 2010, the Republic of Serbia had 14.5% of the population as poor, and the poverty line was at the level of 9763 dinars per month per consumer unit. Percentage of poor in 2006 was 14.4% and the poverty line was at 7171 dinars level per month per consumer basket. The lowest percentage of poor was in 2008 (13.2%), and the level of the poverty line was at 8923 dinars. Accordingly, while the poverty line is increasing, the percentage of poor people has varied (from 2006 to 2008 is decreasing and since 2008 to 2010 is growing) (Table 2).

Table 2. Percentage of the poor in the RS - Relative poverty line

2006	2007	2008	2009	2010
Poverty line = 7,171dinars / month/consumer unit	Poverty line = 7,747 dinars / month/consumer unit	Poverty line = 8,923 dinars / month/consumer unit	Poverty line = 9,583 dinars / month/consumer unit	Poverty line = 9,763 dinars / month/consumer unit
14.4	**13.4**	**13.2**	**13.6**	**14.5**

Source: SORS, retrieved from http://www.inkluzija.gov.rs/?page_id=3179&lang=cs

In accordance with previous findings for both forms of percentage of the poor population expression, it is reasonable and obvious to accept as an explanation that there a simultaneous increase in unemployment and inflation existed, which in turn influenced the increase in the poverty rate of RS.

Percentage of poor by settlement type. The percentage of the poor who are below the absolute poverty line recorded a growth in urban and in rural areas, but the increase in the number of citizens living below the absolute poverty line is more presented in the rural area (Table 3).

Table 3. The poor by type of settlements - the absolute poverty line

Year / Area	2006	2007	2008	2009	2010
Metropolitan area	5.3	6.0	5.0	4.9	5.7
Rural Area	13.3	11.2	7.5	9.6	13.6
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: SORS, retrieved from http://www.inkluzija.gov.rs/?page_id=1490

In urban areas, the number of poor in 2010 grew by 0.8 pp. compared to 2009, by 0.7 compared to 2008 and by 0.4 compared to 2006. The percentage of poor people in urban areas was highest in 2007 (6.0%) and the lowest in 2009 (4.9%). In rural areas the number of poor rose in 2010 by 4.0 pp. compared to 2009, by 6.1 pp. compared to 2008 and by 0.3 pp. compared to 2006. The percentage of poor people in rural areas was at the highest level in 2010 (13.6%) and lowest in 2008 (7.5%).

Percentage of poor by age. Increasing poverty was recorded among children and adults since 2008, but it is terrifying that the number of poor children in Serbia is growing significantly (Table 4).

Table 4. Percentage of the poor children and adults

Year / Age	2006	2007	2008	2009	2010
Children	11.6	10.5	7.1	9.3	12.2
Adults	8.2	7.8	5.8	6.4	8.5
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: SORS, retrieved from http://www.inkluzija.gov.rs/?page_id=1490.

In this period, child poverty increased by 5.1 pp. (from 7.1% in 2008 to 12.2% in 2010 respectively). Poverty among adults in the same period increased for 2.7 pp. (from 5.8% in 2008 to 8.5% in 2010 respectively).

The increase in poverty was recorded in all age categories, but the lowest in the category over 65 years (Table 5).

Table 5. Percentage of the poor by age

Year / Age (years)	2006	2007	2008	2009	2010
Children up to 13	11.6	11.2	7.3	9.8	13.7
Children from 14 to 18	11.7	8.8	6.9	8.4	9.1
Adults from 19 to 24	7.2	6.6	5.9	7.5	11.5
Adults from 25 to 45	8.4	7.4	5.0	6.4	8.9
Adults from 46 to 64	7.0	6.6	5.4	5.3	8.0
Aged 65 and over	10.0	10.3	7.5	7.5	7.9
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: Social Inclusion and Poverty Reduction Unit and SORS, 2012.

According to 2010 data, the most affected are children under 13 years of age (13.7%) and adults in the category of 19 to 24 years (11.5%). In comparison to 2009 the largest increase in poverty among children is just under 13 years (3.9 pp.) and among adults from 19 to 24 years (4 pp.). Obviously, the crucial is 2008, when the smallest percentage of the poor in all categories was recorded and when the two most vulnerable groups had single-digit poverty rate (children up to age 13 and 7.3% of adults 19 to 24 years 5.9%).

Percentage of poor by region. Structure of the poor can be shown on the basis of regional distribution, with the most vulnerable region of Central Serbia (Table 6).

Table 6. Percentage of the poor by regions

Year / Area	2006	2007	2008	2009	2010
City of Belgrade	4,3	2,4	2,9	3,8	5,3
Vojvodina	8,6	11,9	6,8	4,9	6,8
Central Serbia	10,7	9,0	7,0	9,3	12,0
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: Social Inclusion and Poverty Reduction Unit and SORS, 2012.

The highest percentage of poor population in 2010 was in the region of Central Serbia (12.0%), with the largest recorded increase in the number of poor in comparison to 2009 (9.3%). That same year, the lowest number of poor was at the City of Belgrade (5.3%), while the percentage of poor people in Vojvodina was 6.8%. The lowest poverty rate in the City of Belgrade is recorded in 2007 (2.4%), in Vojvodina in 2009 (4.9%) and in Central Serbia in 2008 (7.0%). It is interesting to note that the region of Vojvodina in 2008 and in 2010 had the same percentage of poor (6.8%), and is the only region with negative rate of change in 2010 compared to 2006 (- 1.8 pp.).

Percentage of poor by type of household. The most vulnerable are households with five, six or more members since their poverty index is above average and was the highest compared with other demographic groups. A slight decrease in the number of poor is found only in single-person households (Table 7).

Table 7. Percentage of the poor by type of household

Year / Households	2006	2007	2008	2009	2010
One-person	8.6	8.8	6.6	5.7	5.6
Two-persons	8.7	9.2	5.5	5.6	5.9
Three-persons	5.2	4.9	5.1	5.0	7.0
Four-persons	5.7	5.3	4.7	4.7	7.1
Five-persons	8.3	8.1	5.2	5.7	11.7
Six and more members	17.3	14.4	10.0	14.2	16.4
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: Social Inclusion and Poverty Reduction Unit and SORS, 2012.

Comparing the 2010 to 2006, the largest increase is recorded for households with five members (3.4 pp.), and the largest decrease for households with one (-3.0 pp.) or two members (-2.8 pp.).

Percentage of poor by educational level of the head of household. The largest number of poor is recorded in the category of people with incomplete primary education and primary education. It is evident that the level of education has a direct impact on the poverty of society. Among the population with college or university education a lowest percentage of poor people is apparent (Table 8).

Table 8. Percentage of poor by educational level of the head of household

Year / Education	2006	2007	2008	2009	2010
Uncompleted primary school	21.0	18.8	9.0	14.8	14.2
Primary school	13.7	13.2	10.5	9.2	12.7
Secondary school	5.5	5.4	4.8	3.0	4.8
High school	0.6	0.1	2.7	1.8	2.4
Higher school	1.8	0.4	1.9	0.6	0.8
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: Social Inclusion and Poverty Reduction Unit and SORS, 2012.

Comparing the 2010 to 2006 we can see a decline in the poor population in all categories, except in the case of a person with a college education. General conclusion is that higher education creates less chance for heads of households of falling below the poverty line.

Percentage of poor by socio – economic status of the head of household. The highest percentage of poor people among heads of households in 2010 belongs to the category of unemployed (17.9%) and to the category of other inactive population (17.1%), (Table 9).

Table 9. Percentage of poor by socio – economic status of the head of household

Year Socio – economic status of the head of household	2006	2007	2008	2009	2010
Self-employed	10.2	10.9	5.1	6.0	9.7
Employees	5.2	5.3	3.9	4.6	5.2
Unemployed	14.7	10.9	16.9	17.5	17.9
Retirees	8.8	7.6	5.7	6.1	6.1
Other inactive	28.2	24.2	15.5	29.3	17.1
Total	**8.8**	**8.3**	**6.1**	**6.9**	**9.2**

Source: Social Inclusion and Poverty Reduction Unit and SORS, 2012.

Rural population in the Republic of Serbia is more exposed to poverty, especially multi-member households with several children and unemployed and less educated heads of households.

Conclusion

Generally, in the five years period observed in this paper, absolute and relative line of poverty were increasing constantly (the value of the monthly food basket), while the poverty rate varies (decreasing in the period 2006-2008 and growing in the period 2008-2010). In accordance with previous findings, it is reasonable and obvious explanation that there is a simultaneous increase in unemployment and inflation, which in turn affects the growth rates of poverty in Serbia.

Poverty, quality of life and the degree of vulnerability of the population are the main determinants of inequality and lack of social justice viewed in urban as well as in rural areas. When it comes to fair and equitable social policy in relation to rural areas, this issue should be considered in three levels. The *first level* is related to the general support for the development of rural areas. The *second level* involves consideration of the rural characteristics that make them different from urban areas. The *third level* involves specific recognition between the very rural territories *(Živkov et al., 2012)*. Poverty is more pronounced in rural areas, caused by lower wages and incomes, poor infrastructure, etc. But, whether rural poverty causes poor demographic structure of the population, or some other reason of lagging, the social policy of the state would have to be the same for all citizens. The fact that poor live in rural areas should not lead to deterioration of the principle of equality in the rights for all citizens of the Republic of Serbia.

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KATEGORIZACIJA SIROMAŠTVA U REPUBLICI SRBIJI U PERIODU 2006-2010 [7]

Biljana Grujić, Svetlana Roljević, Nataša Kljajić [8]

Rezime

Cilj rada je realno sagledavanje siromaštva u Republici Srbiji u periodu 2006-2010. godine korišćenjem podataka Republičkog zavoda za statistiku Srbije (RZS). Siromaštvo u Republici Srbiji prati se od 2006. godine primenom metode indeksa potrošačkih cena (CPI). Metod rada baziran je na korišćenju podataka RZS-a i Tima za socijalno uključivanje i smanjenje siromaštva (kabinet potpredsednice Vlade za evropske integracije Republike Srbije), kao i rezultata istraživanja relevantne domaće i strane literature. U radu je analiziran procenat siromašnih prema: tipu naselja, regionalnoj rasprostranjenosti, tipu domaćinstva, godinama starosti, učešću dece i odraslih, stepenu obrazovanja i socio-ekonomskom položaju nosioca domaćinstva. Rezultati istraživanja iz 2010. godine ukazuju da je siromaštvo najrasprostranjenije u Centralnoj Srbiji (12,0%) i među stanovništvom koje živi na vangradskom području (13,6%), u višečlanim domaćinstvima (16,4%), domaćinstvima čiji je nosilac nižeg obrazovnog nivoa (14,2%), kod dece do 13 godina starosti (13,7%) i kod nezaposlenih lica (17,9%). Činjenica da neko ko je siromašan živi na selu ne bi trebalo da dovodi do umanjenja prava koje imaju svi građani Republike Srbije.

Ključne reči: *siromaštvo, procenat siromašnih, kategorije siromašnih.*

7 Rad predstavlja deo istraživanja na projektu 46006: *Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru dunavskog regiona*, kao i na projektu 179028: *Ruralno tržište rada i ruralna ekonomija Srbije - diverzifikacija dohotka i smanjenje ruralnog siromaštva,* finansiranih od strane Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije.

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Review Article

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AGRI-ENVIRONMENTAL LEGISLATIVE FRAMEWORK IN SERBIA IN LIGHT OF THE HARMONISATION WITH EU LAW[1]

Tatjana Jovanić[2]

Summary

Economic sanctions, production and economic drop, as well as impoverishment have significantly reduced capabilities of the state for investment in environmental protection, but as well environmental concerns of agricultural producers. However, compliance with mandatory standards and rules forming the corpus of agri-environmental measures and principles of good agricultural practice are an important step towards preservance of the environment and care about health of humans, plants and animals. On the other side, it is an important prerequisite for Serbian exports of agricultural products. In addition from mandatory rules, which are also relevant for fulfilment of the duty of cross-compliance for producers receiving direct payments, agri-environmental incentives as voluntary commitments of producers to provide a higher level of environmental protection are particularly welcome, but are hardly possible to give rise in the short term. The Paper gives a short overview of agri-environment policy in the EU and is mostly focused on mandatory rules setting duties and responsibilities of agricultural producers and issues related to approximation of Serbian legislative framework with the EU.

Key words*: agri-environmental measures, good agricultural practice, environmental protection, EU law, harmonisation.*

JEL: *Q15, K32*

Introduction

Agricultural land covers 57.6 % of overall territory of the Republic of Serbia. Budgetary investment in the environment is low; on average (statistical data for 2001-2008 period) it amounted to 0.3% of the GDP annually, while other countries in transition assign approximately 2% of the GDP for environmental protection.

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Agro-environmental measures seem to have a low priority in policy agenda. Uncontrolled exploitation of biological resources, conversion of native habitats to agricultural and agricultural to residential and commercial real estate, permanent air, water and soil pollution by nitrates, fertilizers and pesticides makes agricultural production an increasing factor of environmental pollution. The situation was similar in many countries of Central and Eastern Europe, where farms tend to become more industrialised and farmers focused to improve economic efficiency, but with adverse economic effects (OECD, 1997). Low level of awareness related to the environment, insufficient education and inadequate participation of general public in decision making is also evident. Low and almost nonexistent agro-environmental subsidies, non compliance with 'cross-compliance' requirement and generally low awareness of agricultural producers clearly indicates the following: although there is a basic legal framework on the control of agricultural production in the framework of environmental pollution control, the law is not fully harmonised with the EU acquis, there is no effective supervision and overlapping of duties and responsibilities within government institutions is still evident.

Agri-environmental policy in Serbia should become a building block of integrated rural development, which implies linkages between economic, environmental, spatial and social aspects of rural communities. One of the most important steps would be introduction of integrated pest management and further harmonisation with EU agri-environmental rules. The purpose of this Paper is to present and elaborate in brief the legal framework of agro-environmental measures in Serbia, and indicate what are the main issues which for the approximation of the legal framework in the field of agri-environmental measures.

An overview of the main tools of agri-environmental policy

Agri-environmental policies are becoming an increasingly important requirement for agricultural activities. There is a range of agri-environmental policy mechanisms including incentive payments, environmental taxes, obligatory and voluntary standards and tradable permits. The narrow concept of agri-environmental incentives puts an emphasis on payment schemes and cross-compliance mechanisms. In addition to agri-environmental incentives, which are of course underpined by the law, the framework of agri-environmental policy has a strong legal dimension, which is, notably, a spectrum of mandatory rules on the duties and responsibilities of agricultural producers.

It is not easy to design and deliver policy instruments in this field, particularly if participation in agri-environmental incentive schemes is optional. The framework usually defines strategic objectives as the highest level (often national priorities or targets – or supra-national in the case of the EU), then elaborates the more detailed policy, operational and performance objectives which apply to specific mechanisms such as regulations, taxes or incentive payments. The OECD has published guidelines on how to determine the most appropriate agri-environmental policy mechanism to use (OECD, 2010). Many EU countries have more than 25 years of experince in implementing agri-environmental policies. However, the specific situation of transition economies in Central and Eastern Europe urge for specific methods of policy formulation, assessment and implementation tools (IEEP, 2002).

Evaluation of agri-environmantal measures is difficult, some policy frameworks would certainly be more precise than others (Pearce, 2005). Generally speaking, detailed performance objectives are more likely to be quantified at farm level for mandatory rules on land use and protection or for cross-compliance requirements because the majority of farmers are affected and the control of compliance is more transparent. The European Commission has identified a set of agri-environmental indicators to provide information on the state of the environment in agriculture which can make a valuable contribution to policy evaluation.[3]

Contrary to binding standards and taxes, which usually apply to all farmers, agri-environmental incentives rely on farmers choosing to participate in a very wide range of interventions. Agri-environmental schemes represent voluntary agreements between farmers and public authorities, means of rewarding farmers for complying with certain environmental rules or practise a specified form of environmentally friendly agriculture, being compensated for the costs and loss of income. It is important to remember that agri-environmental schemes go beyond simple compliance with mandatory rules on agricultural production and land use, and codes of practice, they represent higher, voluntary, committments of agricultural producers (European Commission, 2005: 4). The legislative framework of mandatory agri-environmental rules, which also form a part of the cross-compliance regime, specifies production methods compatible with the protection of environment, landscape, natural resources, the soil and genetic diversity. Failure to comply with these rules makes the producer subject to administrative sanctions or penalties.

Brief introduction to the EU agri-environmental policy and its legal framework

From the beginning of the 80s the importance of agricultural policy in shaping environment is growing, as many aspects of intensive farming became evident, especially in terms of water pollution, biodiversity and wildlife habitat loss, and environmental considerations began to influence Common Agricultural Policy (Jack, 2009: 109-123). The first European framework for agri-environmental policy was set out in Article 19 of the Council Regulation (EEC) 797/85 on improving the efficiency of agricultural structures, which allowed member states to offer farmers payments for agreeing to follow specific practices in Environmentaly Sensitive Areas. The Regulation was amended in 1987 to allow for the partial financing of approved agri-environmental schemes in specified geographical areas from European Community Funds.

The 'MacSharry' reform of 1992 made the shift from production subsidies to direct payments and highlighted the importance on agri-environmental measures through Council Regulation (EEC) No 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and maintenance of the countryside.

3 European Commission, *Communication from the Commission to the Council and the European Parliament – Development of agri-environmental indicators for monitoring the integration of environmental concerns into the common agricultural policy* (SEC(2006)1136), COM /2006/ final.

Making such requirements obligatory for the member states, this Regulation set the basic framework for most of the second generation of agri-environment schemes. The next CAP reform known as the Agenda 2000 put a greather emphasis on rural development and agri-environmental issues, whithin the so colled 'second pillar'. Agri-environmental rules were included in a more embracing Rural Development Regulation, which Chapter VI set the basic objectives and principles of an agri-environmental measure which member states had to include in their rural development programmes.[4] More detailed rules on agri-environmental requirements are set in a Commission Regulation No 445/2002 implementing Council Regulation No 1257/1999. This Regulation has a broader cover than its predecessor Regulation 2078/92 and leaves more discretion to national authorities.

The legal obligations that form the reference level for the agri-environment measures are set out in article 39.3 of Regulation No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). Therefore, agri-environment payments cover only those committments of producers going beyond the relevant mandatory standards established in Articles 4 and 5 and Annexess III and IV to Regulation (EC) No 1782/2003 establishing common rules for direct support schemes (now repealed) as well as minimum requirements for fertiliser and plant protection product use and other relevant mandatory requirements estalished by national legislation. Up to this reference level the polluter pays principle applies: farmers have to ensure compliance with mandatory national and European environmental standards and respect the basic mandatory standards forming part of the cross-compliance regime at their own costs. Failure to comply with these mandatory requirements is subject to sanctions.

The existing Common Agricultural Policy is focused on three priority areas: biodiversity and the preservation and development of 'natural' farming and forestry systems and traditional landscapes; water management and use and climate change. Rural aid development measures target sustainable farming practices, like agri-environment schemes, while the EU institutions insist that members states enhance compliance with environmental laws and laws on agricultural methods, by sanctioning the non-compliance with these laws by farmers through a reduction in support payments from the CAP. Since 2005, all farmers entitled to direct payments are subject to compulsory cross-compliance, which legal basis is Council Regulation No 73/2009 establishing common rules for direct support schemes for farmers and Commission Regulation No 1122/2009 laying down detailed rules for the implementation of Council Regulation (EC) No 73/2009 as regards cross-compliance, modulation and the integrated administration and control system. Cross-compliance is the basic requirement for agri-environment measures, and farmers bear all the costs for compliance. The two regulations set eighteen legislative standards in the field of the environment, food safety, animal and plant health and animal welfare. In addition, the farmer has to keep land in good agricultural and environmental condition in line with a number of standards related to soil protection, habitats and water management.

4 Council Regulation (EC) No 1257/1999 of 17 May 1999 on support for rural development from the EAFFF and amending and repealing certain Regulations.

Lines above presented the main regulatory framework on tools for agri-environment policy in the EU. Some of the most important EU legislative standards, of a mandatory nature, which are specifically targeting agricultural methods and land use, will be presented below in order to point to the level of harmonisation and need for approximation of Serbian legal framework with EU *acquis*.

The legal framework on agri-environmental responsibilities of agricultural producers in Serbia

Agricultural land regulatory regime

The Law on Agriculture and Rural Development is a sector specific law of a systemic nature, setting the basic definitions, rights and responsibilities of agricultural producers, including a duty to respect environmental and animal health and welfare legislation and to protect the soil.[5] The use and protection of agricultural land in Serbia is an issue gaining the importance (Popović et al., 2011). Law on Agricultural Land prescribes rules on planning, protection, management and use of agricultural land, surveillance of its application and other issues relevant to protection, maintenance and use of agricultural land, which is considered to be the resource of general interest.[6] This law also sets the criteria on the use of arable land for non agricultural purposes. A general duty of owners and users of agricultural land is set out in article 59 of this Law: a) the duty to regularly use the arable land and apply measures prescribed by this or other laws, 2) to act as a good host in accordance with the rules of the code of good agricultural practice. Arable land of first to fifth cadastre class may not be used for purposes out of agricultural production, except when there are exceptions established by law. The destruction and damage to crops, plants, trees and any damage to agricultural land is prohibited, including burning of residues after harvest on agricultural land (notably articles 22-26 and 28).

The Law on Agricultural Land explicitly prescribes that the code of good agricultural practice *is to be prescribed by the Minister in charge of agriculture*, which has not yet been done. The Minister is also entitled to prescribe the allowed quantity of allowed amounts of hazardous and harmful elements in agricultural land and irrigation water and the method of their testing, and also implementing legislation on technical and other conditions for the examination of the control of fertility and the use of mineral fertilizers and pesticides. This law sets the general duty to use the agricultural land for agricultural purpose and forbids discharge and disposal of hazardous and harmful substances on agricultural land and the drainage canals and irrigation, as well as use of non biodegradable films on arable farmland. The determination of existence of dangerous and harmful matters in agricultural land and water for irrigation has to be in line with the Programme issued by the Minister in charge of agriculture. If the existence of hazardous and harmful matters above the allowed limit is detected, the Ministry shall ban or limit the production at that land or the use of such water.

5 Official Gazette of RS, No. 41/2009, 10/2012 – other law.

6 Official Gazette of the Republic of Serbia, No. 62/2006, 65/2008, 41/2009.

Article 21 of the Law on Agricultural Land prescribes the basic requirement that the owner or user of the agricultural land, from first until fifth cadastre class, shall control the fertility of arable land and keep the record of the amount of ingested mineral fertilizers and pesticides. However, this requirement is hard to enforce in practice. Fertility assessment of arable land and the control of ingested mineral fertilizers and pesticides have to be done when needed, but at least every five years. The control of the examination of agricultural land, inputs used in production of primary agricultural products and water used for irrigation may be performed by state owned institutes and private bodies which have been authorized by the Minister for Agriculture, Forestry and Water Management.

Plant health regulatory regime

Law on Plant Protection stipulates rules on protection and improvement of plant health, measures to prevent the introduction, detection, prevention and control of contaminants of harmful organisms, and conditions for production, processing, import and storage of plant products and requirements to objects related to plant activities.[7] The law specifies in particular duties of plant holders to examine and monitor the health of plants, including storage and processing facilities, suppress harmful organisms, undertakes plant protection measures, maintains the evidence on undertaken measures, plant treatment and utilized products and undertake measures which are proposed by phytosanitary inspection or other bodies.

Law on Plant Protection Products specifies general rules and conditions for the application of plant protection substances.[8] Articles 44 and 45 of this Law specify that the use of such substances should be in accordance with the declaration and instruction for use, "in accordance with principles of good agricultural practice and integral plant protection", and in the manner which does not cause threats to the environment. The user of such substances must be qualified to utilize plant protection substances and is responsible for all activities and safeguard measures with regard to utilization of plant protection substances, related to human and animal health and environment. Residues in food and animal feed must not exceed quantities prescribed in implementing regulations, and are prescribed by the minister in charge of agriculture, upon consent of the minister in charge of health.

However, the new law is in the pipeline, as the law of 2009 was based on the Directive 91/414/EEC which is not applicable as of June 2011, and is replaced by the Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the markets. The new law should also be in line with the Regulation (EC) No 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules, Regulation (EC) No 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin, Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides,

7 Official Gazette of RS, No. 41/2009.

8 Official Gazette of RS, No. 41/2009.

Directive 2009/127/EC on the machinery for pesticide application, Regulation (EC) No 1185/2009 concerning statistics on pesticides. The new law should lay down new rules for the authorization of plant protection products, establishment of maximum residue levels of active substances of plant protection products and their control. Most recently, the Minister of Agriculture, Forestry and Water Management had prescribed methods of sampling and testing residues of plant protection products in food and animal feed which attempts to harmonise Serbian agro-environmental legal framework with the Regulation (EC) 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and implementing rules.[9]

One of the most important steps would be introduction of integrated pest management, as the process which entails careful consideration of all available plant protection methods (biological, biotechnological, chemical, agro technical or enrichment measures for plant cultivation), integration of appropriate measures that discourage the development of populations of harmful organisms and keep the use of plant protection products and other forms of intervention to levels that are economically and ecologically justified and reduce or minimise risks to human health and the environment, and the least possible disruption to agro-ecosystems.

The regulation of water use and pollution, nitrates and soil based nutrients

With regards to plant and soil nutrition, the Law on Plant Nutrition and Soil Nutrients regulates quality, control and application of plant and soil nutrients.[10] The Law contains detailed rules on approval of plant nutrition and soil nutrients, duties of the producer, distributor and importer which have to be registered in an official register kept by the Ministry of Agriculture, Forestry and Water Management. Plant, water and soil nutrients have to be registered and may be put on the market if they are approved, registered and properly marked. Plant producer is obliged to maintain the evidence on the use of plant and soil fertilizers, in line with the principles of good agricultural practice, which are yet to be prescribed by the Minister.[11] Ammonium-nitrate fertilizers with high level of azotes are subject to special rules for putting such fertilizers on the market. The Minister is authorized to prescribe characteristics of ammonium-nitrate fertilizers, and methods of testing.[12] In addition to the Rulebook on methods of examination of nutrients[13] the implementing legislation includes rulebooks on the registration of plant and soil nutrients, conditions of their storage, quality assessment and minimal and maximal values of nutrients, content of declaration, packaging etc.

Active substances, safeners and synergists, co-formulants and some other issues will, hopefully, be regulated in the new Law on Plant Protection Products. The draft of it foresees

9 Official Gazette of RS, No. 25/2010, 28/2011, 20/2013.

10 Official Gazette of RS, No. 41/2009.

11 Law on Plant Nutrition and Soil Nutrients, Article 28.

12 Rulebook on characteristics of ammonium-nitrate fertilizers, Official Gazette of RS, No. 70/2010.

13 Official Gazette of RS, No. 56/2010.

specific measure to protect the aquatic environment and drinking water, and gives the Administration for Plant Protection the power to prescribe the measures, allow or forbid certain nutrients, prescribe buffer zones, mitigation measures which minimize the risk of off-site pollution caused by spray drift, drain-flow and run-off.

At this moment, Serbia has not fully implemented the Urban Waste Water Directive (Directive 91/271/EZ), especially pre-authorisation of discharges from the food-processing industry and industrial discharges into urban wastewater collection systems. Directive 2008/105/EC on water quality standards has been partly transposed, as well the Floods Directive (2007/60/EZ) through the Laws ratifying the Convention on protection and sustainable use of the Danube River. Law on Waters[14] regulates the conditions for the use of water for irrigation and the quality of such water, taking into account the type of arable land, means of irrigation as well as the plant.

Nitrates Directive of 1991 forms an integral part of the Water Framework Directive (Directive 2000/60/EC) which aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. Serbia still has not fulfilled the main requirements set out in the Nitrates Directive 91/676/EEC. This is, among other problems, a practical consequence of the inability to fulfil the goals set out in the EU Water Framework Directive. The implementation of Nitrates Directive and Communal Wastewater Directive 91/271/EEC requires high costs of approximation with the EU acquis and it is certainly one among most urging issues in the field of agro-environmental measures, and is indicated in the EC Annual Report 2012 for Serbia.

Official statistical data on communal infrastructure shows that among 2,5 million of households in Serbia, only 1,3 million is connected to public drainage. It has been announced that Serbian Law on Water shall be revised until 2014. Estimates of the cost of building infrastructure to decrease water pollution due to agricultural production amount to 0,9 billion EUR. One of the most important steps would be to determine nitrate sensitive zones. There is no precise data on the use of fertilizers in the Republic of Serbia and the use of plant protection substances (Roljević et al., 2012). Some reports show the decrease of nitrate and phosphorus fertilizers production, and increase in mixed fertilizers production and use.[15] A good sign is the fact that activities on the development of the Plan of protection of waters against pollution have been initialized (SEIO, 2013: 514).

With regards to liability for diffuse water pollution and autrophication, the Directive 98/15/EC amending Directive 91/271/EEC concerning urban waste water treatment clarifies the requirements in relation to discharges from urban waste water treatment plants to sensitive areas which are subject to eutrophication. Transposing the Water Framework Directive,

14 Official Gazette of RS, No. 30/2010.

15 Ministry of Environment and Spatial Planning of the Republic of Serbia (2010): *Fourth National Report to the United Nations Convention on Biological Diversity*, p. 30.

Serbian Law on Waters prescribed measures against pollution by individual pollutants or groups of pollutants presenting a significant risk to or via the aquatic environment. However, as Nitrates Directive has not been transposed, full framework to reduce human induced euthropication should help to reduce the nitrogen and phosphorous load through changes in the agricultural practices, notably by restrictions in the excessive use of fertilizers.

The Law on Agricultural Land introduced erosion measures which users of agricultural land are required to apply, such as temporary or permanent ban on ploughing meadows, pastures and other surfaces, crop rotation, growing perennial plants, growing or lifting of agri-protection belts etc. The control of such measures is the responsibility of local self-government bodies.

The treatment and disposal of farm-based sludge

Directive 86/278/EEC on the protection of the environment and in particular of the soil when sewage sludge is used in agriculture is not implemented in Serbia. This would be of ultimate importance for the environment and health of Serbian consumers, as there is no appropriate control of farm-based sludge which is sometimes used on soil in which fruit and vegetable crops are growing and areas where the EU Directive prohibits the use of sludge. Law on Waters, on the other side, in articles 98 and 99 establishes a duty to treat wastewater in line with the set limits, taking into account environmental standards and to monitor sewage including biochemical and mechanical parameters of the quality. It is the competence of municipalities to prescribe conditions for the discharge of sewage.

Although the Ministry of Energy, Development and Environmental Protection has a leading role in regulation and oversight of the waste disposal,[16] municipalities have significant competences in regulation and oversight of the treatment and disposal of farm-based sludge. The Environmental Protection Agency is monitoring waste management, while practical implementation of waste collection and management is the responsibility of local self-governance, which may confer certain powers to private entities.

Law on Animal Husbandry specifies the main regime of the treatment of animal waste (faeces and urine) and its use as fertilizers. Animal waste as well as the compost used as soil fertilizer is not considered waste. The minister of agriculture and the minister of environment are entitled to prescribe the treatment of animal waste management which is not to be used as fertilizer. Animal waste must be treated in a way which does not endanger human health and the health of animals, environment and the quality of food.

The safeguard of biodiversity

Genetic agricultural resources in Serbia are rich and include a large number of autochthonous sorts and races of cultivated plant and animal species. Serbia has been a Party to the United Nations Convention on Biological Diversity since 2001. Serbia has committed itself to three

16 The administration of the Autonomous Province of Vojvodina is in charge of waste disposal local regulation and oversight at its territory.

main objectives of the Convention: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits. A precondition to the effective subsidies for safeguarding biodiversity is classification and monitoring. Unfortunately, the existing level of biodiversity monitoring in Serbia is incomplete and inhomogeneous. Indicators for measuring biodiversity are non-standard and therefore not sufficiently comparable with the data in the region and Europe. In the last 10 years Serbia ratified almost all the most important global and regional conventions. The first act attempting to regulate biodiversity was the Regulation on the Protection of Natural Rarities of 1993.[17] Ordinance to designate and protect strictly protected and protected wild plants, animals and fungi[18], Regulation on the placing under the control of trade of wild fauna and flora[19] are examples of legal instruments to protect biodiversity. However, nature conservation, incorporation and effective policy towards biodiversity issues are not put high in agenda, although the Strategy for Biodiversity of the Republic of Serbia for the period from 2011 to 2018 *per se* represents an important strategic document.

The Law on Subsidies for Agriculture and Rural Development recognizes subsidies for preservance of plant and animal genetic resources. However, the existing system of subsidies does not appropriately take into account the importance of biodiversity.

The general environmental framework and agriculture

Within a short period after turbulent 90s, as of democratic changes and notably 2001, Serbia has ratified most of the significant global and regional environmental conventions, adopted a new set of laws in the field of the environmental and nature protection. The adoption of the so-called green legislation package, a set of 19 environmental laws was followed by more than 70 bylaws. Although majority of the so-called horizontal directives are transposed, are still many issues to be harmonised with the EU requirements (National Program, 2011). National Environmental Approximation Strategy anticipates achievement of full transposition of the majority of acquis by 2014, which is an ambitious task, as will require significant financial resources, notably in the field of water quality and industrial pollution.

Law on Environmental Protection regulates the integral system of environmental protection in order to ensure healthy environment.[20] It refers to the system of environmental protection which comprises measures, conditions and instruments for sustainable management, prevention, control and reduction of all kinds of environmental pollution. Among issues relevant for agricultural policy, the Law specifically relates to protected natural goods (such as landscapes), biological diversity as genetic, species and ecosystems diversity, and public natural goods, such as water-fronts, forests etc. The Law on Environmental Protection is setting the limitation to perform activities which threaten environmental capacity,

17 Official Gazette of RS, No. 50/1993.

18 Official Gazette of RS, No. 5/2010.

19 Official Gazette of RS, No. 31/2005, 9/2010.

20 Official Gazette of RS, No. 135/2004, 43/2011.

biodiversity, hydro graphic, geological, geomorphologic, and cultural and scenery values. Agricultural production is also addressed to in provisions of this Law on planning and utilization of natural values, and is referred to in the National Strategy of Sustainable Use of Natural Resources of 2012. Article 22 of the Law explicitly prescribes protection of land and soil and its sustainable use, including measures of systematic monitoring of land quality and monitoring of indicators for the assessment of risk of land degradation, while Article 23 refers to water protection and its use in the manner and up to the level which shall not represent threat to natural processes or to renewal of quality and quantity of water.

Law on Nature Protection[21] attempts to include NATURA 2000 strategy and the protection of special areas for conservation of habitats and species and areas of special protection for conservation of habitats and certain species of birds, and has almost fully transposed Directive on Birds (2009/14/EEC) and Directive on Habitats (92/42/EEC). This law sets general rules for protected areas, as areas that have a distinguished geological, biological, ecosystem and/or landscape diversity and are therefore declared by protection document areas of general interest and protected natural goods.[22] The law also refers to landscape protection, protective zones in the area outside the borders of protected area, ecologically significant area and/or ecological corridor which may be defined in order to prevent or mitigate external impacts. Law on Nature Protection governs protection and conservation of nature and biological, geological and landscape diversity. Many of its provisions are relevant for agriculture. The law establishes main principles of protection of forest, wet and water ecosystems and habitats within agro ecosystems.

Other laws with significant impact on agri-environmental concerns

Besides laws within the competence of the ministry in charge of environment, a number of other laws and regulations issued by the ministry in charge of agriculture also regulate activities of producers and processors, such as Law on Food Safety of 2009, which sets basic conditions for the safety of food and animal feed, duties and responsibilities of business subjects in the food sector, hygiene and quality of food and feed.

Law on Organic Production sets criteria for production in line with methods of organic production, control and certification in organic production, processing, labelling, storage, transport, export and import, as well as other questions related to organic production.[23] This law is mostly in line with Council Regulation (EC) on organic production and labelling of organic products and Commission's implementing Regulation No 834/2007 on organic production and labelling of organic products. However full approximation, and harmonisation with EU import rules, organic regulatory regimes for aquaculture, wine etc.,

21 Official Gazette of RS No. 36/2009, 88/2010, corr. 91/2010.

22 Pursuant to Article 27 of the law, protected natural goods are the following: 1) protected landscapes (strict natural reserve, special natural reserve, national park, natural monument, protected habitat, landscape of exceptional characteristics, natural park); 2) protected species (strictly protected and protected wild species); 3) mobile protected natural documents.

23 Official Gazette of RS 30/2010.

imply the need to enact the new law in the course of 2013 (SEIO, 2013: 244).

Law on Animal Husbandry[24] obliges agricultural producers to respect the needs of animals in cultivation, in accordance the Law on Animal Welfare and regulations on healthcare and animal welfare. Law on Animal Welfare[25] introduces a general rule on the behaviour of animal owner or breeder to act as a good host and ensure proper conditions for holding of animals and care. However, although the law is mostly aligned to EU legislation, in practice some of its rules, notably on animal slaughter, are not fully obeyed. Act on wildlife and hunting,[26] Law on Protection and Sustainable Use of Fishing Resources,[27] Law on Forests are also relevant.[28]

The environmental impact of subsidies: cross-compliance as the letter on a paper

Serbian legal framework, attempting to approximate with the EU acquis and CAP, allows for three types of subsidies: direct payments, market support and structural measures. The dominant form of subsidies are direct payments, however the monitoring system of whether farmers live up to standards for environmental protection and animal health and welfare is underdeveloped.

When entitled to subsidies, article 18. par. 2. of the Law on Agriculture and Rural Development obliges the producer to respect regulations which set standards of environmental protection, protection of public interest, plant and animal health and safety, animal welfare and protection of agricultural land. If, on the basis of official inspection records or reports by authorized bodies it has been proved that the producer acted contrary to this requirement, by purpose or negligence, the Administration for Agricultural Payments is entitled to decrease the amount of subsidy or limit the producer's right to one or several types of subsidies in the future.[29] Unfortunately, this remains a letter on the paper, as the monitoring system is ineffective. Therefore, the Law on Subsidies for Agriculture and Rural Development does introduce the basis for cross-compliance mechanism and modulation of the EU's CAP, but is not fully harmonised with the Council Regulation No 73/2009 on direct support schemes for farmers (Jovanić, 2011).

It is very hard to ascertain to what extent subsidies have environmental impact. Rural development measures, as the type of structural subsidies aim at improvement of the environmental protection programmes, preservance of biodiversity and improvement of life in rural areas. The Law on Subsidies to Agriculture and Rural Development specifies the following types of subsidies for sustainable rural development: 1) subsidies for

24 Official Gazette of RS, No. 41/2009, 93/2012.

25 Official Gazette of RS, No. 41/2009

26 Official Gazette of RS, No. 17/2009.

27 Official Gazette of RS, No. 36/2009.

28 Official Gazette of RS, No. 30/2010.

29 Article 18 of this Law is practically repeated in Article 10 of the Law on Subsidies for Agriculture and Rural Development, Official Gazette of RS, No. 10/2013.

implementation of agricultural measures; 2) subsidies for organic production;[30] 3) subsidies for preservance of plant and animal genetic resources; 4) payments for the profit lost due to implementation of good agricultural practices, animal welfare and other environmental protection policies. The fourth type represents agri-environment measure in the sense of EU definition of voluntary commitments of agricultural producers to deliver environmental goods, and has not yet been granted, which is the clear signal of the overall interest in agri-environmental incentives.

Conclusion

Economic sanctions, production and economic drop, as well as impoverishment have significantly reduced capabilities of the state for investment in environmental protection, but as well environmental concerns of agricultural producers who are primarily led by profit. Agro-environmental measures seem to have a low priority or have remained just as a declarative issue, although they are very important for export based activities of Serbian producers and traders.

In the field of environmental pollution control diversification and overlapping of duties and responsibilities within government institutions is still evident, although to a lesser degree since the new environmental legal framework of 2009 has been in force. One characteristic of the institutional framework is diversification and overlapping of duties and responsibilities, and a pice-meal control of environmental protection issues which cause coordination problems both horizontally (cross-sectoral issues) and top down (Republic to local self-governance).

One of the key challenges for Serbia and its agricultural system is how to reconcile environmental considerations with economic development, insufficient public budget and interests of economic operators, notably food exporters, to achieve the real implementation of environmental rules related to agricultural protection. In addition to the ineffective monitoring and reporting system and insufficient institutional capacities, insufficient capacity in surveying the legislation implementation, insufficiently efficient inspection supervision, and inadequate sanctioning system are major obstacles which can only be solved by a systematic reform of the regulatory process and public administration coordination. What remains to be seen is whether the Agriculture and Rural Development Strategy which is under way, will address this issue.

30 Recently adopted Rulebook on the use of subsidies in organic production is a good example how limited resources may be granted, Official Gazette of RS, No. 10/2013.

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AGRO-EKOLOŠKI PRAVNI OKVIR U SRBIJI U SVETLU HARMONIZACIJE SA PRAVOM EU

Tatjana Jovanić[31]

Rezime

Ekonomske sankcije, pad proizvodnje kao i povećanje siromaštva je značajno smanjilo kapacitet države za ulaganje u zaštitu potrošača, kao i svest poljoprivrednih proizvođača o potrebi zaštite životne sredine. Usklađivanje ponašanja sa obaveznim standardima i pravilima iz korpusa agro-ekoloških mera i principima dobre poljoprivredne prakse je važan korak u pravcu očuvanja životne sredine i zaštite zdravlja ljudi, biljaka i životinja. Sa druge strane, to je važan preduslov za izvoz poljoprivrednih proizvoda iz Srbije. Pored obavezujućih pravila, koja su bitna za ispunjenje obaveze unakrsne usklađenosti za proizvođače koji dobijaju novčane subvencije, agro-ekološki podsticaji kao dobrovoljno ustanovljena obaveza proizvođača su naročito dobrodošle, ali ih ne bi bilo realno očekivati u neposrednoj budućnosti. U radu se daje kratak osvrt na agro-ekološku politiku u EU, a najviše pažnje posvećeno je pravilima kojima se ustanovljavaju dužnosti i odgovornost poljoprivrednika u Srbiji i pitanjima usklađivanja domaćeg prava sa pravom EU.

***Ključne reči**: agro-ekološke mere, dobra poljoprivredna praksa, zaštita životne sredine, pravo EU, harmonizacija.*

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EUROPEAN AGRICULTURAL CLUSTERS: HOW CAN EUROPEAN AGRICULTURAL CLUSTERS BE MEASURED AND IDENTIFIED?

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Abstract

This article contains a research into the agricultural clusters of the EU. The clusters are identified on the level of NUTS1 regions. The agricultural clusters are identified by main type of farming and by their contribution to the regional gross value added.

Key words: *Agricultural Clusters, Location Quotient, Farm types.*

JEL: *Q13, Q19*

Introduction

In his book "The Competitive Advantage of Nations" Michael Porter describes what competitive advantage is and how this results in the origin of clusters. Porter used a diamond shaped diagram to illustrate which factors determine competitive advantage. All the four factors are essential ingredients for successful local, regional, international or global competition. The importance of a cluster rises with the sophistication of competition. This means that clusters tend to increase as economies develop (Porter, 1990).

Competition depends on several aspects: personal relationships, face-to-face communication, and interaction between networks of individuals and institutions. It is obvious that both networks and clusters depend on each other. The existence of clusters makes relationships more likely to develop and become more effective and efficient in one place (Porter, 1998), (Buccirossi, Marette, et al., 2002).

In this article the main research question is: "How can European agricultural clusters be measured and identified?"

Section 2 contains the theoretical part of this study. Section 3 describes the different types of clusters. In Section 4 the methodology of measuring clusters will be described. Sections 5 and 6 contain the results. This article is concluded by Section 7.

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Theoretical Framework

Michael Porter introduced the term cluster in economical context in his book: *The Competitive Advantage of Nations (1990)*. However, its history goes back to 1890 where Alfred Marshall was one of the first persons to describe the geography of economic activities and the analysis of clusters in his book: *Principles of Economics (1920, revised edition)*. The theorem of clusters was further developed by economists such as Perroux (1950), Hirschman (1958), Jacobs (1961) and Krugman (1991), (Breschi and Malerba, 2006).

Porter's definition is: *"Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate. Critical masses of unusual competitive success in particular business area's, clusters are a striking feature of virtually every national, regional, state, and even metropolitan economy, especially those of more economically advanced nations"* (Porter 2008).

There is a variety of clusters. Bottazzi et al. presented in 2002 from an Italian perspective the following forms: Horizontally Diversified (e.g. "Made in Italy" luxury goods); Vertical Disintegrated ("Smithian" with a local value chain); Hierarchical (oligopolistic); Research Driven (science-based); and Path Dependent (a Detroit-type agglomeration), (Breschi, Malerba, 2006), (Bottazzi, Dosi et al., 2002).

Another term, which is occasionally used for business clusters, is the term *economy of agglomeration. Economies of Scale* and the *Network Effect* are two related concepts to *economy of agglomeration. Economies of scale* appear when the costs decrease when a company size increases, this can be internal economies of scale or external economies of scale. Lower costs per unit produced are the result of scaling up. This is because of lower transport costs, competing suppliers and specialization. When competing firms are clustered, there can be positive effects; clusters can attract more customers and services than a single company can attract. However, when the cluster becomes congested due to the appearance of to many firms or industries. Therefore external diseconomies of scale may be generated (Heijman and Schipper, 2008).

The *Network Effect* occurs when the value of a product or service increases. It increases when it is used by more actors. An example of a network effect is the use of the telephone. The more telephone users, the more valuable it is for each owner. Another recent example of the *network effect* is social media and internet.

The determinants of Competitive Advantage are described underneath by way of illustration of the four facets of Porter's diamond:

- With *Factor Conditions* we mean the technology, labor and infrastructure (and other conditions) needed in order to be able to compete in a certain industry.
- The *Demand Condition* is the size and character of the home-market influences the growth, innovation and quality of the produced goods (Example: the popularity of

sailing boats in the Netherlands due to the presence of many recreational lakes).
- *Related and Supporting Industries* give a competitive advantage because clusters provide more effective and innovative inputs (The most famous example of this is Silicon Valley, where a lot of high-tech businesses are located close to each other).
- The *Firm Strategy, Structure and Rivalry* are influenced because the conditions of a nation or region influence the way that companies are organized and managed (For example the competition in (South-East)Asia in the electronica industry due to the presence of many large producers), (Porter, 1990).

A cluster becomes stronger by affecting its competitors, this is possible in three ways: first, by increasing the productivity of supporting firms or industries; second, by increasing their capacity for innovation and thus for productivity growth; and third; by stimulating new business formation that supports innovation and expands the cluster (productivity), (Porter, 1998; Porter, 2008).

Those influences on competition depend on several aspects: personal relationships, face-to-face communication, and interaction between networks of individuals and institutions. It is obvious that both networks as clusters are dependent of each other, the existence of clusters makes relationships more likely to develop and become more effective and efficient in one place (Porter, 1998), (Obadic, Zivadinovic, 2011).

Static Productivity

For increasing the productivity of supporting firms or industries, Porter chose the term *Static Productivity*. Static productivity is a covering term of the following principles: access to specialized inputs and employees, access to information, complementaries, access to Institutions and Public Goods, and Incentives and Performance Measurement.

- *Access to specialized inputs and employees:* Companies located within a cluster have access to specialized inputs such as machinery, components, business services and employees that are superior or have lower costs compared to input alternatives from distant locations. The presence of a cluster does not only increase demand for certain inputs but also increases the supply. Competition of supply increases the quality of the supply of inputs. The cluster represents a spatial organizational form that can be more effective or efficient (Porter, 1998).
- *Access to information and knowledge:* Information accumulates within a cluster, whether it is extensive market information, technical information or other specialized information. (Accumulated) Information can be accessed better or cheaper from within the cluster. This allows firms within the cluster to enhance their productivity and get closer to their productivity frontier. The information benefits of clusters have a special case about the availability of information on their current buyer's needs. Sophisticated buyers are often part of the cluster and other participants often gain and share information about buyer needs (from other clusters), (Porter, 1998).
- *Complementaries:* Firms or industries within a cluster are dependent on each other. When a part of the cluster performs badly it affects the performance of the other parts

within the cluster. A simple but good example is tourism: when a hotel in a specific area is very bad, it will negatively influence the souvenir shops and restaurants in that region in the future, because the visitor shares the knowledge and experiences of his/her holiday. Furthermore, the visitor's experience of the hotel depends not only on the primary attraction (the hotel) but also on the comfort and services of the other facilities. So when the hotel and the other facilities are not fulfilling the visitor's needs, he/she will rate the entire cluster negatively. Marketing is a form of a complementarity; a group of related firms and industries can efficiently work together in joint marketing. It also enhances the reputation of a certain location of region (Porter, 1998).

- *Access to institutions and public goods:* Firms and industries can benefit from local public goods (e.g. Infrastructure) and/or benefit from locally situated institutions at low costs (e.g. Research by students from a nearby university). Firms and industries also benefit from information built up within a cluster, this is a quasi-public good. Public or quasi-public goods within clusters are often the result of private investment. Private investments are common because cluster participants perceive the potential for collective benefits (Porter, 1998).
- *Incentives and Performance Measurement:* Clusters can give incentives to improve the efficiency of firms and industries. The main incentive is competitiveness, because local competitors have similar general circumstances. General circumstances make it easy to compare your rivals constantly (labor costs, wages and market access). Measuring the performance is also important for clusters. There are opportunities to compare performances within similar firms. This results in wider opportunities for the firm. The accumulation of knowledge in a cluster should make decisions easier for the firm and the cluster (Porter, 1998).

Capacity for innovation

Information is an important aspect for firms. Clear information about the buyer's needs is the result of knowledge and relationships within a cluster. Cluster participants have the ability to learn early about technological changes and technical possibilities. This results in great opportunities for innovation (within the cluster). Another advantage which clusters have is the fact that the possibility of innovation is faster than firms outside the cluster because firms which supply the input are likely to be located closely. Competitiveness stimulates innovation and vice versa; when a firm innovates, a rival firm cannot stay behind. Isolated firms (firms outside the cluster) are less likely to have the opportunity and/or the incentive to innovate (Porter, 1998).

Clusters and new business formation

Many, if not most, new businesses choose to form within existing clusters. They prefer forming in a cluster above isolated locations because of a couple of reasons. First, the clusters provide incentives to entry through better information about opportunities within the cluster and/or industry. The existence of a cluster in itself indicates signals for opportunity. Individuals within a firm or industry perceive problems in the products, the process, the services or the suppliers. Those individuals are likely to start new firms aimed at filling the perceived problems.

The barriers to entry are lower than elsewhere. Needed assets, skills, inputs, and staff, are often already available within the cluster. Risks of entry are lowered because of: lower entry barriers, multiple potential local customers, established relationships, and the presence of other local firms (which can lower production costs).

These mentioned advantages of establishing a new business formation within a cluster can play a major role in speeding up the process of (cluster) innovation. Because of these innovations, clusters often grow in depth and breadth over time, which further enhances the advantages of the cluster (Porter, 1998).

Cluster identification

Clusters can be identified by kind of knowledge of by form of development. In this section we will discuss the types of clusters identified by different kinds of knowledge and the types of clusters that can be identified by different forms of development.

The knowledge clusters can be differentiated by five types: the factor endowment clusters, the techno clusters, the historic knowhow-based clusters, the low-cost manufacturing sectors and the knowledge service clusters. The *Factor Endowment Clusters* are the regions which have comparative advantages due to the presence of certain factor endowments. This could be the amount of land, natural resources, the availability of labor and the population size of a certain nation or region (Porter, 1990).

As stated in Section 2, business clusters will most likely be formed within a cluster or in area's where the companies can achieve comparative advantages due to geographical location. For instance the harbor of Rotterdam, a main port in the Netherlands, is a good example of a geographical location where a lot of transportation companies are clustered due to the geographical advantages of the appearance of the Rhine and the North-sea.

Techno Clusters are clusters with high technologically orientated businesses. Networking and sharing knowledge is a very important aspect in the techno clusters. These clusters are often linked to universities, research centers or ICT-clusters. Silicon Valley is one of the greatest techno clusters in the world. There are more than 20 universities, including San José State University, Stanford University and San Francisco State University. Furthermore is Silicon Valley known for their high technology companies such as: Yahoo, Adobe Systems, eBay, Google, Intel, Hewlett-Packard and Apple Inc. Wageningen University and Research Centre is also a techno cluster, it is mainly focused on the domain of food (security) and (living) environment (Ianca, Batrinca, 2010).

Historic knowhow-based clusters are the clusters which are based on traditional activities. Traditional techniques in for example management are the result of centuries of know-how of the previous entrepreneurs. A good example of a historic knowhow-based cluster is the financial center in London, with the world's greatest foreign exchange market (Ianca, 2010).

Low-cost manufacturing clusters are clusters which are typically emerged in developing countries within particular industries. The drivers of these clusters are: availability of low-cost

labor and geographical proximity of clients (e.g. Mexico and Eastern Europe), (Altenburg and Meyer-Stamer, 1999).

Knowledge service clusters are like low-cost manufacturing clusters emerged in developing countries. These clusters are characterized by the availability of lower-cost skills and expertise. Those clusters serve a globally growing demand for electronics, engineering, software-development and analytical services (e.g. Shanghai, China and India), (Manning, et al., 2010), (Bronisz and Heijman, 2008).

There are four types of clusters that can be identified by their different forms of development: *Geographical* clusters, *Horizontal* clusters, *Vertical* clusters and *Sectorial* clusters. The *Geographical clusters* exist because of a geographical reason; a locations where certain types of resources are available that attract firms that need that type of resources for their production process.

With *Horizontal clusters* we mean the interconnections between firms and industries on a horizontal level, this is the sharing of resources and knowledge. The *Vertical clusters* are the clusters with interconnection between firms and industries on a vertical level, mostly supply chain clustering. A *Sectorial cluster* is a cluster where firms and industries operate together from within the same sector. This type of interconnection can occur horizontally and vertically (Isbasoiu, 2007), (Matopoulos, Vlachopoulou, et al. 2005).

Location quotients

There is no standard method of measuring a cluster. When we want to measure a cluster, we try to identify, define, locate and describe the cluster. There are a couple of methods to analyze the competitiveness of a certain area, of which the *Location Quotient-method* is widely used (Heijman and Schipper, 2008). Cluster analysis is based on local and regional employment statistics in various industrial sectors. For this article we used two notable databases which provided us the data on clusters and industrial agglomeration: *The European Cluster Observatory* and *Eurostat.*

The European Cluster Observatory is managed by the Center for Strategy and Competitiveness at the Stockholm School of Economics. The European Cluster Observatory is a platform which provides an access point to information and analysis of clusters, cluster competitiveness and cluster policy in Europe. The European Cluster Observatory has three main target groups: Policy makers and government at the European, national, regional and local levels; Cluster Management staff; and Academics and researchers. The European Cluster Observatory database is based on regions and sectors. Their method is to combine geography and industry, in order to statistically trace regional agglomerations in Europe. The European Cluster Observatory designed a framework whose aims are to provide a basis for analysis and benchmarking of regional competitiveness.

The framework which they use for identifying clusters is divided in four layers: outcome indicators, intermediate performance indicators, competitiveness drives and fundamentals. The outcome indicators sit at the top of the framework. The outcome indicators are the

indicators of ultimate performance primarily to gross domestic product per capita. The intermediate performance indicators are about the performance in a range of areas such as patents, productivity, employment rate, exports and growth of firms. The competitive drivers are the core of the framework. The drivers are indicated to clusters, behavior and quality. These sets determine the measurement of economic performance. The fundamentals are about the geographical location, the endowment of natural resources and the size of the economy. They provide opportunities for each region (Observatory, 2012).

Eurostat provides statistical information about institutions of the European Union, furthermore it promotes the harmonization of statistical methods across the member states of the European Union. In the statistical database of Agriculture Eurostat have the following main activities: agriculture, forestry, fisheries and Food: from farm to fork (Eurostat, 2012).

The location quotient is an easy to compute tool for measuring the economic strength of a firm or industry in a region. It calculates the ratio that describes the regional share of an economic activity in a firm or industry compared to the national share of economic activity in that sector. The tool is used to identify specializations in a(n) (local) economy.

The location quotient is equal to the relative share of the sector in the total added value of a region divided by the relative share of the sector in the total national added value. A location quotient under 1 means that a region is not specialized in that computed industry, a location quotient above 1 means that the region is specialized in that sector (Heijman and Schipper, 2008). The formula for the location quotient (LQ) is the following:

$$E_i^j = \text{Gross Value Added in Activity } i \text{ in Region } j$$
$$E_i = \text{Gross Value Added in Activity } i \text{ in nation}$$
$$E^j = \text{Total Gross Value Added in Activity } i \text{ in Region } j$$
$$E = \text{Total Gross Value Added in Activity } i \text{ in nation}$$

$$LQ = \frac{E_i^j / E^j}{E_i / E} \quad \text{or} \quad LQ = \frac{E_i^j / E_j}{E^j / E}.$$

The location quotient will be computed in Excel and eventually in a GIS-software program which will generate maps of the location quotients in Europe.

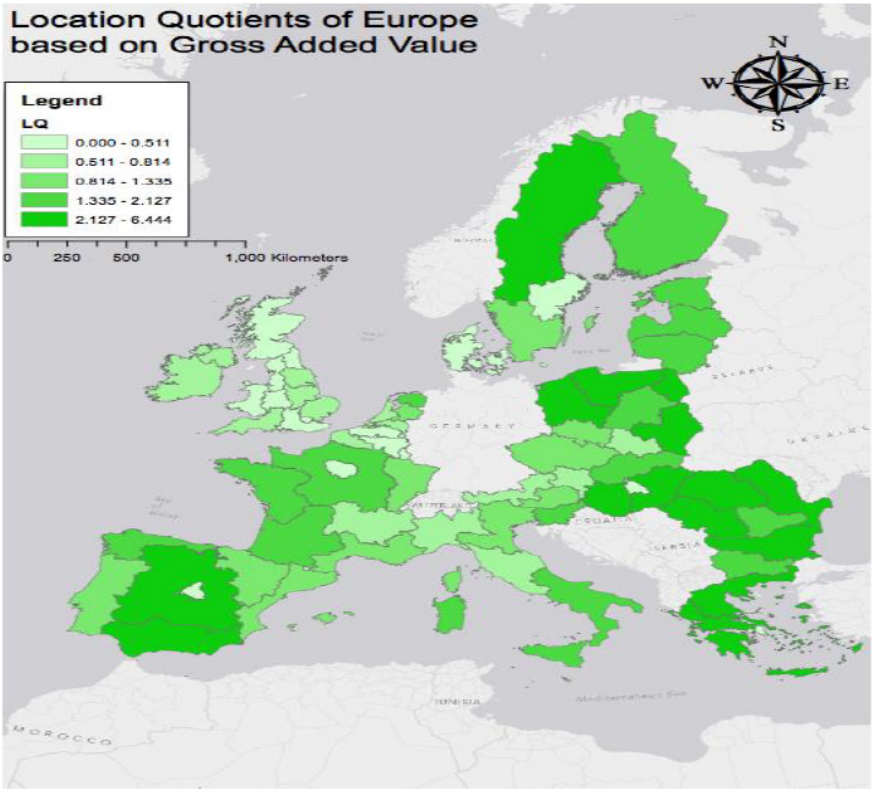
In Figure 1 an overview of the location quotients of gross added value in agriculture in the European Union is displayed. The location quotients of some countries (e.g. Germany) could not be computed due to lack of data or the absence of EU-27 membership. If we take a look at Figure 1, then we notice that the location quotients in Eastern Europe and in Southern Europe are higher than in Western Europe. If we take a look at the top ten location quotients based on Gross Added Value in Europe, we see that Romania has three regions

represented in the top 10. Greece has two regions represented in the top ten, and the other 5 regions are all from Eastern Europe (with ES4 as an exception). See Table 1 for the top ten regions in Europe with highest location quotient.

Table 1. Top ten NUTS-1 regions in Europe with highest location quotients for agriculture based on Gross Added Value (Eurostat, 2007)

NUTS1	Region	LQ
BG3	Bulgaria, Severna I Iztochna	4,5400
HU3	Hungary, Great Plain and North	4,0090
GR2	Greece, Kentriki Ellada	3,5850
ES4	Spain, Centre	3,4220
GR1	Greece, Voreira Ellada	3,1240
RO2	Romania, Nord-Est, Sud-Est	6,4440
RO4	Romania, Sud-Vest, Vest	4,9190
PT2	Portugal, Azores	4,7780
RO1	Romania, Nord-Vest, Centre	4,4470
PL3	Poland, East Region	3,2100

Figure 1. Location Quotients for agriculture based on Gross Added Values (Eurostat, 2007)



Farming types

The second aspect needed for the measuring clusters is the type of farming in the given region. The type of farming is defined as: "the agricultural activity has a higher standard gross margin than two-third of the total" (Eurostat 2012). There are six different categories for the type of farming in Europe:

- *Specialist Field Cropping:* the dry-land and irrigated production of crops, typically on a large scale. The choice of the cropping depends on soil, climate and precipitation.
- *Mixed Holdings:* different kinds of farming types are represented in the given NUTS1 region. Neither livestock nor crop production is the dominant activity. None of the farming activities has a higher standard gross margin than two-third of the total.
- *Specialist Permanent Crops:* one crop produced from plants which last for many seasons, rather than being replaced after each harvest (e.g. citrus, olives, coffee and rubber).
- *Specialist Grazing Livestock:* domesticated animals raised in an agricultural setting to produce food, fiber and labor
- *Specialist Horticulture:* science, art, technology and business involved in intensive plant cultivation (e.g. Fruit, vegetables, floriculture, etc.).
- *No Specialization:* no specific type of farming in that NUTS1 region. There is no type of farming which has more than two third of the total of the standard gross margin. The difference with mixed holdings is that mixed holdings are firms and industries which have different kinds of farming within their firm or industry and the no specialization type of farming accounts for the given region.

Not all categories will be discussed in the further analysis of the agricultural clusters in the European Union. This is for specialized horticulture due to the low appearance of specialized horticulture NUTS1 regions

The critical location factors for field cropping as main type of farming are proper physical production circumstances. Soil, climate, precipitation and low ground prices are some very important factors which determine whether field cropping is possible or not. Thus the potential areas for Field Cropping are parts of: France, Italy, Greece, England, Germany, Denmark and Scandinavia.

The grazing livestock areas in the European Union are mainly in Western Europe, with as an exception Northern Spain and Middle Europe (South-East Germany and Austria). The appearance of grazing livestock areas is especially because of the low ground prices and the proper physical production circumstances. The dairy business can be expected in areas with grassland areas with a low urban pressure and thus low ground prices. Therefore is the dairy business especially located in the coastal areas of England, Wales, the Netherlands, Denmark, parts of Germany, France and Poland (Rienks, Hermans et al. 2004).

A mixed-farming holding is an agricultural firm or industry where there is no specialization in livestock or crop production. There is no dominant activity, which means that none of the farming activities provides more than a two-third part of the standard gross margin (SGM), (Eurostat 2012).

In Eastern Europe we see a lot of mixed holdings as type of farming. Furthermore, the areas with mixed holdings as farming type are only in Eastern Europe. The question now rises, why only in Eastern Europe and why is the only other type of farming in Eastern Europe no specialization?

A reasonable explanation for the appearance of many mixed holdings is that mixed holdings are a low-risk and a risk spreading agricultural activity. This is important because those farmers can not afford to have failed harvest because they only focused on one type of crop. On the other hand it might have to do with the need of self-sufficiency of the Eastern European agricultural entrepreneurs. The lack of good logistics and infrastructure might result in the fact that it is more difficult for Eastern Europe to import agricultural products, therefore it is a simple choice to have different types of crops in order to be self-sufficient. Therefore it can be stated the agriculture in Eastern Europe can be described as mostly low-risk and self-sufficient.

When we take a good look at the appearance of permanent crops as type of farming in Europe, then we see that it is mostly located in Southern Europe. A reasonable explanation for this appearance is the climate. The production of olives, grapes, corn and maize has some certain pre-requisitions, such as temperature, humidity and soil structure. Southern Europe has these pre-requisitions and is therefor perfectly for cropping olives, grapes, corn and maize (Silvis, Slangen, et al. 2002).

Agri-clusters based on Type of Farming and Gross Value Added

By combining the findings in the previous two sections it is possible now to identify agricultural clusters. Regions with agricultural clusters of a certain farming type are characterized by a high agricultural location quotient.

In this section we will discuss the location quotients based on type of farming in the different NUTS1 regions. Based on the gross added value and farm type we will identify the top five NUTS1 regions per type of farming. The range of location quotients for each type of farming is different because we chose to divide the ranges by quantiles with five different classes. The order of type of farming is the same as in Section 5.

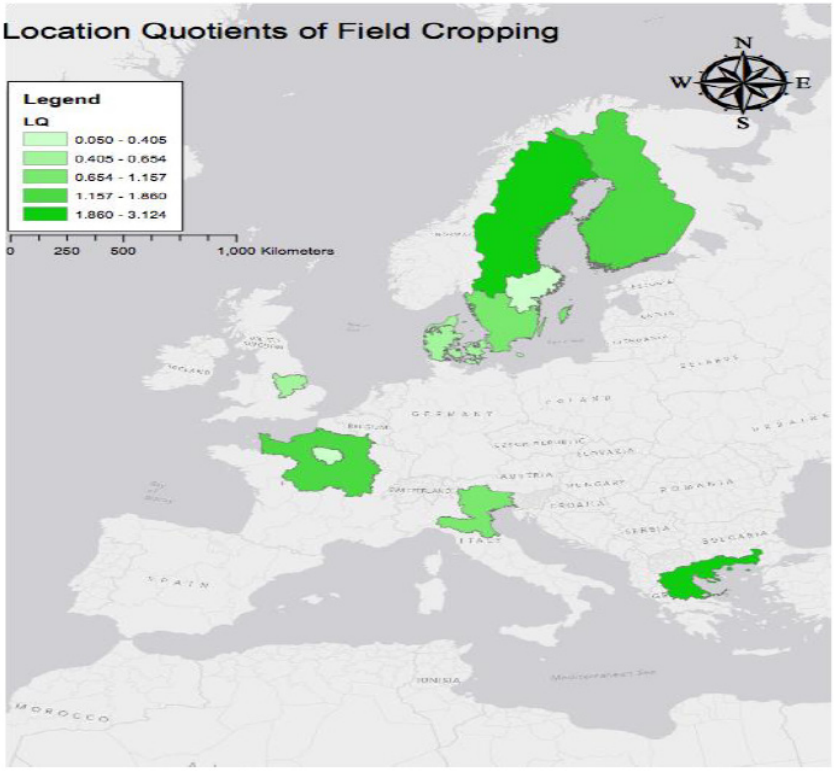
The field cropping areas in the European Union appear in France, Italy, Greece, England, Germany, Denmark, Finland and Sweden. The top five NUTS1 regions for highest location quotient based on type of farming and gross added value are displayed in Table 2 and Figure 2.

The top five regions for field cropping are located in Greece, Sweden, France, Finland and Italy. Because there are not many areas in Europe where field cropping is the main type of farming, it is difficult to make any assumptions about field cropping clusters in Europe.

Table 2. Top five Location Quotients of Field Cropping based on numbers of Eurostat (2007)

Field Cropping	Region	LQ
GR1	Greece, Voreia Ellada	3,12
SE3	Sweden, North	2,16
FR1	France, Île-de-France	1,86
FI1	Finland, Mainland	1,59
ITH	Italy, North East	1,16

Figure 2. Location Quotients of Field Cropping based on numbers of Eurostat (2007)



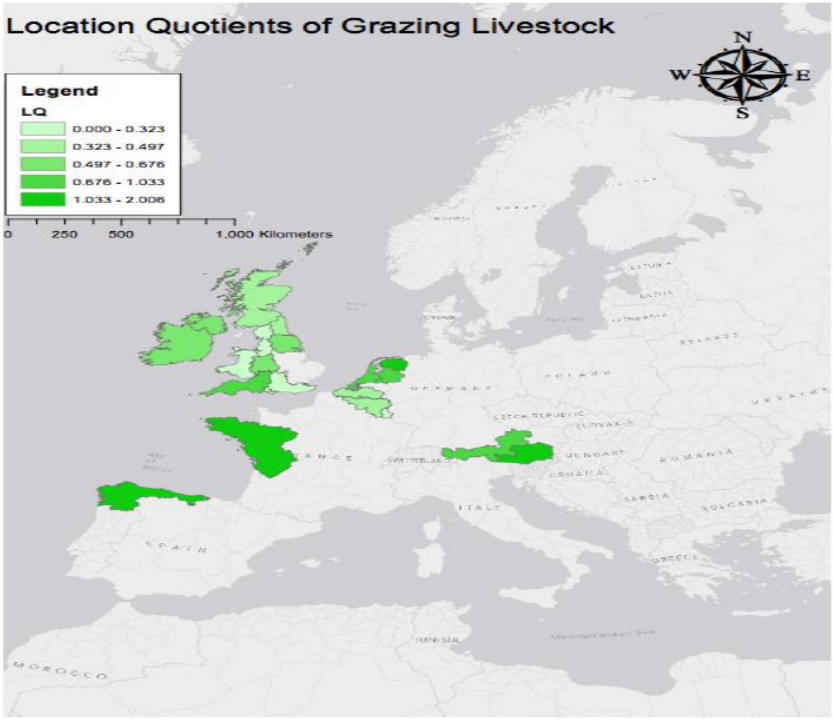
The Grazing Livestock area's in the European Union appear in England, the Netherlands, France, Spain, Germany and Austria. The top five regions for highest location quotient based on type of farming and gross added value are displayed in Table 3 and Figure 3.

The top five regions for grazing livestock are located in Spain, France, The Netherlands and Austria. One thing that is noticeable is that these location quotients are sufficiently lower than field cropping for example. The grazing livestock area's have the same problem as field cropping regarding drawing any conclusions for the appearance of clusters.

Table 3. Top five Location Quotients of Grazing Livestock based on numbers of Eurostat (2007)

Grazing Livestock	Region	LQ
ES1	Spain, North West	2,01
FR5	France,West	1,49
NL1	Netherlands, North	1,46
AT2	Austria, South	1,21
NL2	Netherlands, East	1,03

Figure 3. Location Quotients of Grazing Livestock based on numbers of Eurostat (2007)



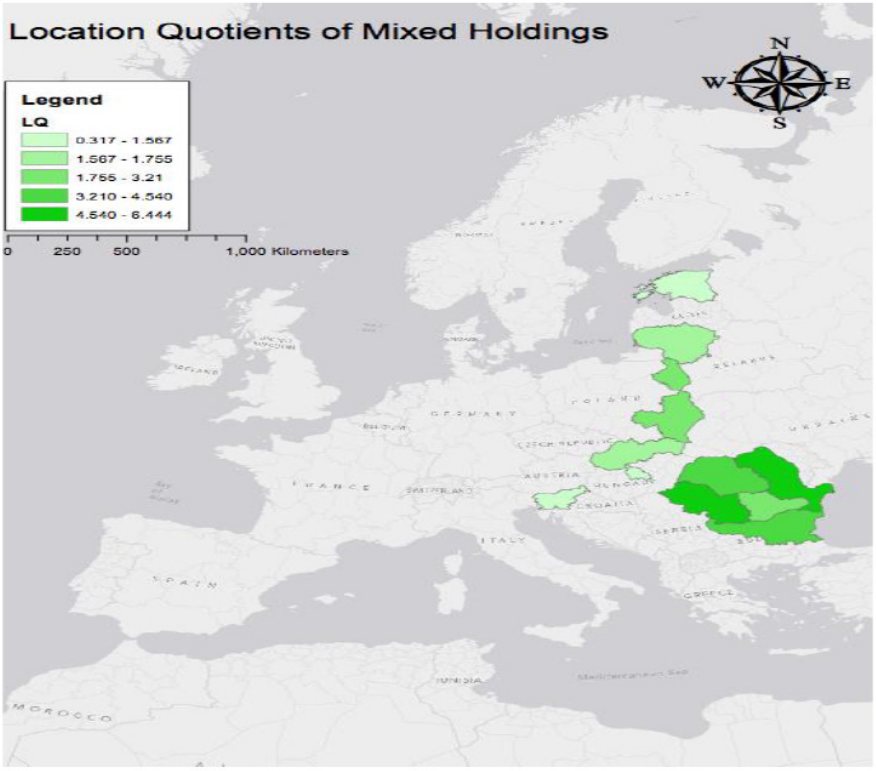
The Mixed Holdings area's in the European Union appear only in Eastern Europe, with in particular Romania, Poland, Bulgaria, Estonia, Slovenia and Slovakia. The top five NUTS1 regions for highest location quotient based on type of farming and gross added value are displayed in Table 4 and Figure 4.

The top five regions of the gross added value of mixed holdings are in Romania, Bulgaria and Poland. The location quotients of the mixed holdings areas are significantly higher than the other types of farming. This might be due to the fact that this type of farming is very diverse. It has a high added value because their production meets their needs in stead of that their needs exceed their production which will lead to importing other agricultural products. Being self-sufficient resulted in high gross added values and thus a high score on the location quotients.

Table 4. Top five Location Quotients of Mixed Holdings based on numbers of Eurostat (2007)

Mixed Holdings	Region	LQ
RO2	Romania, Nord-Est, Sud-Est	6,44
RO4	Romania, Sud-Vest, Vest	4,91
BG3	Bulgary, Sverna I Iztochna	5,54
RO1	Romania, Nord-Vest, Centru	4,44
PL3	Poland, East Region	3,21

Figure 4. Location Quotients of Mixed Holdings based on numbers of Eurostat (2007)



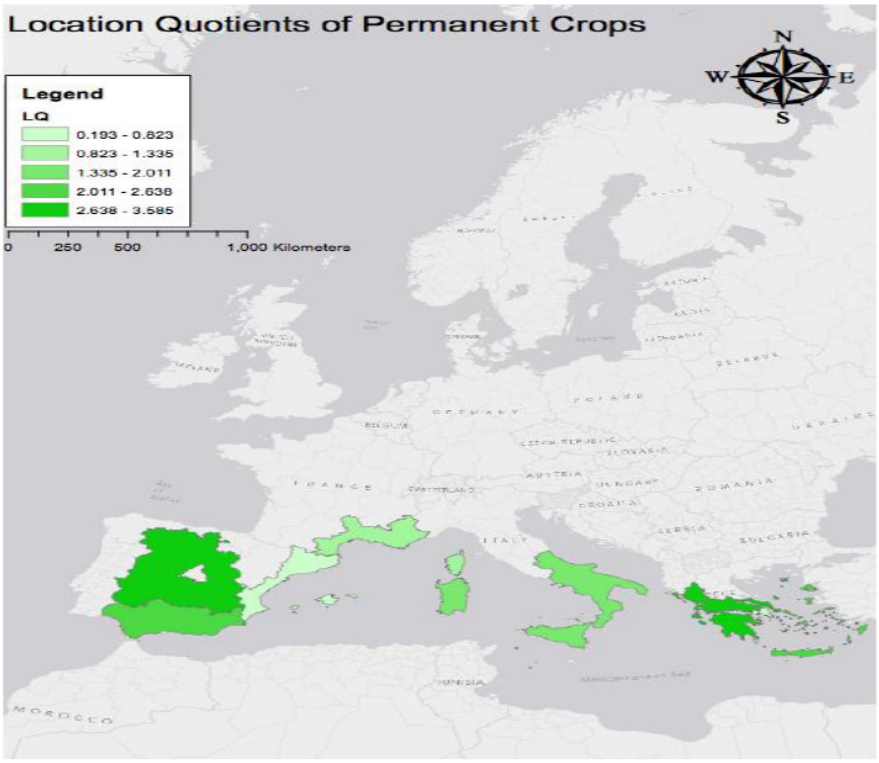
The Permanent Crops area's in the European Union appear only in Southern Europe, with in particular Spain, Italy and Greece. The top five NUTS1 regions for highest location quotient based on type of farming and gross added value are displayed in Table 5 and Figure 5.

The top five NUTS1 regions for permanent crops are located in Greece, Spain and Italy. Based on the location quotient based on labor and the location quotient based on gross added value we might state that there are some permanent crops clusters Southern Europe.

Table 5. Top five Location Quotients of Permanent Crops based on numbers of Eurostat (2007)

Permanent Crops	Region	LQ
GR2	Greece, Kentriki Ellada	3,58
ES4	Spain, Centre	3,42
ES6	Spain, South	2,63
GR4	Greece, Nisia Aigaiou, Kriti	2,41
ITG	Italy, Islands	2,01

Figure 5. Location Quotients of Permanent Crops based on numbers of Eurostat (2007)



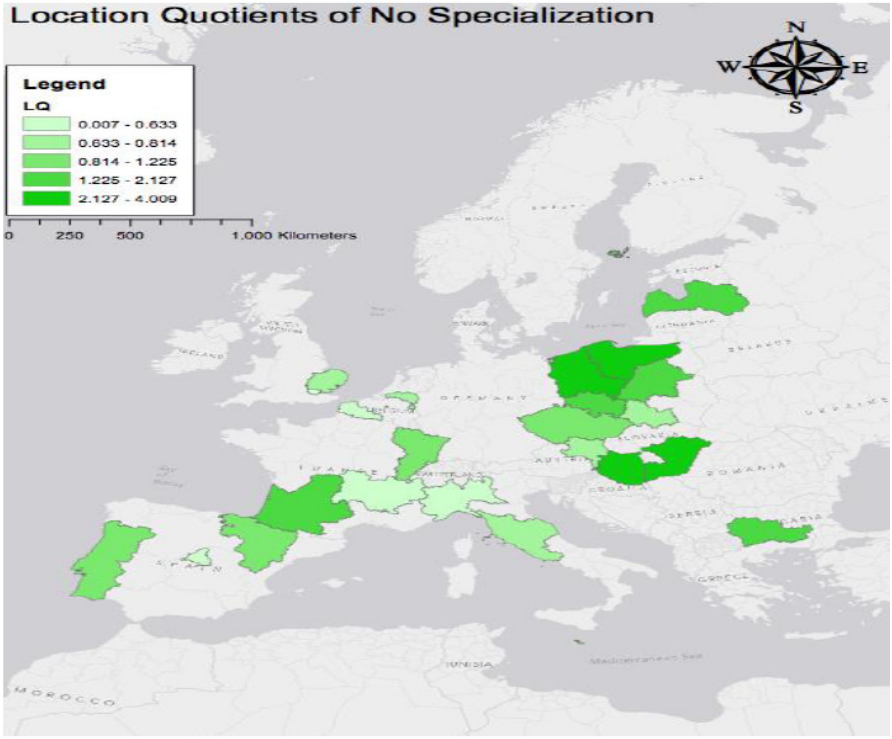
The Permanent Crops areas in the European Union appear in diverse area's in Europe. The no specialization areas are spread through the European Union. The top five NUTS1 regions for highest location quotient based on type of farming and gross added value are displayed in Table 6 and Figure 6.

The top five NUTS1 regions for no specialization are located in Hungary, Poland and Latvia. Because there is no specialization in this type of farming it is difficult to determine whether there are agricultural clusters because there is no data available on any specific farming types in those given areas.

Table 6. Top five Location Quotients of No Specialization based on numbers of Eurostat (2007)

No Specialization	Region	LQ
HU3	Hungary, Great Plain and North	4,01
HU2	Hungary, Transdanubia	3,01
PL4	Poland, Northwest Region	2,69
PL6	Poland, North Region	2,56
LV0	Latvia, Latvia	2,13

Figure 6. Location Quotients of No Specialization based on numbers of Eurostat (2007)



Conclusion

The main research question of this article was: *"How can European agricultural clusters be measured and identified?"*. Location quotients combined with farming types on the NUTS1 level gave us an overview of the spatial distributions of the different types of agri-clusters throughout the European Union.

Mixed holdings have the highest location quotients, followed by the no specialization areas, permanent crops, field cropping and finally grazing livestock.

Especially the mixed holdings and no specialization types of farming area's can be identified as low-cost manufacturing clusters or factor endowment clusters. Eastern

Europe is, in comparison with Western Europe, less developed, there is a high availability of low-cost (agricultural) labor, there is a high geographical proximity of clients and the amount of land and natural resources are also present as their comparative advantages. Given these properties and the calculated location quotients, a number of NUTS1 regions in the east part of the EU may be identified as factor endowment clusters or low-cost manufacturing clusters.

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Review Article

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AN AGRICULTURAL LAND VALUE ASSESSMENT MODEL

Aleksandar Majstorović[1], Dragan Dukić[2], Mihajlo Zogović[3]

Summary

The aim of this article is to establish and present a model which is possible and necessary to apply when assessing the value of an agricultural land in the existing economic, legal and market framework of the Republic of Serbia. This article is a preliminary and integral component of a broader research project titled Value Assessment for Various Types of Real Estate in the Republic of Serbia and the Possibility of Their Expression in Accounting, realized at the Faculty of Real Estate Management, Union Nikola Tesla University, Belgrade. The article presents only those preliminary results and the model related to the specified topic, and uses the methods which are successfully employed, in this domain, in the developed countries, primarily in the USA, Germany and France and which are modified with respect to the legal framework and market conditions in the Republic of Serbia. The topic is significant and relevant in light of the announced privatization of 10,000 ha of agricultural land. It is also possible to use this model to re-examine the validity of earlier agricultural land value assessments within the process of privatization of certain agricultural properties.

Key words: *assessment, value, agricultural land, assessor.*

JEL: *C52, D46*

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Introduction

The property (capital) assessment is a process carried out by a team of trained, certified assessors which needs to result in giving an opinion about the value of the property or specific components of the property on the given day[4].

Legal regulations in this area on the level of the Republic of Serbia consist of:

1) Ownership Transformation Act,
2) Regulation on the requirements that a certified assessor has to meet and the procedure of revoking a certificate,
3) Regulation of the capital value assessment procedure,
4) Instructions for the application of methods of capital value assessment and the way in which the value assessment is presented[5].

In order to carry out the assessment procedure correctly and construct a valid report, it is necessary to understand the meaning of some widely used terms appropriately. For example, the notion of assessment should include the procedure of determining the value as well as giving an opinion about the value of the property (in the present case it is an agricultural property), exclusively on the determined day[6].

The notion that is probably most widely used is value, which in itself is quite vague because there are many acceptable definitions, of which the most correctly used one is *fair* value. Fair value is the amount of money for which the seller is ready to transfer the ownership of the property to the buyer in a wilful transfer while both side are well informed about the relevant facts (a transfer under usual trade conditions). It is also understood that the buyer and seller are not known in advance, i.e. the transfer is hypothetical and the property is considered as it is, without significant investments, which is what has to be completely applied in agricultural property assessment. It is important to note that the amount of money that is paid for a certain property is almost never identical to the one stated in the report of a certified assessor, and this is usually due to the following reasons: special motivation, negotiation skills, as well as the method of financial transaction or other specifics.

In this paper, we will present and analyse, on a hypothetical example, a model of agricultural land value assessment model, which is, in our opinion, the most suitable given the market, economic and other conditions in the Republic of Serbia

4 Majstorović, A., Research project of the Defense Ministry of the Republic of Serbia, 306/12-10, 2008, *Projection of development of the financial function of the defense system by 2020*, pg. 6, Belgrade.

5 A. Majstorović, Research project of the Defense Ministry of the Republic of Serbia. 306/12-10, 2008, *Projection of development of the financial function of the defense system by 2020*, pg. 11-12, Belgrade.

6 Bubić, J, Hajnrih, J. (2012): *The analyses business performances of agricultural enterprises in Vojvodina during the current crisis*, Economics of Agriculture, BSAAE, IAE, AES, No. 2, pg. 183-195, Belgrade.

Basic elements of agricultural land value assessment

Different authors emphasize different factors – elements of real estate value assessment. Those elements are assigned greater or smaller significance depending on the component of the property being assessed (buildings, infrastructural objects, land, forest, etc.). The model of agricultural land value assessment proposed in this paper will take into account the following most important aspects:

1) Location (cadastre municipality),
2) Land capability (type, class),
3) Use (applicability for some kind of agricultural production),
4) Distance from a settlement,
5) Distance from a hard road,
6) Distance from an electricity supply source,
7) Distance from a water supply source,
8) Possibility of irrigation[7].

The abovementioned factors can be established by examining registry lists, copies of cadastre service plans, the sketch of land tracts (this is the most important and most widely used method for agricultural land), pedological maps and analysing the property on the spot (this method is also very widely used under our current conditions).

For determining the market value, it is possible to use the data on market prices of agricultural land on a specific territory as well as the data on the tax base level for agricultural land which is established by the local tax office. The value which is thereby determined has to be increased by adding the values of the real estate located on the property (which should be assessed according to the model and methodology appropriate for that type of real estate), e.g. stationary part of the irrigation system, buildings, fence, wells, roads and crops.[8]

Methods and Materials

Present research project of analysing and creating a model of agricultural land value assessment has been carried out by using the methods of projection, statistical analysis, probability theory, descriptive methods and methods of inductive and deductive reasoning. The main hypothesis is that it is possible to create a model of agricultural land value assessment which can be successfully implemented in the Republic of Serbia. The main goal is to provide a model that can serve as a basis for future agricultural land value assessment and to engage scientific and research institutions in its further development.

Broadly stated, real estate is a part of the surface of the Earth, i.e. something that cannot be relocated from one location to the other without changing its substance. In that light, an agricultural land is a part of the surface of the Earth which is geometrically bound and has a

7 Leko, V., Vlahović, A., Poznanić, V. (1997): *Procena vrednosti kapitala,* Ekonomski institut, Beograd, pg. 88-89.

8 Faculty of Economics and engineering management, *Value assessment for fixed assets at the Public company Zelenilo, Novi Sad*, project no. 8/2012, pg. 23, Novi Sad.

special mark (cadastre mark) and use (for agricultural production), which makes it essentially different from other land properties. The value of the agricultural land, therefore, represents the total income that can be collected from that property expressed in money. While making an assessment of the value of an agricultural land, it is necessary to choose a method by which to carry out the procedure (the methodological framework of assessment), based on predefined and presented elements that determine the value. The assessor of agricultural property value has the task of employing appropriate methods in order to predict the selling price of the agricultural land. In addition, he has to determine the possible benefits, or income, that the property can generate in the predefined period, and all of that has to be expressed in money on a given day.

The notion of assessment denotes an expert's opinion about the value of an agricultural land as a consequence of application of an appropriate methodological framework, and the output result is the value of the property expressed in money determined according to the following algorithm respectively:

- Physical and legal identification of the agricultural land,
- Identification of rights of ownership of the agricultural land,
- Determining the purpose of assessment,
- Determining the effective date of assessment,
- Collecting and analysing the methodological framework of assessment,
- Application of an assessment method (possible methods and their effects on an appropriate sample will be presented in the following sections),
- Making a conclusion about the value and writing a report about the assessment with an opinion of a certified assessor.

The basic assumption in the process of assessment is the assessor's objectivity and lack of any sort of conflict of interests, and it is necessary to take into account specific professional and ethical standards. A fact that tells a lot about the significance of a correctly applied methodological framework is that completely correct applications of different methods can yield different values of the agricultural land, under the assumption that everything is carried out in a methodologically correct way, which is a choice and responsibility of a certified assessor. The market conditions are uncertain and changeable and the results of agricultural land value assessment should be interpreted in light of those uncertainties.

The choice of an assessment method should depend on the quality and availability of data, theoretically, in the conditions of having perfect and equally accessible data, the correct application of any of the methods would yield identical results. However, in practice, where there is no perfect information, methods should correspond one to the other and assessments should be made by applying at least two or three methodological approaches. In assessing the value of agricultural land, it is possible to successfully employ three different methodological groups:

- Expense method (the method of determining real values, expense approach, a static method),
- Comparative method (the method of sales comparison, direct comparison of sale prices),

- Method of income capitalization (method of income assessment, crop approach, dynamic method, profit capitalization method).

Before defining these methods theoretically and presenting the effects of application of each of them to the assessment of value of an agricultural land, it is important to point out that the process of evaluation should contain the following formal and substantial elements:

- Defining the assessment arrangement,
- Collection, selection and analysis of data,
- General data (macroeconomic, statistical, regional, etc.),
- The data specific for the property assessed (history, expenses, prices, profits, exploitation),
- Comparative (competition, similar transactions, etc.),
- Analysis of the property's best use,
- Assessment of property value,
- Application of the methodological framework of assessment (related to the expenses, market and crops),
- Reaching the conclusion about the value, and
- Writing the assessment report.

Apart from the application of an appropriate methodological framework and the knowledge and skills of the certified assessor, the value of agricultural land stated in a report of a certified assessor is also influenced by political, natural and market factors. The influence of political and market factors is the same as with the assessment of other types of real estate, while the influence of natural factors is different so it has to be specially analysed.

When speaking about these factors, it is primarily about the impact that nature, independently of human will, can make in the sense of change of the value of the agricultural property. The question of climate change and natural disasters is here crucial and the value of the property can vary with respect to the degree in which some of these factors are present or non-present.

The first item on this list of factors is the susceptibility to floods. Heavy rains and melting of snow and/or the rise of the sea –level on the one hand, and the expansion of urban areas, one the other, have caused floods to become one of the most frequent natural catastrophes in the world. In our conditions, the susceptibility of agricultural land to floods influences its value extremely negatively, while, one the other hand, one-hundred-per-cent absence of the possibility of floods has almost no impact on the price of real estate, which is a phenomenon that will be interesting to further explore. According to our research[9], similar situation is found when it comes to the value assessment of an agricultural property susceptible to draughts.

The next on the list of natural factors is the earthquake. Interestingly, this factor has almost no influence on the value of agricultural properties in our region, but it has a significant,

9 Faculty of Economics and engineering management, *Value assessment for fixed assets at the Public company Zelenilo Novi Sad*, project no. 8/2012, pg. 28-33, Novi Sad.

we would say, rather psychological than real, effect when it comes to constructions sites, especially buildings on those sites. This definitely makes sense because the construction of buildings in earthquake-prone and highly earthquake-prone areas entails high risks, which are related to significantly higher expenses than usual.

Among other natural factors, in the Republic of Serbia, the climate factors have the greatest impact on the value of agricultural land. As it is known, the Republic of Serbia is located in the North hemisphere and as such it has a moderate continental climate and a moderate Mediterranean climate, which means that there is no impact of extreme climate factors and that there is a complete cycle of all four seasons, which definitely increases the value of agricultural land. Land that is located in the areas of moderately increased humidity and constant temperature in the interval of 22-25° C, like, for example, on some islands in tropical regions, has the highest price.

The market value of agricultural land can be defined as the amount of money that can be received for it in an open and competitive market, under normal conditions, with consent of both sides, in a transaction between interested sides that possess an optimal level of information about the relevant facts[10]. Getting the most accurate values of agricultural property on the market is the main motif for the implementation of assessment models, and the value thus arrived at is never 100 per cent correct because it is, after all, a consequence of assessment, evaluation and valorisation, and as such, it is subjective. Nevertheless, it is important, and in the following cases, it can be said to be necessary:

- The need to secure a financing source,
- Making appropriate investment and business decisions,
- For the purposes of financial and accounting reports,
- In different kinds of property lawsuits,
- For taxation, insurance, etc.

In practice, the market value of an agricultural property is the price which can be obtained under the given conditions on the market and it is located in the interval: the lowest market value (the price which can be obtained with great certainty on a market with a higher number of buyers) – realistically expected market value (the price which can be obtained in a reasonable period with most of the buyers) – maximal expected market value (the price which can be obtained with limited certainty in a short period of time with a small number of buyers who are, for subjective reasons, particularly interested in the agricultural property in question). Certainly, the relation between supply and demand is defined by the part of the interval value in which the obtained price is located. In case supply is greater than demand, the temporal period needed for arriving at the selling price will be longer and the price will mostly be located between the lowest market value and realistically expected market value. In case supply is smaller than demand, the temporal period for arriving at selling price will be shorter and the selling price will be located between the realistically expected market value and maximal expected market value of the agricultural property.

10 Ljumović, I., Cvijanović, J., Lazić, J., (2012): *Valuation of biotechnology companies: Real options approach under uncertainty*, Economics of Agriculture, IAE, no. 1, pg. 51-63, Beograd.

Results

In this section, we present the results of our research in the form of application of the model on the assessment of value of a concrete agricultural land. In the following example, we will illustrate a practical implementation of the proposed model of agricultural property value assessment and present a summary of effects of implementation of different, but allowed methods of assessment, whose framework we presented in the part of the article that defines the methodology. Example: The assessment of market value of the agricultural property Dobrava 2, surfacing 17.8 ha in Novi Sad, Cadastre site no. 23 cadastre municipality Novi Sad – III 2012/07/27.

Table 1. Basic information about the assessed real estate

Real estate as a part of assessment:	**Agricultural property Dobrava 2**	
Surface kp. Br. 23 KO NS - III	S=178000 m2	The year of ownership: 1950. First class of agricultural property
Basic information about the owner	Farm XY, Novi Sad	Manager XX, Novi Sad
PIN	Transfer account	Personal number

Table 2. Basic information about the assessor

The name of the company	XXX
PIN	3216521789
Assessor's first name and last name	Yyy Xxx
Register No	2154/8
Phone number	000/23152993
Proof of ownership	Ownership document No 521/12-3

Location of the agricultural land – micro-location description:

The location of the agricultural property is on the outskirts of the city's industrial zone, on an attractive location beside the highway E-75 and near the international railway route, 4.4 km away from the port Dunav 1[11]. It is characterized by traffic connections, which gives it greater transformability into a construction site, which would make its value several times greater. The type of soil on the property on this location is I class humus. The property is rectangular in shape with dimensions given in the appendix, ideally even and just 500m away from an irrigation channel. It is possible to enter the property from the main road and by the longer side there is a macadam road which is its integral part. There is no information about recent trade with similar property, but there have been some sales of smaller properties , up to 1.5 ha, with agreed prices ranging from 8.000 to 12.000 €/ha. Through immediate examination, it was determined that there is no negative impact of natural factors on the property, nor the possibility of sudden natural or artificial pollution. The value of the property was assessed as stagnating in the lower region of maximal expected market price and that the interest in buying it is low and the interest in renting it is non-existent. Also, the average time period for selling a property of this kind is 12 months.

11 Cvijanović, D., Vuković, P. (2012): *Uloga marketinga u turizmu dunavskog regiona Srbije*, Institut za ekonomiku poljoprivrede, Beograd.

Table 3. Final results of the application of the value assessment model according to the three methods presented

Total surface	Estimated value – expense method	Estimated value – comparative method	Estimated value – profit capitalization method	Expected selling value	Date of assessment	Median exchange rate of Euro
17.8	240 300.00	178 000.00	156 640.00	175.000.00	31/12/2012	113.68

Source: Created by the authors, according to the research project - *Value Assessment for Various Types of Real Estate in the Republic of Serbia and the Possibility of Their Expression in Accounting,* realized at the Faculty of Real Estate Management, Union Nikola Tesla University, Belgrade, 2012-2014, pp. 66-82.

Discussion

If we carefully analyse the data arrived at, it might be possible to draw appropriate conclusions and spot certain regularities. It is important to know that during every assessment of value, the so-called Elaboration of value assessment is created, which has to contain all the working papers of the certified assessor. The Elaboration is an official document and it can serve to make a reconstruction of the whole process of value assessment. Similarly, it is possible to accurately calculate the number of working hours that each member of the assessment team invested, and based on that it is possible to calculate the compensation for the service of assessing the value of an agricultural property. That elaboration can also be used as evidence in case of a lawsuit between the client and the certified assessor.

As can be seen in table 3, the highest assessment of value of the property in question of 13 500 Euro/ha or 240 300 Euro in total was arrived at via the expense method, and the lowest one of 8 800 Euro/ha or 156 640 Euro in total, was arrived at via the profit capitalization method. Examination of the working papers of the assessors enabled us to establish that such results reflect high expenses of investment in production on that property and bad estimation when it comes to the possibility of finding a similar property (trade method) which would, in this case, be very expensive. On the other hand, a few years of weaker agricultural production in the last decade and a lot of anomalies in on our stock market of agricultural products caused such a low price to be arrived at through the application of profit capitalization method. The application of comparative method included taking the average selling price of 10 000 Euro (which was admittedly received for much smaller properties of similar characteristics), which gave the sum of 178 000 Euro and the value that should be expected from selling the property is in that area. According to the Elaboration of the assessment of value of the agricultural property Dobrava II, we can see that the expected selling value of the property was reduced by 3000 Euro as a proof of the owner's determination to really sell the property to the unknown potential buyer. It often happens that instead of fixed value, the assessor determines the narrowest possible range of values, which is also acceptable and, sometimes, the only possible procedure. It is also important to note here that it is crucial to specify the day for which the assessment of value of the agricultural property holds. In our case, it is December 31, 2012 because the commercial, market and other conditions that hold for that day perhaps might not hold for some other

day. In the end it is necessary to list the exchange rate according to which the calculation is made, because it is a legal obligation that all financial reports be expressed in the national currency, i.e. Dinar.

The presented model of agricultural land value assessment was created with the basic aim of serving as a basis for future agricultural land value assessments in the Republic of Serbia and analyses of sales of agricultural land that have already been carried out. Its primary advantage is flexibility. This flexibility is evident from the choice of the relevant assessment method, but also in the choice and consideration of appropriate factors that, in the end, influence the final value of an agricultural land according to the presented model.

This model also leaves enough room for scientific and other institutions in the Republic of Serbia which operate in this domain to, based on the hypothesis of this research which claims that it is possible to create and apply agricultural land value assessment model, improve it continually in accordance with present market, economic, political, social and other factors which have a greater or lesser degree of impact. Taking all this into account, we think that this is a pioneering attempt at establishing a consistent model which could successfully be used in the Republic of Serbia for a number of years.

Conclusion

The assessment of value of an agricultural property is a subjective projection of expected value which it is possible to achieve according to the given market conditions and available information. Certified assessors of value of agricultural property (but also all other forms of real estate) have an obligation to apply rules, standards and the methodological framework of value assessment with utmost professional care and according to strict ethical requirements of the profession, and to make a formalized report about the completed assessment, whose most important part is the assessor's opinion about the value of the assessed agricultural property. Everyone who uses those value assessment reports should know some of the most important limitations of the procedure itself as well as the fact that the assessment is to a certain extent based on the professional judgment of the assessor, which can often be subjective.

Nonetheless, if the methodological framework of assessment is correctly employed, if the assessor is educated and trained enough to meet the requirements of such a demanding process as value assessment and if the model of agricultural property value assessment is correctly created and implemented, the result should be an assessment that corresponds to given economic, commercial and market conditions, and it can be expected with great probability that the value arrived at will get its full affirmation on the real market. Otherwise, unnecessary expenses are made through the employment of professional assessors. Those expenses are usually not small because the assessment of value of an agricultural property demands work of highly educated and trained professionals, and incorrect results can only confuse the users of the report about the assessment of value, which is, by all means, a situation which no one would desire in real life.

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MODEL PROCENE VREDNOSTI POLJOPRIVREDNOG ZEMLJIŠTA

Aleksandar Majstorović[12], Dragan Dukić[13], Mihajlo Zogović[14]

Rezime

Cilj rada je da uspostavi i prezentira model koji bi bilo potrebno i moguće primenjivati za procenjivanje vrednosti poljoprivrednog zemljišta u postojećem ekonomskom, tržišnom i pravnom okviru Republike Srbije. Rad je preliminarni integralni deo šireg naučno-istraživačkog projekta pod nazivom Procena vrednosti različitih oblika nekretnina u Republici Srbiji i mogućnosti njihovog računovodstvenog iskazivanja, realizovan na Fakultetu za menadžment nekretnina Univerziteta Union Nikola Tesla Beograd. U radu su prezentirani samo oni preliminarni rezultati i model koji se odnose isključivo na definisanu temu, a korišćene su naučne metode koje se uspešno primenjuju u ovoj oblasti u razvijenim zemljama, pre svega u SAD, Nemačkoj i Francuskoj, modifikovane u skladu sa normativno-pravnim okvirom i tržišnim uslovima relevantnim za Republiku Srbiju. Tema je značajna i aktuelna u sklopu najavljene privatizacije 10.000 ha poljoprivrednog zemljišta. Navedeni model takođe bi se mogao koristiti za preispitivanje validnosti ranije izvršenih procena vrednosti poljoprivrednog zemljišta u sklopu privatizacije pojedinih poljoprivrednih dobara.

***Ključne reči**: procena, vrednost, poljoprivredno zemljište, procenjivač.*

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Review Article

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CORRUPTION IN THE LAND SECTOR[1]

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Summary

The corruption is both a major cause and a result of poverty around the world. Corruption in the land sector can be generally characterized as pervasive and without effective means of control. In this paper we analyze the risks and forms of corruption in the land sector citing some documented examples from the world and from Serbia. The paper concludes that all countries facing a problems with land administration needs the rebuilding of land administration institutions to provide access to land as essential to rekindle economic growth and social stability. It can also be concluded that Serbia is on the path of mild progress in planning land administration and land management.

Key worlds: *corruption, causes of corruption, forms of corruption, land sector, Serbia.*

JEL: *D73, H82, K42, H83, P37, I32*

Introduction

Corruption has been going hand in hand with mankind from its beginnings. There is no doubt that it is a great mischief. Summing up the consequences of corruption, Council of Europe Criminal Law Convention on Corruption preamble emphasizes the following[4]:'Corruption undermines the rule of law, democracy and human rights, undermines good governance, fairness and social justice, distorts competition, hinders economic development and endangers the stability of democratic institutions and the moral foundations of society'. Concept of corruption comes from the latin word *corruptio* and signs of depravity, bribery, blackmail. The term of corruption is defined in different ways depending on the attitude it is observed from (such as psychological, sociological, economic, criminal, legal phenomenon). A large number of authors who study and research this phenomenon tend

1 The paper is part of research on the project III 46006: "Sustainable agriculture and rural development in function of achievement strategic goals of Republic Serbia in the Danube region", which is financed by Ministry of Education, Science and Technological development of Republic Serbia. Project period 2011-2014.

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4 Official Gazette of Serbia and Montenegro – international agreements, br. 12/05.

to consider public service as its center, and hence the corruption is defined as "behavior that the deviation from regular performance of public service for personal or other benefit; it is a violation of norms in order to achieve personal interest" (OSI, 2002). Definition of corruption alleged by famous international non-governmental organization engaged in the fight against corruption. Transparency International (TI) includes „any activity that constitutes an abuse of the delegated powers in order to achieve personal gain". But, it should be noted that the element of bribery can be recognized in some other morally unacceptable behaviors which are not defined as criminal offenses, economic offenses or misdemeanors. Such behaviors are especially common in the area of economic activities, and use of monopoly or dominant market position and actions in a situation of conflict of interest is typical for them. This leads to the conclusion that corruption with only one of its (smaller) parts is manifested in a way that can be successfully regulated by norms of criminal law. On the other hand, on the higher levels it is hidden by the forms of morally problematic or even socially acceptable behavior (Tanjević, 2012).

The corruption is dynamic, variable and adjustable negative social phenomenon, therefore there is a need to continually investigate and control it. The land sector is not immune to corruption, since the phenomenon of corruption and its various forms threaten almost all economic sectors of a country.

World is facing a food crisis which pushes agricultural commodity prices to record highs and increasing numbers of poor and hungry. According to last Food and Agriculture Organization (FAO) data in the world has 868 million undernourished. There are many inter-related issues causing hunger, which are related to economics and other factors that cause poverty. They include land rights and ownership, diversion of land use to non-productive use, increasing emphasis on export-oriented agriculture, inefficient agricultural practices, war, famine, drought, over-fishing, poor crop yields, etc. But, one of the reason for increasing the number of hungry people is corruption, especially in the land sector. The corruption is both a major cause and a result of poverty around the world. Corruption affects the poorest the most, in rich or poor nations, though all elements of society are affected in some way as corruption undermines political development, democracy, economic development, the environment, people's health and more.

FAO is working with its Members and the entire international community for achievement of the Millennium Development Goals (MDGs). These eight goals - each with specific targets and indicators - are based on the UN Millennium Declaration, signed by world leaders in September 2000. They commit the international community to combating poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women (FAO, 2000).

The State of Food Insecurity in the World 2012 presents that the number of people suffering from chronic undernourishment is still unacceptably high, and eradication of hunger remains a major global challenge. Sustainable agricultural growth is often effective in reaching the poor because most of the poor and hungry live in rural areas and depend on agriculture for a significant part of their livelihoods. Rapid progress in reducing hunger requires government action to provide key public goods and services

within a governance system based on transparency, participation, accountability, rule of law and human rights (FAO, 2012a).

Given the huge food crisis in the world and in Serbia the aim of this paper is to examine one of the causes of rising poverty- corruption in the land sector. Based on the existing relevant literature, mainly the data of the international organization, analysis and synthesis methods have been applied to this study.

Land governance

Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. This includes decisions on access to land, land rights, land use, and land development. Land governance is basically about determining and implementing sustainable land policies and establishing a strong relationship between people and land (FIG, 2010). As a system, land governance is ultimately centered on how people use and interact with land. Sound land governance is fundamental in achieving sustainable development and poverty reduction and therefore a key component in supporting the global agenda, set by adoption of the MDGs. The land management perspective and the role of the operational component of land administration systems therefore need high-level political support and recognition.

Sustainable land governance should: provide transparent and easy access to land for all and thereby reduce poverty; secure investments in land and property development and thereby facilitate economic growth; avoid land grabbing and the attached social and economic consequences; safeguard the environment, cultural heritage and the use natural resources; guarantee good, transparent, affordable and gender responsive governance of land for the benefit of all including the most vulnerable groups; apply a land policy that is integrated into social and economic development policy frameworks; address the challenges of climate change and related consequences of natural disasters, food shortage, etc., and recognize the trend of rapid urbanization as a major challenge to sustain future living and livelihoods (FIG, 2010).

Effective land governance supports food security and ensures sustainable livelihoods that are essential for people and countries that rely on land as one of their main economic, social and cultural assets. Empirical findings from more than 63 countries show that where corruption in land is less prevalent, it correlates to better development indicators, higher levels of foreign direct investment and increased crop yields (TI, 2011). Countries suffering from an intensive corrupt public sector are also confronting land sector corruption. This is supported by recent TI finding that suggested strong correlation between levels of corruption in the land sector and overall public sector corruption (TI, 2011). Land governance and anti-corruption now feature in the agenda of multilateral organizations such as the FAO, World Bank (WB) and UN-HABITAT. FAO

is developing Voluntary Guidelines on the Responsible Governance of Tenure of Land[5], Fisheries and Forests in the Context of National Food Security promote secure tenure rights and equitable access to land, fisheries and forests as a means of eradicating hunger and poverty, supporting sustainable development and enhancing the environment. They were officially endorsed by the Committee on World Food Security on 11 May 2012. Since then implementation has been encouraged by G20, Rio+ 20, United Nations General Assembly and Francophone Assembly of Parliamentarians (FAO, 2012b). The governance of tenure is a crucial element in determining if and how people, communities and others are able to acquire rights, and associated duties, to use and control land, fisheries and forests. Weak governance is often cause of many tenure problems, affects economic growth, investments, environment and social stability. Because of corrupt tenure practices or if implementing agencies fail to protect their tenure rights people may even lose their lives if it leads to violent conflict.

The WB has developed a Land Governance Assessment Framework (LGAF). LGAF focuses on five key thematic areas that have been identified as major areas for policy intervention in the land sector. Thematic areas are: legal and institutional framework, land use planning, management, and taxation, management of public land, public provision of land information, dispute resolution and conflict management. It is made up of a range of indicators that are then ranked as a performance measure relevant to a specific theme (WB, 2012).

At UN-HABITAT, The Global Land Tool Network (GLTN)'s main objective is to contribute to poverty alleviation and the Millennium Development Goals through land reform, improved land management and security of tenure. GLTN aims to establish a continuum of land rights, rather than just focus on individual land titling; improve and develop pro poor land management as well as land tenure tools; unblock existing initiatives; assist in strengthening existing land networks; improve global coordination on land; assist in the development of gendered tools which are affordable and useful to the grassroots; improve the general dissemination of knowledge about how to implement security of tenure (UN-HABITAT, 2012).

5 Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, "land" is used here to include other natural resources such as water and trees.) Land tenure is an institution, i.e., rules invented by societies to regulate behaviour. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions (FAO, 2002). Another definition said that land tenure is the right to hold property; part of an ancient hierarchical system of holding lands (Princeton University, 2010).

Risks and Forms of Corruption in the Land Sector

Corruption in the land sector can be generally characterized as pervasive and without effective means of control (TI, 2011). It can be divided into two groups, small- scale and big-scale corruption. Small-scale corruption includes administrative corruption, while big-scale means political corruption.

According to TI data presented in Table 1 there are a number of areas of land sectors that are at risk of corruption in various forms. The most important areas vulnerable to corruptions are: land administration, customary land tenure, management of state-owned land, land use planning, conversion and investments and payments for environmental services. Dominant risk factors are inadequate land laws and procedures and unclear institutional responsibilities or property rights, lack of transparency in different processes and procedures and bureaucracy. The most common form of corruption is bribery of government officials (TI, 2011).

Table 1. Risks and Forms of Corruption in the Land Sector

Area	Risk Factors	Forms
Land administration	- Inadequate land laws and procedures; - Excessive or unpublished fees for land services; - Lack of recognition of land uses and rights; - Under-developed and non-transparent land registration systems; - Absence of up-to-date and accurate land records; - Existence of multiple land management authorities; - Irregular practices in the collection of land taxes; - Limited accessibility of services - Lack of effective compliant, grievance and oversight mechanisms; - Absence of a code of conduct.	- Bribery of land administration officials and law enforcement authorities; - Fraud and production of false land claim documentation.
Customary land tenure	- Lack of legal recognition and delineation of customary land; -Traditional practices of payments and exchanges; - Opaque systems, absence of outside control and lack of clarity in allocation of land; - Monetarisation and speculation on land sales.	- Abuse of power by chiefs; - Conversion of property and capture of revenues by chiefs and influential people; - National institutions and business interests override local land rights.
Management of state-owned land	- Lack of inventory, delineation and management of state land; - Irregularity of land prices for disposal and acquisition; - Unclear institutional responsibilities and decision mechanisms; - Absence or lack of clarity of regulations for leasing land or exercising eminent domain; - Lack of effective compliant, grievance and oversight mechanisms.	- Bribery of government officials to obtain public land at a fraction of market value; - Manipulation of compulsory land acquisition and compensation processes by government officials and investors; - Irregular conversion of property and land classification status by government officials.

Area	Risk Factors	Forms
Land use planning, conversion and investments	- Lack of transparency of planning processes and land allocation procedures; - Opaque, slow and bureaucratic processes for issuing building development permits; - Unclear land use and property rights; - Lack of effective complaint, grievance, independent oversight and enforcement mechanisms; - Lack of an independent media.	- Capture of rents and profits originating from land conversion and re-zoning by government officials and investors; - Abuse of government officials' discretionary power to propose real estate and land developments that increase the value of her/his personal property; - Acquisition of land through state capture and/or by investors and developers having received insider information from government officials; - Bribery of government officials by investors and/or developers.
Payments for environmental services (e.g. UN-REDD)	- Lack of legal recognition of tenure rights; - Lack of recognition of protected areas and lands reserved for environmental protection; - Opaque, slaw and bureaucratic payment systems.	- Capture of funds by developers, investors and government officials; - Acquisition of parcels eligible for payments by developers, investors, and government officials.

Source: TI, 2011.

Some documented cases of corruption in the world and in Serbia

In Mexico, a recent study reveals that illegal payments to land authorities ranked among the top 10 services plagued by bribery in the country (Transparencia Mexicana, 2011). The survey's results show that a bribe has to be paid at least once out of every 10 times that a person solicits a land permit. Another public opinion survey, conducted in Bangladesh, estimates these figures to be much higher. Findings from a national household survey show that land administration ranks among the top three institutions in Bangladesh with the worst rates of bribery (71.2 per cent) based on people who have had contact with the service (TI Bangladesh, 2010). A study in India estimates that US$ 700 million worth of bribes are paid annually by users of the country's land administration services (TI India, 2005). According to survey work in Kenya, the average bribe paid by those dealing with government land agencies was US$ 65 in 2011, a figure that had been rising in the last two years but which has since fallen (TI Kenya, 2011). The same survey also finds that Kenya's Ministry of Lands is the fourth most corrupt public administration body in the entire country. Nearly 58 per cent of people who have sought land services from the ministry have been asked to pay a bribe; of those requested to make an illegal payment, more than one-third did.

Ideal opportunities for political corruption usually manifests are land reforms, development projects or land transaction. For example, corruption has been one of the causes of the collapse of the property market in Spain in 2009. In operation called'OperaciónMalaya', the police seized more than US $3 billion in assets and froze 1,000 bank accounts after it was discovered that 30,000 homes had been illegally built in the town, including on environmentally protected land (TI, 2011). Political corruption is also reflected in the purchase of land at a lower price from the owners (under the argument of eminent domain[6]) and resale at a much higher price

6 Eminent domain is the power of the state to seize private property without owners consent. Historically, the most common uses by eminent domain are public facilites, highways, and reilroads.

with profit taking by individuals. This is documented in Kenya's land reform over the last 50 years (WRI/Landesa, 2011; KNCHR /KLA, 2008).

Three types of corruption, individual, business and political are observed in the land sector of Serbia. Land registry officials are third most corrupt public officials, with nearly 6% of citizens who had interactions with them, resulting in a bribe being paid, according to one United Nations Office on Drugs and Crime survey (UNODC, 2011). More than 200,000 Internally Displaced Persons are living on Serbian territory. They often face problems of insufficient security of tenure and risk eviction due to privatizations in the housing market. This is especially the case of IDPs living in collective centers. Many of them have lost personal documents, and the lack of documentation causes some to live in informal or illegal settlements.

According to the US Department of State (DoS, 2011), the Serbian land administration system is in a poor state and suffers from corruption. Land records often do not match the legal registers kept in municipal courts, which results in a long waiting period for resolving such problems. In addition, real estate registers are incomplete and outdated. In many cases, there are no proper records on the nationalization of the land, which may slow down restitution efforts. In addition, real estate registers are incomplete and outdated. In many cases, there are no proper records on the nationalization of the land, which may slow down restitution efforts. Apart that, transition in Serbia provided the opportunity for various forms of abuse and illegal behavior through the privatization of public ownership in the economy. Privatization of Serbian agribusiness was not being transparent, with frequent changes of legislation, in a kind of legal vacuum. During this process, in the past decade, more than 50,000 workers lost their jobs, which directly caused the increase of hungry and poor. An report on the state and cooperative property has been written by the Anti-Corruption Council with the intention to point to a systemic problem in the privatization of the companies privatized in the field of agriculture. The report discussed problems of the state and cooperative owned land in 146 privatized companies in the area of agriculture. What is common to all subjects of privatization in this area is that generally had registered in the Land Registry "right of use" of agricultural land in all the forms of ownership (social, public and cooperative), regardless of the form of organization (conglomerates, companies or cooperatives). Due to the interference forms of ownership in entities that are subject to different legal regimes, the Privatization Agency was required to explicitly write and warn that privatization subject is not state and cooperative ownership of farmland. Since the Privatization Agency is not clearly stated this in the contract, some customers have registered as the owners of agricultural land, which was owned by the state and cooperative (SBPK, 2012). On the other hand, some properties are sold at lower prices even tenfold. This group includes the sale of the social capital of agricultural enterprises Zobnatica which was estimated at 11 mil. EUR and sold after the second auction for 1.8 mil. EUR, although the two bidders in the first auction offer worth about 20 mil. EUR (SBPK, 2013). The Privatization Agency has changed aggravating conditions, indicating that the buyer can be the only one that has a 4-star hotel, which was unacceptable given that the predominant Zobnatica activity is not hospitality but agriculture and livestock. In particular, the question of who and how to be responsible for one-quarter of the privatized agricultural enterprises in Serbia in the privatization contracts were canceled

and their property looted, without any consequences for irresponsible buyers and everyone in the chain of state institutions, which were required to check whether the new owners meet their contractual obligations.

Legal protection of property rights in Serbia is weak, largely on account of the corrupt, ineffective judicial system. An example of conflict of interest and irregular behavior of government officials that shocked the business community is the government's interference in the case of a mineral water manufacturer in which the government illegally took the role of arbiter in the proprietary documents market from the Securities Commission. To support its candidate in the sale, the government, in a late-night session, ordered prosecutors to threaten the Securities Commission with arrest (Trivunovic et al., 2007).

Political corruption in the land sector is usually extremely hard to document. One of the reasons for this should be sought in the fact that political corruption usually involves the interface between the holders of political and economic power and opens the way for the widespread abuse of public functions on the one hand and the smooth, fast and enormously enriching individuals close to the government, on the other hand (Tanjevic, 2011). At the same time these are people who are "social elite", or people who enjoy a good reputation and have a social status thanks to which are protected. Their works rarely can be detected and characterized as illegal, and if so, they are rarely prosecuted. Importance of this type of corruption is not only economic endangerment of society. Its holders, in order to make his power unlimited cross institutional boundaries.

One very good example is territory of Kosovo and Metohia where corruption is a major issue in the land management/administration sector as well as high policy sector. According to a study by the Organization for Security and Co-operation in Europe (OSCE) in Kosovo, illegal occupation of property remains rampant, property rights records have become unreliable, illegal construction and informal settlements have exploded, and informal and illegal transactions continue unabated (IDMC, 2007). Corrupt measures are often used to deprive minority populations of their property rights. Many cases have been reported of Kosovo Albanians destroying private property belonging to Kosovo Serbs. The U.S. State Department posits that some cases of violence against Serbs may have been attempts to force them to sell their property. There are reports that Kosovo Serbs have had difficulty accessing their property, which were sometimes occupied or used by Kosovo Albanians. In some cases, Kosovo Serb property was reportedly sold by persons falsely claiming to be their attorneys and presenting forged documents in court. In situations where the rightful owners did not live in Kosovo, such fraud went undiscovered for months (IDMC, 2007). Perfect example of weak rule of law is again Kosovo. Municipalities and ministries not only discouraged but, at times, actively prevented minority returnees from reconstructing their homes or other vulnerable persons from accessing their property through selective or inappropriate regulation of construction and land use (Katz, Philpott, 2006).

Discussion

Corruption is one of those phenomena the knowledge of which is basically, although it is believed to be a simple topic familiar to everyone. However, it is a much more complex problem than it may seem at first glance. A high degree of social danger, a variety of forms, latent inhibition, adjustability to social changes, artfulness of the performer –to name only some of its characteristics. Consciousness of the danger and harmfulness international activities directed to successful fighting against it. Large organizations such as FAO, WB and UN-HABITAT put in their agenda land governance and anti-corruption. This fact can indicate the importance of fighting corruption in the land sector in order to reduce poverty. The problem of corruption is a global problem faced by all countries, regardless of whether they are developed or not. The occurrence and extent of corruption depends on many factors: economic and social instability, undemocratic and autocratic regimes, the lack of appropriate legislation and regulations, lack of control, lack of transparency, lack of professional ethics, the association centers of economic and political power, etc. However, it is obvious that corruption, as a sort of an "infection", affects mainly developing countries, seeking to exploit all their weaknesses in order to find fertile ground for its own development and expansion (Soskic, 2004). Due to a number of factors, primarily the accumulation of economic problems, low wages and falling living standards of population greater part, corruption is mostly related to developing countries. This was confirmed by the Corruption Perceptions Index published by TI. Its maximum value is ten, and then means that there is no corruption in the country (which is, of course, a theoretical case). All Western Balkan countries are very poorly placed, which means that in these very high levels of corruption. Of the six countries of the region are best placed Croatia, (4.1) Macedonia (4.1) and Montenegro (3.7), while the lower part of Serbia (3.5), Albania (3.3.), Bosnia and Herzegovina (3.2.), (Table 2).

Table 2. Corruption Perceptions Index in Western Balkan countries

Western Balkan countries	Corruption Perceptions Index
Croatia	4.1
Macedonia	4.1
Montenegro	3.7
Serbia	3.5
Albania	3.3
Bosnia and Herzegovina	3.2

Thus, we can conclude that the level of corruption in Serbia is very high. After the democratic changes in 2000 Corruption Perceptions Index was 1.3, and in the meantime, this index increased the last three years is 3.5, which indicates that corruption in Serbia remains widespread, and that the fight against corruption did not produce significant results.

Corruption in Serbia is of a systemic character. It has ''infected" all public services, and citizens have accepted corruptive behavior as a form of socially acceptable behavior. In addition, the biggest problem is the fact that discovering and punishing the perpetrators of "petty" corruption, creates the illusion that this is the most prevalent form of corruption

in the society, while, on the other hand corruption offenses, particularly those committed by the members of the political and "social elite", are under-detected or not prosecuted, although they cause the greatest damage to the society and are one of the worst obstacles our country is facing on its way to European integrations. This situation restrains serious foreign financial investments, both in the form of capital investment, primarily in internal infrastructure, and those of local character. Foreign investors, some of them personally affected by the global financial crisis, still hesitate to inject fresh capital into the Serbian market, waiting for better conditions, reflected in the harmonization of laws with EU standards, transparent operation of public services, easier and uniform administration procedures and most importantly, a stable political situation. As it could be seen from Table 3 Serbia is characterized by fluctuations in the volume of foreign direct investment (FDI). The largest FDI net inflow is achieved 2006 (4,153 million), after which there is a gradual reduction. Companies from the EU have been the leading investors in Serbia for the past eight years.

Table 3. FDI in Serbia (in 000 EUR)

Year	2005	2006	2007	2008	2009	2010	2011	2012
Total FDI (EUR)	1,215,362	4,152,961	2,458,492	2,193,035	1,742,980	1,107,614	2,206,836	851,523
Share of EU FDI in Total FDI	89.67%	62.92%	84.63%	81.33%	67.2%	78.63%	88.31%	64.28%

Source: EU, 2013a

Conclusion

All countries facing a problems with land administration needs the rebuilding of land administration institutions to provide access to land as essential to rekindle economic growth and social stability (FIG, 2010). India has embarked on converting their deeds based land registration system for rural areas into a title based one. This is a daunting task involving over 140 million owners and 430 million records in nine scripts and 18 languages. However, it is estimated that it will result in an uplift of 1.3% GDP and reduce petty corruption in the land sector by around US$700 mil/year (more than India's entire science and technology budget). A similar process is unfolding in Indonesia where it is estimated that 7.3 million hectares of land currently lies idle or abandoned with a significant direct opportunity loss each year. The process is being accelerated by using mobile land offices in rural areas – including motorcycles.

It seems that Serbia is a little jump forward in terms of planning land administration and land management. The report of US Department of State 2011 shows that Serbia is working with WB assistance to modernize its cadastral systems. Also the permitting processes that control both the acquisition of land in Serbia and decisions related to use of such land generally are considered a significant barrier to foreign investors. Serbia's new Constitution, adopted in September 2006, permits private ownership of the construction land which will make foreign investment more attractive. Apart this, officially launched a project "Rural Development – Effective Land Management", which will assist and empower state and municipalities and

private land owners to more efficiently manage and use agricultural land. The project will be implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and is supposed to run for 3 years (1/2013 to 12/2015). The budget of 3,78 mil. EUR is financed by the European Union (2,78 mil. EUR) and the German Federal Ministry for Economic Cooperation (1 mil. EUR), (EU, 2013). These activities can help reduce petty corruption in the land sector of Serbia. In order to reduce business and political corruption, there must be a political will and commitment.

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KORUPCIJA U ZEMLJIŠNOM SEKTORU

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Rezime

Korupcija se javlja kao neumitni pratilac tranzicionih procesa i predstavlja specifičnu karakteristiku privrednog kriminaliteta. U Srbiji je korupcija jedan od najvećih društvenih problema koji dovodi do širenja ekonomske nejednakosti, usporava i onemogućava privredni rast i razvoj, ruši legitimitet institucija i potkopava osnovne vrednosti na kojima se društvo zasniva. Korupcija je istovremeno i glavni uzrok i rezultat siromaštva u svetu. Korupcija u zemljišnom sektoru može se generalno okarakterisati kao pervazivna kategorija bez efektivnih mera kontrole. U radu se analiziraju rizici i oblici korupcije u zemljišnom sektoru uz navođenje dokumentovanih primera korupcije iz sveta i iz Srbije. U vezi sa tim se zaključuje da sve zemlje koje se suočavaju sa problemima u zemljišnoj administraciji trebaju ponovo da izgrade institucije zemljišne administracije. Ovim olakšanim pristupom zemljištu ubrzao bi se ekonomski rast i socijalna stabilnost. Takođe se zaključuje da je Srbija na putu blagog progresa u smislu uređenja zemljišne administracije i upravljanja zemljištem. Međutim, borba protiv korupcije zahteva jedinstven pristup ovoj pojavi od strane svih subjekata, i mora se odvijati na jednom opšte društvenom planu, uz primenu i preventivnih i represivnih mera. Ipak najvažnije je da postoji politicka volja da se slučajevi korupcije otkrivaju, procesuiraju i kažnjavaju.

Ključne reči: *korupcija, uzroci korupcije, oblici korupcije, zemljišni sektor, Srbija.*

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NEW FISCAL ROLE OF THE GOVERNMENT IN THE TRANSITION OF THE AGRICULTURE IN SERBIA

Igor Pejovic[1], Vladimir Jovanović[2]

Summary

It is necessary to use huge potentials in agricultural and food processing sector in the Republic of Serbia during the EU accession process. Due to world economic crisis, lack of direct foreign investments, unfavorable conditions in banking sector and irrational usage of available resources, it is necessary to prepare agriculture in order to cope with free competition on the European market. Therefore, there is a need for appropriate support to agricultural development in line with international standards. This requires changes in course of national support to agroeconomic development in the fiscal area, or in other words, adoption of number of stimulating financial measures in agrarian policy of the Republic of Serbia.

Key words*: agricultural production, Republic of Serbia, fiscal and agrarian policy, agrarian budget, subsidies, rural development and EU accession.*

JEL: *O13, Q10, E63, E60*

Introduction

In the current economic and financial conditions there are many reasons of economic and financial nature, which determine the necessity of establishing permanent sources of agriculture financing through agrarian budget. Solving of complex development problems in agriculture is impossible without introducing a wide range of tax incentives and exemptions. An orientation towards market liberalization and free international trade is undeniable, but also it is necessary through fiscal policy measures to introduce an effective system of subsidies for agricultural production, as it is a case with developed countries of the European Union. It may be noted that the budgetary resources compared with those in countries from the region and the European Union are insufficient for achieving the existing and development priorities in agriculture. This directly affects the unfavorable

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economic situation and the international competitiveness of agriculture and makes structural adjustments to customs and other requirements of the European Union difficult. At the same time, contemporary agricultural policy means an active agrarian budget directed towards the development of SMEs and entrepreneurship. In today's environment, strong governmental support for rural development and financing of specific agricultural production is insisted on, which requires reform of fiscal forms, which have different effects on agricultural development.

Research methods

The research was conducted using various research methods and techniques like: induction, deduction, analytical and synthetic descriptive method. Contemporary domestic and foreign literature was used in the paper.

Financial government support in agricultural production

Inadequate role of the government is one of the basic problems of agriculture in Serbia in the period of transition and EU accession in the conditions of global economic crisis.[3] This is confirmed by the lack of systematic measures of macroeconomic, agrarian and fiscal policies, causing chronic problems that cause unfavorable economic position of agriculture.

In recent years there is a necessity for strong government support in financing of the specific agricultural production. In this context, the agrarian budget should have an important role, because it unites government measures in the field of agriculture development. Financial measures also apply to a variety of fiscal measures, privileged credit investments from primary issues, subsidies for agricultural production and others. Permanent financial support of the state is conditioned by the necessity of investing significant financial resources in agriculture, characterized by a long period of retention and turnover of invested funds and a lack of own funding sources due to low profit margins in primary agricultural production. Taking these specificities into account, in the last decade of the twentieth century, Central Bank directly provided the funds for financing the agricultural production, with privileged interest rates. On the basis of credit policy which acknowledged the seasonal character of a production and the need for short-term investments, a support for agriculture was sought. These selective primary issue credits from commercial banks were based on macro-economic and agrarian goals in a given year. Loans from the primary issue were approved with the discount rates, which were significantly lower than current interest rates on financial markets. During this period, the predominant part of funds from the primary issue was directed to agriculture. Funds from the primary issue invested through selective loans were insufficient and inadequate for agrarian needs, thus, this did not provide a sufficient impact on improving the economic position of agricultural entities. Financing of the agriculture from primary production was abolished in early 1994, because the investments mentioned above contributed to growth of the inflation rate. During this period a need for a new way of financing of the specific agricultural production emerges in the conditions of reduced money supply and rising interest rates of

3 Milanović, M. (2006): *Približavanje Srbije Evropskoj uniji-novije komparacije poljoprivrede i agrarne politike*, Ekonomika poljoprivrede, Beograd, br. 2/2006, str. 96-97.

commercial banks. This has caused the growth of the production costs and the emergence of pronounced financial crisis in the sector. These and other reasons have caused the necessity of establishing permanent sources of funding through the agrarian budget, as a part of the budget of the Republic of Serbia.

The agrarian budget

The funds from the agrarian budget provide support for maintaining of the current production and for an agricultural development. Incentives from the agrarian budget were insufficient to achieve the priorities of the agricultural production modernization, to satisfy the needs for market supplying and to ensure better situation for the agricultural producers[4]. During this period, the average subsidies in agriculture per capita ranged six to eight times less than in the European Union, while expressed per hectare these were about twelve times less than in the EU. It may be noted that agricultural production then had ten times less government support than in the developed countries of the European Union. At the same time, the short and long term goals of the agrarian budget were not accomplished, in terms of increased competition, quality, standard of living, production, exports, productivity, technological innovation and development of rural areas.

The share of agricultural funds in the budget of the Republic of Serbia amounted to 5% to 8.3% during the 1996-2000 period and 3.10% to 6.2% in the period 2001-2006. These funds were insufficient, as evidenced by the data on the share of agriculture in GDP (12.90% to 24%).[5] During this period, the predominant part of the funds from the agrarian budget included premiums for milk producers (33%), crop production and others. Incentives for village revitalization have been abandoned in 2001 when subsidies for wheat purchasing were introduced. In accordance with development priorities, in 2003 the incentives were introduced for the export of agri-foodstuffs, improving the quality of land and subsidies for the expansion of the estates. Agricultural policy has failed to improve the financial situation of the agriculture in Serbia during the recession.[6]

Changes in agricultural policy, following the example of developed economies, were made in 2004 in order to adapt agricultural production to market economy. Incentives were introduced for agricultural and food products market development, credit financing and rural development. Aimed at increasing of the estates size, the support was given to long-term leasing of agricultural land and the non-refundable financing of the development priorities in agriculture was performed. Premiums for milk were not paid to processors any more but directly to agricultural producers and registered farms. Measures of support to production and market (55%) and to rural development (20.1%) and the costs of public and professional services (24.9%) had the largest share in the agrarian budget in 2004.

4 Cvijanović, D., Pejanović, R., Milanović, M. (2006): *Tranzicija poljoprivrede Republike Srbije - dometi, efekti i ograničenja*, Ekonomika poljoprivrede, Beograd, br. 4/2006, str.938-939.

5 Radović, G. (2009): *Podrška države u funkciji finansiranja poljoprivrede*, Agroekonomika, Beograd, br. 41-42/2009, str.74.

6 Birovljev, J. Glamočanin, B. (2011): *Agrarna i ruralna politika u Srbiji*, DAES, Ekonomski fakultet, Novi Sad, str. 25-39.

Incentive credit policy was introduced in 2005. Funds for abetment of credit policy (20.7%) have increased their own share in the agrarian budget in 2006. The abetment of a rural development (5.1%) was performed with the funds from the National Investment Plan. It was then the support to agricultural production and market of agricultural and food products (38.1%) were reduced, while simultaneously the share of public participation and professional services costs (36.1%) was increased.

The funds of the agrarian budget in this period were insufficient to meet the current and development needs of agricultural production, which directly affects the structural adjustment to requirements of the European Union.[7] Government funds are inadequate related to the importance of agriculture in the structure of domestic production, because in this period the share of agriculture in GDP achieved an average of about 19%, and with the related industries about 40%. At the same time the share of agriculture in total exports is about 25%, while the state budget funds for support of agriculture amount 5%, which is significantly less comparing to neighboring countries (10% to 14%).[8]Subsidy funds were reduced in this period, because a part of the funds was invested in the form of loans, which according to the expert opinions was inconsistent with the basic function of the agrarian budget related to provision of the non-refundable incentives. Funds from the agrarian budget do not correspond to the importance of agricultural production, including the AP Vojvodina, where they ranged from 2.4% to 3.9% in the period 2004-2006. The analyzed period is characterized by not solving the problem of financing of the agricultural production, and inadequate financial support of the government to this important economic activity. The Government of the Republic of Serbia has in 2009, based on the Budget Law, adopted the Regulation on the use of funds to support rural development through support of the agricultural investments. Incentives are related to the construction of facilities, cold storages, silos and the procurement of certain equipment in agriculture. An agricultural cooperatives and private individuals, i.e. holders of the agricultural estates, have the right to use these incentives, with certain exceptions. The right to use non-refundable incentives is conditioned with providing the amount of own funds for the realization of investments. The amounts of funds are determined depending on the character of certain areas. In the Article VII of the Regulation the maximum amounts and percentages of incentives in relation to the total value of investments were precisely determined depending on their purpose.

7 Simić, N. (2006): *Poreski sistem kao faktor ruralnog razvoja*, Ekonomika poljoprivrede, Beograd, br. 2/2006, str.253-267.

8 Pejanović, R. (2009): *Razvojni problemi poljoprivrede Republike Srbije*, Agroekonomika, Beograd, br. 41-42/2009.

The measures of institutional support

Regulation on the abetment of the agricultural production was adopted in March 2012, defining the conditions for the use of incentives for investment in production and placement of certain agricultural products. Farmers are entitled to a refund of insurance in the amount of 40% of the premiums. Beneficiaries and other conditions are precisely determined in Regulation. Regulation on the establishment of credit support for investment in agricultural machinery and equipment through the subsidization of interest rates was adopted by the Government of the Republic of Serbia in 2012. Credit support is achieved through subsidizing the part of the interest that banks charges to borrowers, in order to encourage agricultural production. Entrepreneurs, legal entities and individuals are entitled to use funds, i.e. to credit support for investment in specified agricultural machinery. Introducing a regulated system of subsidies for the production of beef and pork is planned, which should enable an increase in livestock fattening and meat production and a reduction of the underground economy.

In the Law on Agriculture and Rural Development, the direct structural and market incentives are precisely determined, depending on the difficult working conditions in agriculture. Direct incentives are related to premiums, incentives for production, allowances and support for non-commercial farms. Forms of market incentives are export incentives, storage costs and credit support. Structural incentives include measures of rural development, quality improvement and protection of agricultural land and the measures of institutional support, where those of financial nature have the predominant importance.

The global economic and financial crisis has, according to assessment of international institutions, affected the continuation of the trend of increased consumption of agricultural products. Developing countries are unable to produce the necessary quantities of food and hence are forced to import. Thus, in the period 2000-2007 a pressure on the prices of agricultural products has increased. Foreign investments in agriculture have amounted to USD 32 billion, which represents only 0.2% of total foreign direct investment. The trend of reduction of foreign direct investments in agriculture of the developing countries is continued, which is conditioned by administrative barriers, the political sensitivity of the agricultural sector and the limitations of the system of ownership over the agricultural land. Impacts of international corporations on agriculture extend beyond the direct foreign investments, since they are oriented to variety of short-term and long-term arrangements with local farmers rather than to ownership investments. There are new investors in the world emerging in the sector of agriculture, such as civil, and venture capital funds. There is also a growth of investments between developing countries, while international companies focused their investments in production of meat, flowers, fruits and vegetables in developed countries. Their investments in developing countries are directed to specific export products, mainly oilseeds, soybeans, fruits and sugar cane. Trend of growth of certain products imports is continued in the under-developed countries, which is conditioned by rising consumption of food products. During the food crisis, barriers to foreign investments in agriculture in the developing countries must be eliminated.

The stabilization and development objectives in agriculture

Modern agricultural policy implies an active agrarian budget directed towards the development of SMEs and entrepreneurship. In determining the basis of current agrarian budget, and ensuring stable and affordable source of funding it is necessary to take into account the impacts of globalization, the need for ensuring food assurance and rural entrepreneurship and the development of small and medium enterprises, social security, the humanization of work, quality of food and care about the environment, sustainable development and others. This requires strengthening of the institutions of agrarian loans in a specific economic environment in the EU accession process, which includes the legal harmonization in the field of agriculture.[9] It should be noted that in this process there are upcoming significant changes and challenges relating to quality standards, rural development, new opportunities for export of competitive products, and increased import competition in the domestic market of agricultural and food products, due to reduction of customs protection. This requires increased investment in agriculture in accordance with European standards and the importance of agriculture for the economy of the Republic of Serbia. In this process it is very important to get familiar with a way of subsidizing agriculture in the European Union. Significant investments in the agricultural sector are necessary in order to take advantage of the huge potential in the agricultural and food sector. It is illusive that the development objectives in agricultural production can be achieved without a developed financial market. It is undisputed that a large number of natural, demographic and economic factors affect the agricultural development in various stages of development of the Republic of Serbia, within which those factors of financial nature are very important. The fact that the stabilization and development objectives in agriculture need to be achieved in the terms of the financial crisis, i.e. the decrease in foreign direct investment, purchasing power and income of farmers, represents a difficulty. In addition, the industrial sector is characterized by continuous increase in prices of agricultural inputs and low purchase prices of certain agricultural products, while in the trade sector there are relatively high margins on agricultural and food products, the long contract terms and violations of payment schedules of the agricultural products. The situation is aggravated by the condition of the banking sector, in which there are high interest rates and prices of ancillary services. Negative tendencies are being deepened due to the global economic crisis and decrease of the credit potential for agricultural production. In drafting of the primary objectives of the agrarian policy a successful examples from the region should be taken into account, particularly from Bulgaria, Hungary, Slovakia, Kazakhstan and Ukraine, referring to legislation, inspection services, and export credit policies, public warehouses, commodity reserves and electronic reserves.

Changes in rural development and agricultural production require reform of fiscal and tax policy. Changes related to various fiscal forms cause different effects on agricultural development. Solving of the complex development problems in agriculture is not possible without considering tax incentives and exemptions. Requirements refer to the increase and the allocation of funds intended for agriculture in Serbia. Loan funds represent the additional

9 Vlahović, B., Tomić, D., Gulan, B. (2006): *Priprema agrokompleksa Srbije za evropske integracije*, Ekonomika poljoprivrede, Beograd, br. 2/2006, str. 122-125.

funds to those contained in the agrarian budget. Grants are directed towards the stabilization of the agricultural products market, encouraging of the development and structural changes. The importance of the investment loans is also emphasized in the agrarian policy, as well as those loans aimed at ensuring an effective system of stocks and seasonal agricultural products reserves, the smooth running of production and the necessary working capital. The new tax exemptions and incentives to local authorities are directed towards stimulating agricultural production, increasing of the investments, enlargement of the estate and others. In technical terms the proper establishing of the tax base and precise definition of tax exemptions is required.

In drafting of the goals and measures of the agricultural policy contained in the National agriculture program of Serbia, in the following years, it is insisted on considering of specificities of the environment characterized by rapid growth of the demand for agricultural products, particularly in the developing countries, the expected increase in volume of agricultural production in the world, by declining growth rates. Enlargement of the European Union also affects the changes in the market of agricultural products. New strategies must be based on the principles of the EU, WTO and CEFTA.[10] There is an orientation towards market liberalization and free international trade with the support to agricultural development, in accordance with international standards, particularly in the financial sphere. Only in this way it is possible to utilize the great potential of Serbia in the agricultural sector. This includes changes in ownership structure and the enlargement of estates, institutional support, measures for increasing of the exports and competitiveness of agricultural production and development of the loans market.

Favorable trend is included in the tendency of growth of the food prices in the world. Priority objectives in the future are related to the improvement of the work of the institutions, increased investment, joint programs, commercial-crediting and financial activities, improving of the competition, quality and other agricultural inputs. It is necessary to develop credit lines and to establish the Funds for Agricultural Development at various levels and develop a system of subsidies and procurement of agricultural inputs. It is desirable to develop a system of subsidizing insurance premiums and compensation for damage from natural disasters. There is also an orientation towards building of regional and local institutions to support rural development, particularly in the areas of investment activity.

It is especially important to prepare agriculture for accession to the European Union so that Serbia would be able to withstand competition in the free European market. In doing so the basic principles of the WTO also should be taken into account, which are related to the reduction of external protection, the elimination of export subsidies and certain non-customs barriers etc.

The necessity of increasing the agrarian budget is based on the needs for increasing competitiveness in the EU accession process and taking into account the attitude that

10 Katić, B., Popović, V., Milanović, M. (2008): *Uticaj sporazuma o stabilizaciji i pridruživanju na poljoprivredu Republika Srbije - globalni pristup*, Ekonomika poljoprivrede, Beograd, br. 4/2008, str. 340-342.

agriculture is viewed as a comprehensive rural development. In the short term it is planned that the share of the agrarian budget in total budget amounts to about 5%. The structure of the budget should be aimed at increasing of the investments, funds for rural development, reducing of the administration costs, export subsidies and the share of the financial support in earned realized income. To this end, it is needed a long term planning of the measures and the necessary budgetary resources, with respect to basic principles of reform of the policy of agricultural production and trade in the agricultural products market in the European Union, which means the separation of subsidies from production, the new social assistance system, the introduction of quality standards and environmental protection. It is also understood to achieve a high degree of financial discipline in the implementation of agricultural policy. The goal is the gradual reduction of direct expenditures for the agriculture and precise statement of the requirements for EU aid in achieving the objectives of rural development.

New measures should include investments in agricultural estates, improvement of production and marketing of agricultural products, professional training and support to young farmers, afforestation and environment. New initiatives are instruments of support for EU rural policy. Thus, the SAPARD program was created to support the growth of agricultural production and support rural development policy in the period of EU accession. New programs of assistance to support rural development are contained in the new instruments and programs of the pre-accession assistance (IPA).

In the accession process it is necessary to stop the long-term negative trends in the national economy and to change the role of agriculture as a social stabilizer in times of global economic and financial crisis, especially as it affected not only the inflow of direct foreign investments, but also their outflow from Serbia and the region. Agriculture, according to available resources, should become an export business, i.e. the strategic orientation in the policy of the agricultural production development. Analyses indicate inefficient use of available resources, and lack of stimulating nature of economic, particularly financial measures in agrarian policy of the Republic of Serbia. The new agrarian policy requires taking coordinated actions and measures related also to the establishment of agrarian development banks and other financial activities in the terms of global economic crisis.

Conclusion

The research results confirm that in order to take advantage of large agrarian potentials of Serbia in the terms of financial crisis and the lack of foreign direct investment and loans, there is a need for more fiscal support for agricultural production. This determination is fully consistent with the economic importance of this priority sector, which together with food and related industries creates about 20% of the GDP. The funds from the agrarian budget do not correspond to the importance of agriculture (funds for subsidies in agriculture in the budget of Serbia for 2012 amount to only RSD 19.9 billion, representing approximately 2.45% of total budget) and its export capabilities. At the same time this poses a danger to make it uncompetitive in the international market, especially after the accession to the European Union when it is necessary to reduce customs restrictions. If in the next short period the funds from the agrarian budget do not increase significantly, in accordance with policies in

the region and EU countries, it may happen that a great opportunity for development of the Republic of Serbia, in terms of production and export, remains unused with unpredictable macro-economic, political and social consequences. So it should be strived towards greater government assistance in the financial sphere, and provide measures to support agriculture through monetary and fiscal measures and instruments. At the same time, it is necessary in short term to significantly increase funds for agriculture to the level of about 5% of budget funds. By efficient implementation of fiscal measures in coordination with monetary support, the adverse position of the agriculture, i.e. its share in exports and realized GDP can be improved in the short term. There are real opportunities for substantial increase in gross and net value of agricultural production, which now amounts to five, i.e. four billion dollars, and exports, which now does not match the great potential of agriculture and is only about two billion dollars. It is unacceptable that the export of agricultural products per hectare of arable land, or per capita is about three times lower than in Central and Eastern Europe. Therefore, the government must take urgent measures also in the fiscal policy and increase the incentives from the budget of Serbia, which now amount to USD 29 per farmer, while in the European Union that value is USD 130.

The preparation of the Serbian agriculture for free competition in the European market is becoming an imperative for current economic situation, especially in the terms of existing world financial crisis and the demands of the EU accession process. That, in accordance with international standards, requires changes in the way of providing of government support to agriculture development, i.e. the introduction of a series of stimulus tax incentives and exemptions, in accordance with the European Union's agricultural policy.

Active agrarian budget should be focused towards the development of SMEs and entrepreneurship. Fiscal reforms and substantial fiscal support to agriculture, as the development opportunity of the Republic of Serbia, should help agriculture in order to use its development, especially export potentials. Budgetary policy has to provide optimum support to specific agricultural production and rural development.

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NOVA FISKALNA ULOGA DRŽAVE U TRANZICIJI POLJOPRIVREDE SRBIJE

Igor Pejović[11], Vladimir Jovanović[12]

Rezime

U procesu pridruživanja neophodno je iskoristiti ogromne potencijale u poljoprivrednom i prehrambenom sektoru u Republici Srbiji. U uslovima svetske ekonomske krize, nedostatka stranih direktnih investicija, nepovoljnog stanja u bankarskom sektoru i neracionalnog korišćenja raspoloživih resursa, potrebno je pripremiti poljoprivredu da bi bila u stanju da izdrži slobodnu konkurenciju na evropskom tržištu. U tom smislu treba pružiti veću podršku poljoprivrednom razvoju, saglasno međunarodnim standardima, posebno u načinu državne podrške poljoprivrednom razvoju u fiskalnoj sferi, odnosno uvođenju niza stimulativnih finansijskih mera u agrarnoj politici Republike Srbije.

Ključne reči: *poljoprivredna proizvodnja, Republika Srbija, fiskalna i agrarna politika, agrarni budžet, subvencije, ruralni razvoj i pridruživanje Evropskoj uniji.*

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THE ATTITUDES TOWARD APPLICATION OF VIRAL MARKETING IN THE FOOD INDUSTRY IN SERBIA

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Summary

This paper examines the attitudes toward apllication of viral marketing in the food industry in Serbia. The research consisted of both an extensive theory review and empirical research, including case studies, surveys and in-depth interviews. Viral marketing has been defined as any marketing program (online or offline) that is designed to achieve an exponential growth by spreading marketing effects from customer to customer. The paper's hypothesis, stating that marketing managers in Serbia have positive attitudes toward the usefulness of viral marketing in the food industry, has been supported by the results of both primary and secondary research. Finally, a number of limitations and risks associated with the viral marketing strategy have been presented, followed by a brief discussion of possible ways to overcome the challenges.

Key words: *viral marketing, word of mouth marketing, viral marketing in Serbia, food marketing.*

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Introduction

Although economic crisis had a negative impact on food sector in Serbia, it still represents "a significant segment of the industrial structure and an important factor of the stability of overall economic and social trends in Serbia" (Savić et al., 2012).

One of the corner stones of its success is related to application of adequate communication tools. Although in food industry discounts and bonuses as a sales promotion activities are frequently used, the large volume of research into consumer-targeted sales promotion does

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not provide a unified conclusion regarding their effects (Mesaroš et al., 2013). Following the trends in economically developed countries, the food industry in Serbia is in a process of adoption and implementation of the viral marketing strategy as a relatively new communication tool with proven positive results. Therefore, the aim of this paper is to examine the attitudes of marketing managers toward its use and effectiveness, as well the limitations and risks, of viral marketing in the food industry. A theoretical background on the scope and definitions of viral marketing will be given in the first part of the paper. The central part of the paper will discuss, based on empirical research data, the *attitudes* toward viral marketing in general, and more specifically in the food industry in Serbia. It will also give us an insight into the perception of usefulness of the application of viral marketing in the food industry in Serbia. In other words, the research hypothesis of our paper, that *marketing managers in Serbia have positive attitudes toward the usefulness of viral marketing in the food industry, will be tested.*

Research Method

Our theoretical research consisted of an extensive review of scholarly articles, books and Internet resources on both viral marketing and food marketing. The theoretical review was followed by empirical research (Survey, 2012) based on the following three methods:

1. Case study - understanding the critical success factors of eighty viral marketing campaigns (mostly in the US, Canada and Serbia). The purpose of this stage of research was to gain a better understanding of the nature of viral marketing, its common characteristics, and principles typical for most viral marketing campaigns.
2. Survey of marketing managers of 68 companies in Serbia.

   The survey consisted of two samples. The first was a simple random sample involving marketing managers from thirty five companies with 50-4,000 employees, from various industries including auto industry, construction, food industry, health care, technology, industrial engineering and machinery, mining, tourism, wholesale and retail trading, marketing, media and trade show industry and professional services.

   The second sample was a convenience sample consisting of thirty three selected small, medium and large companies in the food industry including soft drinks, distillers and vintners, brewers, agricultural products, meat, poultry and fish, packaged foods and meats, and food services.
3. In-depth interview with the marketing managers of ten companies who ran successful viral marketing campaigns in the past. The purpose of this research method was to discuss the experiences, success factors and effectiveness of various viral marketing campaigns.

When processing results from our sample, we have used the binomial test (e.g. when comparing positive and negative experiences with viral marketing), and gamma correlation coefficient (e.g. when relating those who have used viral marketing in the past and those who plan to use it in the future or those who believe in its benefits). Our research was mostly exploratory in nature due to applied sampling methods and a relatively small sample

size. In order to be able to create statistical inferences about the whole population (food businesses in Serbia), the survey research would require a larger random sample. It is worth noting, however, that most of the research results were consistent between various research methods (primary and secondary), different samples (whole industry vs. food industry), and between a number of similar survey questions.

The measurement of managers' attitudes has been based on quantitative analysis of survey questions such as:

a) whether or not marketing managers believed that viral marketing can be successfully used in the food industry (table 2),
b) whether or not marketing managers planed to use viral marketing in the future (table 3),
c) whether or not they considered their viral campaigns as successful (table 4),
d) whether or not they believed that viral marketing would benefit their company in the future (table 5),
e) whether or not there was a positive corroleation between those who had used viral marketing in the past and those who believed in its benefits (table 6), and finally
f) whether or not there was a positive corroleation between those who had used viral marketing in the past and those who planed to use it in the future (table 7).

Viral Marketing Defined

Companies now have great opportunities for the implementation of word of mouth marketing programs: satisfied (or even delighted) consumers of the product/service can now easily share their experience with a large number of other people by the use of social networks (Penenberg, 2009, McColl, 2010). Word of mouth is increasingly becoming "word of mouse" which, supported by Internet technology, gives impetus for the application of the viral marketing strategy (Sudarević, 2011).

The term "viral marketing" has been used widely over the last fifteen years, yet it has often been confused with a number of terms such as "buzz marketing," "word of mouth marketing," "e-word of mouth marketing (eWOM)," "word of mouse marketing," "evangelist marketing," "network marketing," "referral marketing," "guerilla marketing" and similar terms.

The term was first introduced by Steve Jurvetson and Tim Draper (1997), the founding investors of Hotmail, who considered viral marketing to be "the special catalyst for Hotmail's torrid growth". They used the term *viral* "not because any traditional viruses are involved, but because of the pattern of rapid adoption through word-of-mouth networks".

According to Ralph Wilson (2012), one of the first authors on viral marketing, viral marketing describes any strategy that encourages individuals to pass on a marketing message to others, creating the potential for exponential growth in the message's exposure and influence. According to Wilson, off the Internet, viral marketing has been referred to as "word-of-mouth," "creating a buzz," "leveraging the media" or "network marketing." But on the Internet, for better or worse, it's called "viral marketing."

Cordoba argued that „in a sense, viral marketing parallels word-of-mouth activities, but in an Internet setting" (Hung-Chang, C. et al., 2007). Similarly, Alison Stateman (2005) described viral marketing as a „network enhanced WOM".

The Word of Mouth Marketing Association (2007) offered a broader definition of viral marketing as a type of word of mouth that involves "creating entertaining or informative messages that are designed to be passed along in an exponential fashion, often electronically or by email" (underlined by authors). WOMMA's definition did not narrowly focus on the Internet or on electronic means, although this is what "often" makes things more viral. Similarly, Laudon and Traver (2002) in their definition did not even mention electronic media, but rather described viral marketing broadly as "the process of getting customers to pass along a company's marketing message to friends, family, and colleagues".

Based on the above, as well as on the analysis of real life viral marketing cases, we would like to suggest the following (broader) definition of viral marketing (Šurjanović, Sudarević, 2013): *"Viral marketing is any marketing program designed to achieve exponential growth by spreading marketing effects from customer to customer"*.

It is worth noting that according to our definition:

a) The exponential growth[4] is required for any marketing program to be considered "viral."

b) Viral marketing is based on spreading marketing effects from customer to customer. In other words, viral marketing is just one type or special case of word of mouth marketing which happens when the number of customers grows exponentially.

c) Viral marketing takes place both online and offline. The difference is not in the media; the difference is in the intensity. During our research of viral marketing cases, we have seen quite a few viral marketing programs that took place even before the Internet era, yet they did meet the above criteria of "exponential growth." The viral marketing examples of Apple's Mac computers, Polaroid instant cameras, Volkswagen's Beetle, Tupperware dishes, MCI's Friends & Family Program (a telecommunications company), Harley Davidson motorcycles and similar other examples come to mind. In the food industry, examples of viral programs before the Internet include the Coca Cola contests (dated back as far as 1916!), the Pepsi Challenge, or Amway and Forever Living's MLM marketing programs. However, it is fair to say that the viral marketing concept received full attention with the emergence of Internet technologies. The Internet is considered the perfect media for word of mouth marketing, as it allows news to spread much faster through the "word of mouse" (Šurjanovic, 2012), while at the same time, "consumers communicating via email may persuade more readily than mass media advertising" (Phelps et al, 2004). Kalyanam, Masonis and McIntyre (2007) conclude that viral marketing is

4 A number of authors have offered a mathematical framework for describing a viral marketing process and for measuring the intensity of word of mouth and viral marketing (Bouchard and St-Amant, 2012, Bughin, et al, 2010, Schmitt et al., 2011, Kumar et al., 2007, Shu-Chuan and Kim, 2011, Yang et al, 2010).

now increasingly used by the marketing managers of Fortune 500 companies, while Google's UK managing director Mark Howe urged even more firms to embrace viral marketing (Jones, 2007).

Application of Viral Marketing in the Food Industry

Companies in the food industry are no exception in terms of the use of the viral marketing strategy: there are many notable examples, such as Burger King, General Mills, Pepsi, Evian, Brewer Anheuser-Busch, Long John Silver's, Doritos, Chick-fil, Cadbury, McDonald's, Beer.com, Heineken, and Skittles.

Food businesses have been represented on most "top ten" viral lists in various publications over time. According to BlogStorm (Altoft, 2008), the UK's largest blog discussing Internet marketing, there were three food businesses among the top ten most successful viral campaigns of all time (Burger King, Thresheers and Cadbury). Advertising Age (Learmonth, 2011) created its own list of "Top Ten Viral Ads of All Time"; there were again three companies from the food industry among the top ten most successful campaigns (Evian, Pepsi and Doritos). Finally, at the recent third-annual Ad Age Viral Video Awards organized in April 2012 by AdAge.com (Pardee, 2012), two out of ten awarded campaigns were from the food industry (Coca Cola and Heineken).

Viral marketing has also been used in the food industry in Serbia. Several innovative viral marketing campaigns deserve to be mentioned here:

- Promotion of the new "Lav" beer bottle design by Carlsberg;
- "Hello!" musical contest and "Sosa" cooking recipes by Fruvita beverage company;
- Promotion of "Ella" skim milk through a Guinness book of records event by Mlekara Subotica;
- "Fans of Medeno Srce" Facebook marketing campaign by Pionir confectionary products;
- "Jelen Beer Bands" by Apatin Brewery;
- "Cookie by Cookie" campaign by Banini biscuit and wafer company;
- Virtual ice cream eating contest by Frikom ice cream and frozen food company, and
- "Chocolympic Games" by Stollwerck confectionary company.

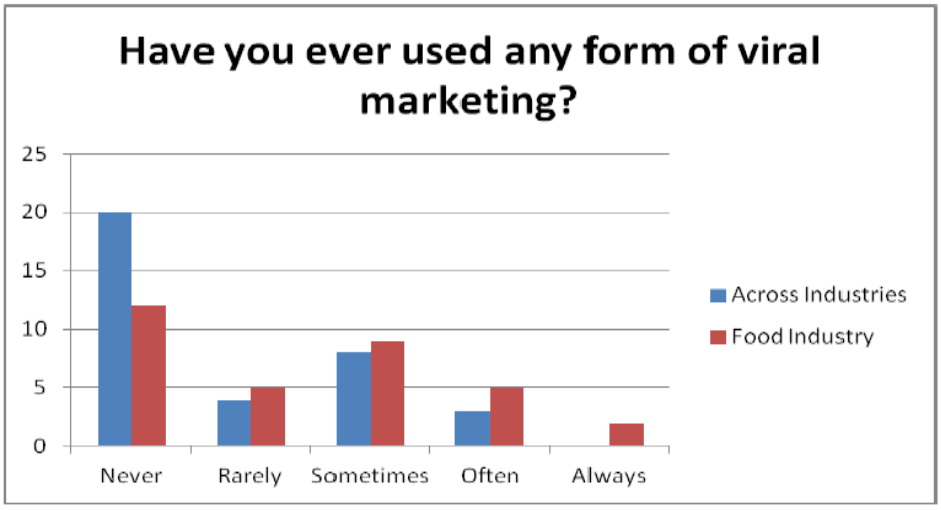
In order to determine *the degree of use of viral marketing campaigns,* we have first looked at the situation across industries. In our general random survey 42.86% of marketing managers in Serbia reported that they have used some form of the viral marketing strategy. This relatively high degree of use of the viral marketing strategy can be partly explained by the relatively broad definition of viral marketing in our survey; the questionnaire first described what was meant by viral marketing (through the definition and examples) and then asked the participants how often they had used any form of viral marketing, regardless of whether or not they had used the term "viral marketing" itself.

Table 1. The frequency of use of viral marketing in Serbia

	Have you ever used any form of viral marketing?					Total
	Never	Rarely	Sometimes	Often	Always	
Across Industries	20	4	8	3	0	35
Food Industry	12	5	9	5	2	33

Source: survey data 2012

Picture1. The frequency of use of viral marketing in Serbia



Source: survey data 2012

While the first survey was general, the next survey involved marketing managers in the food industry only. The percentage of those who have used the viral marketing strategy in the food industry in Serbia was 63.64%, much higher compared to the average across industries (42.85%). The difference was significant, as suggested by the calculated p-value of 0.013.

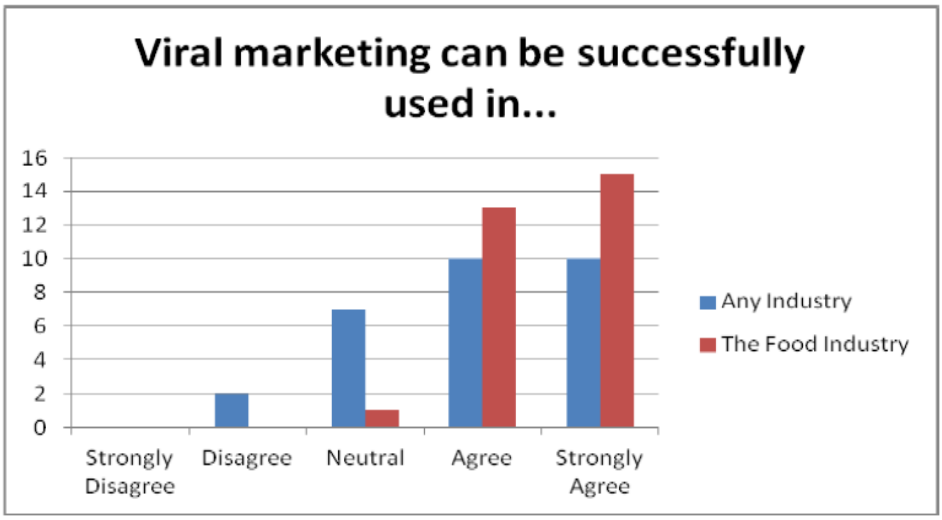
The attitudes toward the application of viral marketing in the food industry were evaluated using three questions. In the first question, respondents were asked to indicate their level of agreement with the statement that viral marketing can successfully be used in *any* industry. The responses were expressed in five categories from 1-5 (where 5 indicated strong agreement). The responses are shown in the table 2.

Table 2. The attitudes toward the universality of use of viral marketing in Serbia

	Viral marketing can be successfully used in...					Average Rating
	Strongly Disagree ("1")	Disagree ("2")	Neutral ("3")	Agree ("4")	Strongly Agree ("5")	
Any Industry	0	2	7	10	10	3.97
The Food Industry	0	0	1	13	15	4.48

Source: survey data 2012

Picture 2. The attitudes toward the universality of use of viral marketing in Serbia



Source: survey data 2012

The relatively high average agreement of 3.97 (table 2) suggests that there was a widespread belief in Serbia that the viral marketing practice, in one form or another, could be widely used in any industry. This insight of the "universality" of viral marketing made sense, having in mind that most marketers typically have limited marketing budgets and therefore try to find new, creative ways of maximizing ROI of their campaigns, regardless of their type of business or industry.

In the following question, the respondents were asked whether they agree with the statement that viral marketing can successfully be used in the food industry. The purpose of this question was to serve as a first indication of possible problems or hesitations toward the application of viral marketing in the food industry, but also to check the consistency between answers to similar survey questions.

As indicated in the table 2, there was quite a high degree of optimism (a rating of 4.48) regarding the potential of viral marketing in the food industry in Serbia.

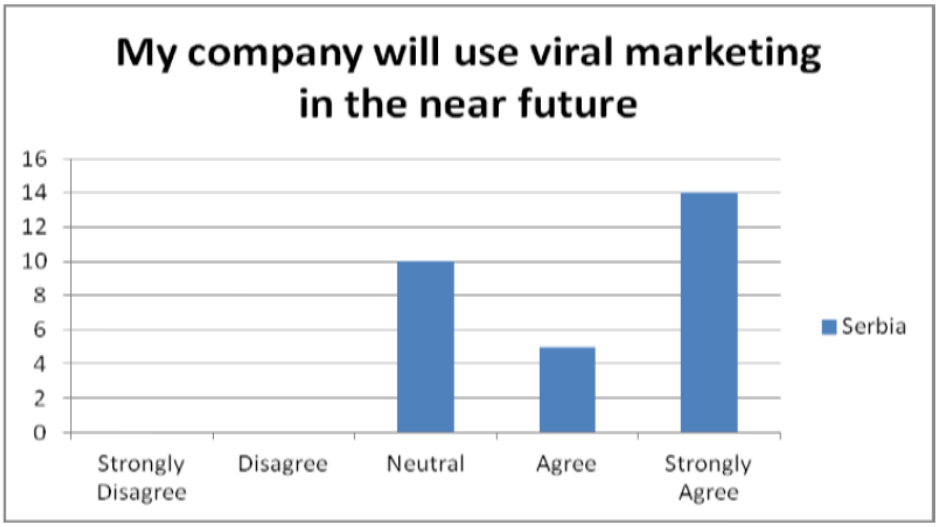
Finally, the third question was regarding the managers' plans to use viral marketing in the future; 65.52% of managers in the food businesses in Serbia agreed or strongly agreed with the statement that they will use viral marketing in the near future, resulting in an average rating of 4.14 (table 3).

Table 3. The intentions to use viral marketing in the food industry in Serbia in the near future

Country	My company will use viral marketing in the near future					Average Rating
	Strongly Disagree ("1")	Disagree ("2")	Uncertain ("3")	Agree ("4")	Strongly Agree ("5")	
Serbia	0	0	10	5	14	4.14

Source: survey data 2012

Picture 3. The intentions to use viral marketing in the food industry in Serbia in the near future



Source: survey data 2012

In summary, the above secondary and primary research in Serbia demonstrated the wide acceptance and positive perceptions of viral marketing in the food industry; the viral marketing trend appears to be general, and the food industry seems to be no exception.

In an attempt to explain the popularity of viral marketing in the food industry, it might be argued that most of the consumers of food products are the mainstream consumers who generally respond well to any marketing or word of mouth marketing program. In addition, most food item purchases tend to be somewhat emotional or high impulse items, which provide the opportunity for viral marketers to more effectively influence buyer's decision making process.

Usefulness of the Application of Viral Marketing in the Food Industry in Serbia

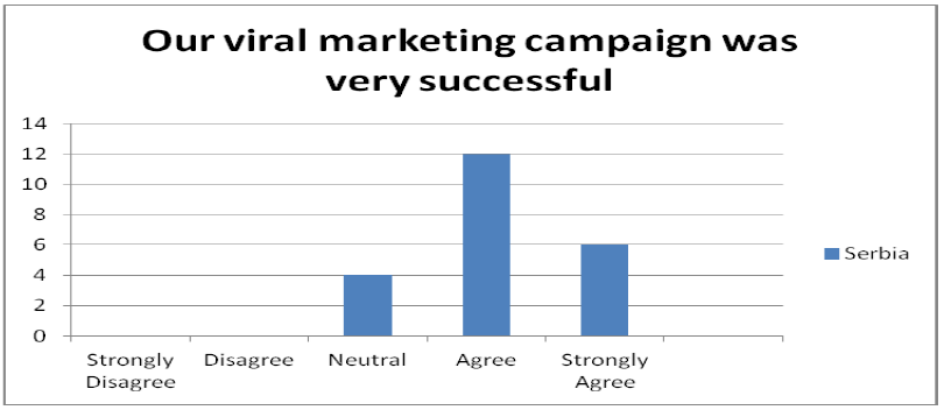
The usefulness of the application of viral marketing in the food industry was explored based on four questions or tests. In the first question, those managers who had previous experience with viral marketing campaigns were asked whether they agreed that their campaign had been very successful. Their responses are shown in the table 4.

Table 4. The perceived successfulness of viral marketing campaigns in the food industry

Country	Our viral marketing campaign was very successful					Average Rating
	Strongly Disagree ("1")	Disagree ("2")	Uncertain ("3")	Agree ("4")	Strongly Agree ("5")	
Serbia	0	0	4	12	6	4.09

Source: survey data 2012

Picture 4. The perceived successfulness of viral marketing campaigns in the food industry



Source: survey data 2012

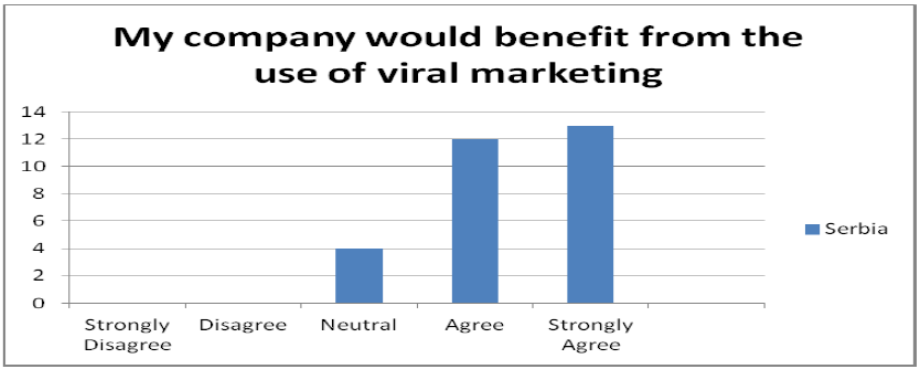
As presented in the table 4, the average agreement with the statement was 4.09 in Serbia. The results of the binomial test in the sample in Serbia suggested that *positive experiences are more common than negative experiences* (since the calculated p-value was 0.00). In the second question, the managers were asked whether they agreed that the use of viral marketing would benefit their company.

Table 5. The attitudes toward the benefits of viral marketing in the food industry

Country	My company would benefit from the use of viral marketing					Average Rating
	Strongly Disagree ("1")	Disagree ("2")	Uncertain ("3")	Agree ("4")	Strongly Agree ("5")	
Serbia	0	0	4	12	13	4.31

Source: survey data 2012

Picture 5. The attitudes toward the benefits of viral marketing in the food industry



Source: survey data 2012

The average rating of 4.31 revealed high degree of optimism about the usefulness of viral marketing.

The following two tests were based on the correlation between the responses to the previous questions. We first tested if those who had used viral marketing campaigns in the past (still) believed in its benefits (table 6).

Table 6. The correlation between those who had used viral marketing in the past and those who believed in its benefits

Pair of Variables	Valid N	Gamma	Z	p-value
Have you used any form of viral marketing in the past? & Our company would benefit from the use of viral marketing.	29	0.407035	2.200442	0.027776

Source: survey data 2012

The results shown in the table 6, based on the p-value of 0.027776, suggested that there was a significant and positive correlation between the two variables.

Furthermore, we also tested if those who had used any form of viral marketing in the past planned to use viral marketing again. The gamma rank correlation and p-values shown in table 7 suggest that there was a significant and positive correlation between the two variables in Serbia.

Table 7. The correlation between those who had used viral marketing in the past and those who planned to use it in the near future

Pair of Variables	Valid N	Gamma	Z	p-value
Have you used any form of viral marketing in the past? & Our company plans to use viral marketing in the near future.	29	0.653846	3.666039	0.000246

Source: survey data 2012

The last two findings are particularly relevant, as they confirm that the marketing managers who had had an experience with viral marketing in the past believed in the benefits of viral marketing. This is another, although indirect, indication of the usefulness of the application of the viral marketing strategy in the food industry.

Concluding Remarks

Our secondary research, both internationally and in Serbia, pointed out that there were quite a significant number of successful or extremely successful viral marketing campaigns, in terms of achieving the desired marketing effects. The campaigns of food businesses usually occupied the top positions among the most successful viral campaigns as listed by various professional publications.

Our primary research suggested that viral marketing, if defined in a broader sense, is actually quite widely accepted and used by marketing managers in the food industry in Serbia. The number of participants who reported successful campaigns significantly outnumbered those who reported that their campaign was not successful. Furthermore, most managers believed that the viral marketing program would benefit their company, and they planned to run the viral marketing campaign again in the future. There was a positive rank correlation between those who had used viral marketing in the past and those who believed in its benefits, as well as between those who had used it in the past and those who planned to use the viral marketing strategy in the near future.

We believe that there is sufficient evidence based on primary and secondary research to support the paper's hypothesis that *marketing managers in Serbia have positive attitudes toward the usefulness of viral marketing in the food industry.*

It is worth noting, however, that there are a number of issues and limitations of viral marketing. These issues are often discussed in professional circles and scholarly articles; they also surfaced in our surveys. The general negative comments about viral marketing highlighted the overall unpredictability of outcomes, the difficulty to completely control the marketing process, the danger of compromising the brand image, problems with achieving the growth plateau, difficult measurements of campaign effects, and similar. Some problems and limitations were more specific to the food industry, such as the problems in managing large increases in product demand, the inability to try the food products during the campaigns, as well as the specific regulations in the food industry[5]. Several respondents in Serbia also believed that it was too early to run viral marketing programs, as, in their opinion, part of the population was not yet ready for the campaigns centered on the new media.

These problems need to be addressed and managed. Some participants in the research suggested a number of principles and tactics to overcome these problems. Their comments stressed the *principles* of more rigorous planning, designing new viral marketing

5 The ethical and regulatory issues with the application of viral marketing in the food industry have been studied by Montgomery and Chester (2009).

measurements, synchronizing viral marketing campaigns with the overall branding strategy, integrating the viral marketing campaign with all other marketing activities, as well as genuinely caring about the real needs of customers. The suggested *tactics* in the food industry included a more extensive use of visual images and, whenever possible, the use of product samples or giveaways. The campaigns needed to be well coordinated with social media channels in order to encourage online conversations and receive early feedback from customers.

There is a need for the next stage of research that could identify the viral marketing principles and tactics that will help marketing managers plan and execute successful viral marketing campaigns while minimizing the risks associated with viral marketing.

Acknowledgment

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STAVOVI U POGLEDU PRIMENE VIRALNOG MARKETINGA U PREHRAMBENOJ INDUSTRIJI U SRBIJI

Tomislav Sudarević[6], Branislav Vlahović[7], Ivan Šurjanović[8]

Rezime

Rad istražuje stavove u pogledu primene viralnog marketing u prehrambenoj industriji u Srbiji. Istraživanje se sastojalo od pregleda literature, kao i od empirijskog istraživanja na bazi analize slučajeva, anketa i ličnih intervjua u okviru prehrambene industrije u Srbiji. Viralni marketing je definisan kao bilo koji (onlajn ili oflajn) marketing program koji je osmišljen s ciljem da se postigne eksponencijano širenje marketing efekata od potrošača do potrošača. Hipoteza rada da marketing menadžeri u Srbiji imaju pozitivan stav po pitanju korisnosti primene viralnog marketinga u prehrambenoj industriji je podržana na osnovu rezultata i primarnog i sekundarnog istraživanja. Na kraju rada predstavljen je jedan broj ograničenja i rizika viralnog marketinga, i diskutovani su mogući putevi da se ovi problemi prevaziđu.

Ključne reči: *viralni marketing, marketing „od usta do usta", viralni marketing u Srbiji, marketing prehrambenih proizvoda.*

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SOURCES OF INVESTMENT FINANCING AND THEIR IMPACT ON ECONOMIC GROWTH OF THE REPUBLIC OF SERBIA

Aleksandra Tešić[1], Dragan Ilić[2], Rajko Tepavac[3]

Abstract

The aim of this paper is to point out to the important issues of investments in Serbia, with particular focus on the fact that investments can never be the objective but only the generator of economic growth, its pace, development structure and stability. With this in mind and depending on economic cycle and its phases, the connection between the amount and structure of investments and economic growth is studied as well as the investment behaviour as part of global demand and spending in the function of total consumption.

In the analysis of investments and their financing effects on economic growth of Serbia, relevant studies and articles were used, together with the reports and publications of competent institutions. The results of the analysis indicate the crisis of investments and their financing method in Serbia which has been accumulating for many years now, with an increasing foreign debt arising from predominantly external investment financing. The main conclusion is that for every economy, programming and monitoring of necessary investments, their economic, technical and regional structure as well as financing system is of strategic importance.

Key words: *economic growth, foreign direct investments, investment portfolio, savings.*

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Introduction

Investments are the generator of economic growth, its pace, development structure and stability. It is proven in theory and empirically confirmed in the development processes of almost all world economies that a higher investment rate produces effects

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on a higher growth rate i.e. bigger share of investments in the gross domestic product enables higher growth rates. However, when analysing this pattern, it is possible to ask a couple of additional questions:

- is there, and if yes, what is the investment limit in the gross domestic product which will not jeopardize other forms of spending and economy stability;
- is it possible in the long-term to strike a balance between spending and investments, which will ensure an optimum growth and optimum ratio of current to investment spending;
- how can both an optimum and stable growth be achieved and, if possible, full employment and balance in external economy i.e. how a particular investment structure affects import and export composition;
- how to achieve the level of investments which will act as an actual generator of development alongside the striking of balance between savings and investments in the long term;
- how to ensure the formation of optimum investment structure and its effects on the quality and dynamics of economic growth;
- what is the investment functional structure and behaviour of particular forms of investments in the development process (crisis, prosperity, accelerated development, slow or sluggish development). Namely, there are real investments (capital assets), financial investments and workforce investments (high expertise in new technologies and financial transactions). These two forms of investments are largely neglected, although they are becoming predominant in the investment structure with very complex effects on numerous macroaggregates and relations in economy and society.

Investments and economic growth

In modern economies, it is of great importance to provide optimum relation and manage an efficient policy of: 1) real investments (investments in capital assets and reserves) and 2) financial investments (deposits, cash, shares, bonds) - mainly considered to be a speculative economy and directly related to cash redistribution and savings. Not until the second phase that the savings are targeted toward real capital via stock exchange transactions.

These relations are very complicated in the generation of gross domestic product and behaviour and formation of its components (spending and investments, i.e. savings). The relations seem to be even more complicated in the modern open economies where the available gross domestic product is "adjusted" by import of capital while export of capital adjusts spending. Therefore, import and export of capital is very important, especially its targeting, use and effects on national economy: be it directed toward the increase of consumer spending, to cover budgetary expenses and deficits or for investments (whereby it is very important whether or not it is being used for productive or non-productive investments).

The above mentioned implies that investments do not only generate development, but also the process of economy modernization i.e. restructuring and technological process. In relation to other forms of final spending (consumer and general spending), the investments

have a multiplier effect on gross domestic product. It is a well-known effect of investment multiplier, which is connected to the accelerator effect on spending.[4]

For illustrative purposes and further analysis, below are main relations in construction of spending function in a few developed economies and in Serbia in a longer period.

Table 1. Structure of gross domestic product use

Indicator	1980	1990	2005	2010	2011
USA					
Personal consumption	63,1	65,3	65,5	58,1	56,3
Current state expenditures	19,1	18,0	16,9	19,6	22,1
Investments	17,4	15,5	16,4	16,6	14,0
Export	5,7	7,1	6,9	7,0	6,6
Import	5,5	5,1	6,0	8,0	12,2
EEC (EU)					
Personal consumption	59,1	61,0	60,6	58,4	57,7
Current state expenditures	15,2	16,1	15,9	16,2	19,4
Investments	23,1	21,0	19,9	18,1	16,3
Export	22,8	28,3	30,2	28,2	26,6
Import	22,1	26,1	27,2	26,4	24,8
GERMANY					
Personal consumption	58,5	57,0	55,9	56,1	54,4
Current state expenditures	15,8	18,2	17,3	18,6	19,8
Investments	26,4	22,9	22,0	20,0	18,1
Export	22,0	28,1	29,9	26,3	25,9
Import	20,6	25,7	27,3	25,9	24,1
JAPAN					
Personal consumption	55,2	54,0	52,1	52,0	51,1
Current state expenditures	8,2	8,8	8,4	8,9	9,9
Investments	34,9	32,2	30,8	27,1	24,4
Export	11,2	14,7	17,4	18,2	16,3
Import	9,9	10,9	11,0	12,6	11,4
SERBIA (YUGOSLAVIA)					
Personal consumption	55,5	53,9	53,7	56,2	58,4
Current state expenditures	9,3	9,0	9,4	11,8	16,8
Investments	31,9	31,8	18,9	15,5	12,4
Export	13,3	13,7	12,1	14,1	12,2
Import	22,8	26,0	22,3	25,2	24,1

Source: IMF – International Financial Statistics, 1980-2011 and Statistical Yearbook of the Republic of Serbia for 2012, Table 6.19.

Data in the Table 1 indicate that investments are not 'overstretched', while the consumer spending in all economies, save for Serbia, recorded a drop of between 2 and 7 percentage points. The drop in investments and 'propensity to invest' is connected with the global financial crisis, restrained real capital investments, and is also the consequence of stock

4 Komazec, S. (1994): *Makroekonomija*, Institut BK, Beograd, pp. 113-130.

exchange crisis and investments in financial instruments.[5] In addition, Serbian economy faces many challenges concerning depreciation, low labour productivity and widening gap between nominal and real aggregates in economy.

Economic cycles, crisis and investments

Modern economic systems are characterised by financial market imperfections as the rise in unemployment and decline in the demand for consumer goods, with the corresponding increase in savings seems almost automatically recessive. Ever-present rise in savings is not automatically transferred to the capital market, as there is no sufficient demand and wish to invest due to diminished product realization opportunities, higher investment risk and aggravation of all development performances.[6]

Behaviour of corporations and capital markets in the function of corporate financing is an issue which is not sufficiently researched in a modern theory, particularly in terms of qualitative analysis. Therefore, we shall separately analyse the behaviour of capital and financing in the crisis phase, particularly in the phase of high boost.

Crisis phase of the cycle and behaviour of capital

Crisis phase of the cycle is characterised by securities market exodus (increased sale of securities), increased liquidity preference and difficult investment of securities (collection of the capital required for investments is impeded). On the other hand, the cost of capital soars, banks curtail new lending, the collection of mature loans increases – resulting in conversion of loan into a cash form. Tendency of a corporation to retain money grows, self-financing increases, however, not for the purpose of financing new investments but to cover the changed investment structure. Namely, corporations lead the policy of adequate investments in means of production (real capital), reserves and financial assets, which in different cycle phases leads to fluctuations and change in the structure of total investments. Cyclic fluctuations of investments into different forms of assets are determined by current boost, business opportunities and corporate decisions on the utilization of available financial resources. In the lack of own resources, required capital is simultaneously secured on the banking loan market and by issue of shares.[7]

In the phase of depression and the beginning of revival, when profit is still low, business opportunities weaken, investments into real capital drop, whereas liquidity and change in investment structure to the benefit of financial investments grow. The crisis dramatically reduces the amount of financial assets accepted in the capital market

5 Arestis, P., Sawyer, M. (2004): *Re-examining Monetary and Fiscal Policy for the 21st Century*, Edward Elgar Publishing Inc., Northampton Massachusetts 01060 USA and Louth, Lincolnshire, UK. Printed and bound in Great Britain by MPG Books Ltd, Bodmin, Cornwall, pp. 35-38.

6 International Monetary Fund, *A New Look at the Role of Sovereign Credit Default Swaps*, Chapter 2m, April 2013, pp. 2-6, http://www.imf.org/external/pubs/ft/gfsr/2013/01/index.htm

7 *Komazec, S., Ristić, Ž. (2009): Ekonomija kapitala i finansiranje razvoja, EtnoStil, Beograd, pp. 278-281.*

by industrial corporations.

Increased investments into instruments of labour and reserves play an important role in the distribution of cash capital, depending on the behaviour of different forms of capital in the total cyclic capital movements. When business agreements are secured, the investments into production capital increase, the uncertainty in prosperity leads to increased investments into commodity capital, whereas a growth into a cash capital appears as the remnant of the previous two investment forms. The crisis significantly modifies complex relationship between industrial and loan capital, forcing corporations to become more independent from the loan capital market.

In the phase of crisis the share and absolute loan supply of corporations drop. In the phase of depression, the accumulated surplus of share capital is often used to decrease the dependency from external financing. The activity on the loan capital market slides. As the difficulties in the turnover of total capital grow, corporations increasingly rely on their own funds with minimum utilization of external sources – mostly short-term bank loans for current payments and preservation of liquidity.[8]

Boom and investment financing

In the prosperity phase, particularly its final stage, when the presence of crisis is already felt in its disguised forms and big business tries to implement its investment programmes, namely, when in fierce competition, corporations increase their production capacities, implement fast modernization to preserve the market and performance, fail to timely respond to initial deviation of demand from mass production – the gap appears between equity investments and decrease in market demand. The growth of profit and income is slowed down and partly veiled by a sudden growth of commercial loans. This leads to actual notional profit and growth of investments into financial assets which increasingly become less liquid and, by their nature become investments into reserves rather than into liquid assets. Generation of surplus real capital (reserves and illiquid financial assets) produces difficulties in the turnover of total industrial capital and hyperaccumulation of capital assets.[9]

High boost and favourable development conditions result in increased use of loan capital market by corporations. Loan capital market is becoming a significant factor in total investment financing. Schumpeter has explained in details credit expansion policy, its negative effects and dynamic role it assumes in the economy.[10]

Marginal propensity to invest, in nominal and real terms, is significantly lower than the average. It is a consequence of decreasing orientation in targeting domestic savings funds and borrowed funds towards investments. Domestic sources give place to foreign

8 Begg, D., Vernasca, G. et al (2011): *Economics*, Tenth Edition, McGraw-Hill, New York, pp. 614-629.

9 Mishkin, S., Frederic (2004): *The Economics of Money, Banking and Financial Markets*, 7th edition, Pearson Addison Wesley, pp. 148.

10 Schumpeter, J., *Theory of Economic Development*, http://findarticles.com/p/articles/ mi_ qa3913/ is_200204/ai_n9083256/pg_2/?tag=mantle_skin;content

sources (loans, direct investments, portfolio investments), which weakens material basis of economy and its ''growing" or self-financing power.[11]

Cyclical behaviour of production and all forms of employed capital is reflected through the appearance of hyperproduction crisis of commodity capital, via a complex system of relations between industrial and loan capital. The amount and terms of bank and mortgage loans account for about 2/5 of total external financing. The remaining part is constituted of sources based on securities issue. Industrial crisis and crisis of real capital inevitably lead to shocks in credit financing sphere. For this reason, it is interesting to analyse modern economies and characteristic behaviour of their internal resources and investments in different phases of economic cycle.

In the prosperity phase, credit expansion results in fast growth of industrial production (though, credit expansion may prolong the period in which hyperproduction takes on its disguised form), indebtedness of non-financial corporations increases rapidly, whereas the interest in self-financing weakens. Therefore, self-financing depends on cyclic movement of profit, especially since depreciation is loosely connected with cyclic fluctuations, thus linking self-financing to undistributed profit.[12]

As a result, investment in elements of production capital decreases in the period of crisis, but increases in the prosperity phase. Increase in self-financing, if considered as an investment of own funds into real capital, grows in recovery and prosperity phase, and slows down at the end of the recovery phase. The increase in self-financing in the time of crisis is forced due to the increase in ''liquidity preference" and decrease in real investments, and due to caution of corporations in income distribution by creating reserves to bridge the crisis phase and difficulties in all forms of capital turnover.

Investments and borrowing

As previously mentioned, the investments are the generator of economic growth, especially due to their multiplier effect on the set of economy macro aggregates. To that extent, it is necessary to analyse the following key elements of investment process:

- the amount and rate of gross and net investments;
- investment financing sources;
- structure of investment spending (equipment, import and export, technical structure of investments, economic structure of investments and the like);
- investment effects on spending, income, employment, growth, export, import and other forms of spending; and
- realisation of investments.

The investments statistics, which by all its important elements used to be kept in the Bureau

11 Nikolić, A. (2011): *Upravljanje investicijama*, FIMEK, Univerzitet Privredna akademija u Novom Sadu, pp. 44-55.

12 Blanchard, O., Amighini, A., Giavazzi, F. (2010): *Macroeconomics – A European Perspective*, Prentice Hall, International, First Edition, pp. 307-318.

for the Settlement of Payments, nowadays is trying to analyse this area through indirect indicators of investment movements via long-term and medium-term industry and bank borrowing abroad and domestic investment bank loans and long-term loans granted to the citizens. However, this does not allow actual investment data analysis, particularly the analysis of economical, technical and regional investment structure, let alone the effects of investment. Therefore, investment spending is tried to be indirectly viewed and analysed through the use of medium-term and long-term bank loans granted to industry and citizens. The results of this approach are explained below. During the financial crisis 2007-2012, the banks in Serbia approved 933.6 billion Dinars of long-term and medium-term loans to enterprises (companies) and 399.5 billion Dinars to citizens. The amount of loan, which is still present in these two sectors, amounts to 1,704.1 billion Dinars.

Table 2. Long-term and medium-term bank loans (in bln. RSD)

Year	Companies	Citizens	Other	Total investment credit
2007	185,4	253,3	17,3	456,0
2011	495,4	527,6	117,0	1.140,0
2012	1.119,0	652,8	388,3	2.160,1
The rise in credit	933,6	399,5	371	1.704,1

Source: NBS, Statistical Bulletin No. 2, 2012 and Balance Sheet of the Banking Sector at the end of 2012, Macroeconomic analysis and trends, Table of Bank Investment. http://www. ecinst. org.rs/sites/default/files/mat-kratki/temabrojamat220.pdf

If loan supply denominated in Dinars is converted into Euros, according to the mean exchange rate, this amounts to approximately 15 billion Euros of investment spending, which cannot be the indicators of investments into fixed funds, especially in terms of their structure, quality, and branch and regional earmarking of funds. Interestingly enough, in this period, foreign direct investments (mainly from sale of enterprises and banks) also amount to approximately 15 billion Euros. Borrowings of industry abroad (and of other sectors) *make up for* the lack of national savings (accumulation), which results in the soaring of foreign debt.[13]

Table 3. Structure of foreign debt per sectors (in millions EUR)

Indicator	2001	Structure	2012	Structure	Change 2001-2012
Public sector	10.256	93,5	10.900	42,4	+644
(NBS)	309		1.596		1.287
SPU	-		453		453
Short-term	150		-		-150
Enterprises	607	5,5	9.930	38,6	+9.323
Long-term	38		9.832		+9.794
Short-term	569		98		-471

13 Đurić, D., Živkov, D., Kolar, S. (2011): *Problemi fiskalnih neravnoteža i mogući rizici koji proizilaze u postkriznom periodu*, Ekonomika poljoprivrede, vol. 58, br. 2, pp. 299-309.

Indicator	2001	Structure	2012	Structure	Change 2001-2012
Banks	105	1,0	4.891	19,0	+4.786
Long-term	10		4.277		+4.267
Short-term	95		614		+519
Total debt	10.968	100	25.721	100	+14.753

Source: Public Finance Bulletin, December 2011, pp. 21, table 8 for 2012 according to the balance at the end of October.

The Table 3 shows that during the analysed period, enterprises used approx. 10 billion Euros of long-term loans, whereas banks used 5 billion Euros. That amounts to approx. 15 billion of ''additional" accumulation (savings) for investment financing. Simultaneously, the income of 20 billion Euros was realized by foreign remittances and 17.5 billion Euros by regular net foreign loans. In the analysed period, this amounts to approx. 53 billion Euros or almost 70 billion Dollars. That kind of capital inflow and domestic investment credit in the period 2001-2012 produced a modest average growth rate of approx. 3% and gross investment rate of 16.7%. The main concern regarding these data is that they do no show the type of investments and which sectors they targeted. It is often emphasized in public that the amount of foreign investments required to achieve the economic growth rate of 6-7% is between 3 and 5 billion Euros per annum.[14]

If the growth of gross domestic product had been higher, the share of investments in GDP would have been adequately lower. It is considered that the required and desirable gross investment rate should be above 25% of gross domestic product. However, there are at least two questions to be asked regarding this issue: (a) since investments are actually modest, what happened to such large sources of investment funds and (b) what happened to depreciation in such financing system? If we include depreciation funds in financing, with their share in gross domestic product of between 14% and 16%, then net investment rate above depreciation is between 2.2% and 4.2%. Net investment rate is rather low, while total employment was reduced by 400 thousand of then employed persons, and if we consider industry, that number was 555 thousand. The unemployment rate in that period increased from 12.8% in 2001 to 23.7% at the end of 2011, and approx. 26% in 2012.

It should be emphasized that the structure of loans granted to enterprises is unfavourable and it cannot be attributed to a bigger impact on dynamization of economic growth. Namely, the amount of 1.9 billion Euros accounts for financial intermediation, 2.1 billion Euros relates to real estate business and rental while 1.7 billion accounts for trade. Processing industry accounts only for 935 million (food and beverage industry taking almost a half).[15]

Movement of investments in Serbia in the last decade of its development, especially of gross and net investments as well as total investments in capital assets, are shown in the following table (calculated according to different publications).

14 E.g.: *Postkrizni model ekonomskog rasta i razvoja Srbije 2011-2020*, Ekonomski institut - MAT i Ekonomski fakultet – FREN, avgust 2010, pp. 48.

15 Bulletin Public Finances no. 12, 2011, pp. 21 and October 2012.

Table 4. Investments in capital assets (amounts in billion RSD)

Year	Investments in capital assets	Gross investment rate	Depreciation in GDP (%)	Net investments	Net investment rate
2001	81,5	19,4	15,6	-40,7	-5,2
2002	120,4	11,8	14,3	-25,3	-2,3
2003	188,6	16,1	13,9	25,4	2,2
2004	253,3	17,7	15,4	33,3	2,3
2005	303,8	17,3	15,1	38,7	2,2
2006	379,8	19,7	13,7	89,8	6,0
2007	448,1	24,3	18,5	125,3	10,8
2008	532,4	23,8	14,8	138,5	9,0
2009	510,2	16,2	14,6	114,1	1,6
2010	522,8	14,8	15,1	51,8	-0,3
2011	482,6	12,6	...	...	...

Source: SGS 2012, Table of investments and GDP, Public Finance Bulletin, No. 4, 2012

Gross investment rate in the period of new financial crisis drops significantly from 24.3% in 2007 to 12.4% in 2011. This includes net investments, as well. If we consider inflation rate, which in particular years was two or three times higher than depreciation rate, it is clear why real investment value has been decreasing in the past years. Therefore, in the process of investing and very slow and sluggish development, the capital is not replenished; instead, its value melts down and decreases.[16]

Foreign direct investments and portfolio investments

Foreign direct investments (FDI) include the control of domestic residents over an enterprise acting as a foreign resident. This concerns the acquisition of control over an enterprise abroad.[17] According to the Economy Development Programme in Serbia from 2009 until the end of 2012, the expected amounts of foreign direct investment are the following:

	Planned	Realized
- in 2009	1.200 million EUR	1.373 million EUR
- in 2010	1.500 million	860 million
- in 2011	1.800 million	1.514 million
- in 2012	2.200 million	800 million

Direct investments and portfolio investments are not defined.

16 Komazec, S. (2010): *Inostrani kapital – razvojni doping ili dužnička kriza*, Asterix, Beograd, pp. 182, 241.

17 Kovačević, R. (2000): *Strane direktne investicije i međunarodno tržište kapitala*, Jugoslovensko bankarstvo, br. 3-4, pp. 3-24.

The following data, provided in the table below, indicate whether FDI increased the supply of funds and launched total investments and what is their share in total investments and gross domestic product.

Table 5. Foreign direct investments, gross domestic product and gross domestic investments (in millions of RSD, foreign currency according to current exchange rate)

Indicator	2005	2006	2007	2008	2009	2010	2011
Gross domestic product	1.887	1.962	2.277	2.601	2.713	2.987	3.293
Gross investments in fixed funds	303	380	448	533	510	523	483
Net investments	39	90	125	122	114	52	...
Gross investment rate	17,3	19,7	24,3	23,8	16,2	14,8	12,4
Net investment rate	2,2	6,0	4,5	9,0	1,6	-0,3	...
FDI	215,7	259	127	192	137	86	151
FDI share in GDP	6,1	14,8	6,2	5,4	4,8	2,9	4,5
FDI share in gross investments	32,0	52,0	22,0	31,0	26,8	16,4	31,0

Source: Table compiled by the author using numerous issues of NBS Bulletin and Public Finance Bulletin.

In the period 2005-2011, foreign direct investments in Serbia amounted to 13.7 billion Euros. In the structure of foreign direct investments, the biggest investments were in financial sector (37%) due to capital increase in banks followed by investments in services and telecommunications (29%), whereas FDI in industry amounted to only 18% (primarily owing to privatization of enterprises). While in 2008 our economy saw a FDI inflow of 1.824 million Euros or 2.572 million Dollars, in the same year, the inflow of Slovakia was 13 billion Dollars, the Czech Republic 11.4 billion, Poland 7.7 billion, and Hungary 6.8 billion. From 1994 to 2008, Hungary attracted approx. 64 billion Dollars of FDI.[18]

In the analysed period, the share of FDI in gross domestic product was between 2.9% and 14.8%, i.e. 6.4% on average, for the whole period. The share of FDI in gross investments ranges from 16% to 52% depending on the year and approx. 30% considering the whole period. That basically means that domestic savings practically disappeared from investment financing system (save for depreciation).

In order to gets a clearer picture of their class in investment financing in Serbia, and to simultaneously exclude exchange rate fluctuations, they are provided below in foreign currency.

18 International Monetary Fund, *World Economic Outlook*, October 2012, www.imf.org/external/pubs/ft/weo/2012/02/weodata/index.aspx

Table 6. Share of foreign direct investments in gross domestic product and gross investments (in million EUR)

Indicator	2005	2006	2007	2008	2009	2010	2011	2012
GDP	20.365	23.305	28.468	32.668	28.883	29.024	32.993	30.074
FDI	1.250	3.323	1.821	1.824	1.373	860	1.514	800
Share of FDI in GDP	6,1%	14,8%	6,2%	5,4%	4,8%	2,9%	4,5%	2,7%
Share of FDI in gross domestic investments	32%	62%	22%	31%	26,8%	16,4%	31,0%	...

Source: Ministry of Finance of the Republic of Serbia, Public Finance Bulletin, no. 101, January 2013

The lies in a very adverse structure of FDI, since *Greenfield* investments (investments in building new facilities) have almost a symbolic share. Foreign capital enters Serbian economy usually through privatization of existing enterprises and banks. *Greenfield* investments are the initiator and stimulator of economic development[19], although so far, there have been but a few. Therefore, these investments mostly went to the purchase of state and socially-owned capital through privatization.[20]

Portfolio investments are a form of international investments where primary motive of investor is not a control over an enterprise but the generation of income. The difference between direct investments and portfolio investments is essential.

The sole motive of a portfolio investor is constant income generation from the capital invested in security purchases (of companies, government, insurance companies and the like). Those are fixed-interest securities. It all comes down to „cutting out coupons“from their securities. Portfolio investor and depositor are driven by almost the same motivation. Unlike direct investor, portfolio investor does not strive to directly develop business and capture the market.[21]

Table 7. Portfolio investments in Serbia (in million EUR)

Indicator	2007	2008	2009	2010	2011	2012
Assets	-3	-28	-5	-30	67	57
Liabilities	682	-63	-46	69	1.552	0
Portfolio investments – net	679	-91	-51	39	1.619	57

Source: NBS, Statistical Bulletin, January 2013, table 14a

Portfolio investments are uncertain and quite variable additional source of financing, especially since they are closely risk-related. So far, in investment policy and attraction of foreign capital, portfolio investments have had a modest, almost symbolic character, save for 2011 (bond issue in Euros to cover budget).

19 Kindlberger, Č. (1998): *Međunarodna ekonomija*, Beograd (prevod), pp. 411.

20 Horvat, B. (2008): *Dinamičan ekonomski rast*, Evropski centar za mir i razvoj, Beograd, pp. 242-244.

21 Group of authors: *Tržište novca i kapitala*, VBPŠ, Beograd, 2010, pp. 260, 262.

Capital inflow and sources of investment financing

In the last decade of development Serbia has seen an inflow of about 80 billion Dollars (64 billion Euros) for various purposes. Foreign direct investments amount to as much as 14.7 billion Euros; investment portfolio to 2.9 billion Euros; inflows from privatization (liability-driven investments) to 1.3 billion Euros; net use of investment loans abroad 45 billion Euros, and when debt amortization is deducted, this amounts only to 14.8 billion Euros (of which 9.9 billion in economy sector and 4.9 billion through banking sector); domestic investment loans 11.4 billion Euros. This totals (without remittances from abroad which we do not treat as investments but as current spending) to about 44 billion Euros (with remittances from abroad the total inflow amounts to 64 billion Euros). Namely, in this decade, the remittances have accounted for about 20 billion Euros; on account of donations there have been 1.8 billion, however, we did not include them into investment potential. When all of the aforementioned is taken into account, for all purposes, this totals to 65.8 billion Euros.

Naturally, here it will be reasonable to ask a couple of questions: (1) Where did this large redirection of assets end up? (2) Where did, in all of that, economy accumulation disappear? (c) What happened to funds for depreciation purposes in economy which, in these ten years, amounted to about 25 billion Euros? If gross investments in capital assets (without reserves) are estimated to about 50 billion Euros in this decade, this means that a considerable portion of own funds (for amortization) has been channelled to the current spending.

The issue remains whether such amount of gross investments (their technological, economic, regional and other structure are not known) could start economic growth and address the issue of high unemployment rate i.e. find the way out of the developmental crisis. Since the noose of foreign debts is tightening, with high liabilities arising from debs, a considerably higher rate of economic growth is required to loosen this debt noose, duly service debts and gradually generate financial surplus and savings for domestic investment funding. The rate of economy self-financing is extremely low. All of the aforementioned requires a general swing in the development-generating investment sector, both in complex analysis of investments and combining the sources of financing with the analysis of investment effects.

Conclusion

Foreign capital in the financing of economic development and gross domestic investments can only be a supplementary and not the main source of financing. As foreign capital is driven by its own interests, no national economy has managed to develop solely based on the import of foreign capital:

- capital generates an increasing dependence on both new capital import and the total import of debtor country;
- capital draws more profit compared to the country of origin or other countries;
- in already highly indebted countries the utilization of capital is often connected with political give-and-take policies, blackmails and the like;
- more often than not, in addition to being profit-driven, capital additionally counts

on the exploitation of natural resources of the debtor;
- exodus of capital is very common, particularly in countries where there is high political and financial risk;
- foreign capital often enters into lucrative activities leading to development disproportions.

In its macroeconomic policy, Serbia has chosen an open economy model for commodity and financial capital. High credit and capital dependency from foreign creditors has been created in both public and private sector. The share of foreign capital in the financing of domestic investments is high as well as liabilities for utilized capital, which has created a highly indebted economy. Domestic savings participate in investment financing with a small percentage, except through foreign bank loans where foreign savings are concentrated. In addition, economy has an increasingly lower rate of gross investments, whereas in some years disinvestment has been recorded in connection with net investments. Emergence of financial crisis has produced gradual decline in foreign capital inflow. Due to inadequate investment structure investment effectiveness drops, economic growth rate slows down and unemployment is on the rise.

Since there is no long-term development strategy which would make investments the main lever of dynamization, modernization and change in development structure, it is only natural that the concept for the creation of structure of required investment funding sources is lacking. Development model and the funding concept of selected projects must be fundamentally changed. The utilization of foreign capital and taking foreign loans must take into account all the aforementioned factors, particularly the control of capital utilization, terms and effects of its use as well as the effects the accumulation outflow has on the economy.

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IZVORI FINANSIRANJA INVESTICIJA I NJIHOV UTICAJ NA EKONOMSKI RAST REPUBLIKE SRBIJE

AleksandraTešić[22], Dragan Ilić[23], Rajko Tepavac[24]

Rezime

Cilj rada je da ukaže na važne probleme investiranja u Srbiji, s posebnim naglaskom na činjenicu da investicije nikada ne mogu biti cilj ekonomskog razvoja, one su samo generator privrednog razvoja, njegovog tempa, strukture razvoja i stabilnosti. Imajući u vidu ove stavove, istražuje se povezanost visine i strukture investicija i ekonomskog rasta, ponašanje investicija kao dela globalne tražnje i potrošnje u funkciji ukupne potrošnje, zavisno od ekonomskog ciklusa i njegovih faza.

U razradi efekata investicija i njihovog finansiranja na ekonomski rast privrede Srbije, korišćene su relevantne studije i članci, kao i izveštaji i publikacije nadležnih institucija. Rezultati analize ukazuju na krizu investiranja i metodâ njihovog finansiranja u Srbiji, koja se kumulira već niz godina, sa sve većim inostranim dugom po osnovu dominantno eksternog finansiranja investicija. Osnovni zaključak je da je za svaku privredu od strateškog značaja programiranje i praćenje potrebnih investicija, njihove ekonomske, tehničke i regionalne strukture, ali i sistema finansiranja.

***Ključne reči**: ekonomski rast, strane direktne investicije, portfolio investicije, štednja.*

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Review Article

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ORGANIZATIONAL AND ECONOMIC CHARACTERISTICS OF PRODUCTION AND MEAT PROCESSING COMPANY

Dragić Živković[1], Zoran Rajić[2], Sreten Jelić[3], Mersida Jandrić[4]

Summary

This paper presents the organizational-economic features of production and processing of meat in one of the leading companies in manufacturing and processing of meat in Serbia. Merge the relations that are related to organizational –economic, technical and technological segment.

Key words*: organization and economics of meat production, production conditions and results.*

JEL: *Q13*

Introduction

The production of meat in Serbia is approximately 450,000 tons, and the number of registered slaughterhouses varies between 900 and 1000. Production has stabilized in recent years, although the capacities of slaughter facilities due to technical obsolescence and inability to fulfill the standards are unused. A few years ago there were 1100 slaughterhouses which employed 25,000 employees in Serbia *(Tomić et al, 2007)*. Reducing meat production in recent decades is the consequence of reducing the number of livestock and poultry, but even more of the trading volume. The presence of Serbia in the international meat market is symbolic and amounts 0.17% *(Đorović et al, 2010)*. The company's main activity is manufacturing and processing of meat from a wholesaler from which coordinates the work of six regional offices. Founded as a small artisanal meat processing plant today is one of the most advanced and most modern slaughterhouses in Serbia and the Balkan. The company is fully implemented HACCP system. Policy of quality is based on the principles of respect for customer requirements, compliance with

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laws, regulations and standards of products and services, improve partnership relations, the application of modern technologies to improve working process, and development of new products as well as increase productivity and profitability, raising the level of knowledge and the establishment, maintenance and continual improvement of quality management system. The processing capacity is 60 tons per day, and every day throughout Serbia is exported 30 tons of meat products. From the beginning until today, the company is privately owned. Production program includes 180 products (durables and semi). Product placement is done through its own 22 stores and six distribution centers all over Serbia (Bačinci, Belgrade, Kragujevac, Nis, Požarevac, Užice, and are opened a representative offices in Montenegro, Serbian Republic and the Republic of Macedonia).

Materials and working methods

The subject of study is the operations of the company, by concentrating on organizational and economic conditions, organizational structures, the most important trade goods, total income, value of production, labor costs, financial results, economic principles of business, level of mutual integration of organizational units and economic aspects of production. Shown relations refer to the organizationally-economic, technical and technological segment in order to encourage positive developments. In the research are applied standard methodological procedures (indices, comparisons, tabulation, calculating methods), methods of analysis and balance calculated indicators of business success. For the preparation of paper are used business reports of the company for the past two years, internal and internet company presentation, rules of quality management, consultation with relevant managers and appropriate literature sources.

Research results with discussion

Manufacturing and meat processing plants company started in 1993 year and is located in Srem. Its path of development is constantly preceded upwards. Year 2003 was critical in the development and market success of the company. Then were started new capacities, and with the purchase of the latest technology, the process of obtaining more durable goods was at the highest level. Business risks are thereby completely excluded. In that year was produced a total of 1.287 million kg of pork and beef and 2.998 million kg of processing meat. In the years when economic activity was taking place in difficult conditions (loss of markets, war, destroyed the monetary system, hyperinflation, etc.), the company was able to maintain a leadership position in the market. The company has, due to increased demand and market expansion, increased investments in equipment and infrastructure. Currently has in its possession 5993 m2 under buildings, 1372 m2 of vacant buildable land and 14,588 m^2 of agricultural land. Vehicle fleet consists of four freight cars "Mercedes", 9 passenger vehicles and 10 commercial vehicles. Reliability of the production process is based on strict implementation of HACCP system. Its implementation has led to the construction of so-called. "Logistics warehouse" with a capacity of 30,000 kg. Meat and meat products production is characterized by a multi-stage production process. Primary goals of production function are providing appropriate product quality, eliminating

the bottlenecks and optimization of production process *(Mladenović et al, 1997)* .Total production for products or groups is shown in Table 1.

Table 1. Meat and meat products production (in kg)

Production	Year (kg)	
	I	II
Fresh meat	1.648.000	1.805.000
Meat products	5.599.000	5.900.000
TOTAL	7.247.000	7.705.000

Source: internal documentation

In total meat production, fresh meat participated with 23.43% and meat products with 76.43% *(Munćan et al, 2004)*. Realization of fresh meat and meat products in domestic and international market is shown in Table 2.

Table 2. Fresh meat realization

Realization	Accomplished (kg)		Structure (%)	
	I	II	I	II
Fresh meat				
Domestic market	1.556.910	1.754.001	100.00	98.11
Foreign market	0,00	33.782,45	-	1.89
Total realization	1.556.910	1.787.784	100.00	100.00
Meat products				
Domestic market	4.699.869,69	4.938.668	93.88	85,09
Foreign market	306.443	865.091	6.12	14.91
Total realization	5.006.312	5.803.759	100.00	100.00

Source: internal documentation

Total sales of fresh meat in second year compared to the previous, increased for 15%, although realization of fresh meat in domestic market decreased by 1.89%. Total realization of processed meat products category increased by 16%, and realization of domestic market decreased by 8.79%, while the implementation of the international market increased from 6.12% in the first to 14.91% in the second year. In total sales fresh meat attended by 23% and meat products with 77% (data relating to the second year). The company besides owning its own retail network also finds its way to customers through a system of wholesale and retail of various market chains. The structure of total income as the sum of the commercial, financial and other income is shown in Table 3.

Table 3. The structure of total income (RSD)

Income	Accomplished		Structure (%)	
	I	II	I	II
1. Business income	1.475.796	1.533.873	97.02	97.29
2. Financial income	1.326	35.885	0.09	2.28
3. Other income	43.952	6.795	2.89	0.43
Total income (1+2+3)	1.521.074	1.576.553	100.00	100.00

Source: internal documentation

The largest percentage of revenues consist of revenues from regular operations, or in the structure of total revenue, operating income in both years are over 97%. Most of the commercial revenues were generated through sales of finished products. Revenue from sales in both years, nearly 99%. Other income has little involvement in operating income. In the structure of total expenditures largest percentages (95.72%) occupy operating expenses (Table 4).

Table 4. Structure of total expenditure (RSD)

Expenditure	Accomplished		Structure (%)	
	I	II	I	II
1. Business expenditure	1.438.918	1.482.215	94.99	95.72
2. Financial expenditure	67.526	59.647	4.46	3.85
3. Other expenditure	8.340	6.596	0.55	0.43
Total expenditure (1+2+3)	1.514.784	1.548.458	100.00	100.00

Source: internal documentation

The highest percentage in the structure of direct costs occupying the cost of materials (74.32%), followed by wage workers whose number is reduced from 14.07% to 10.61%. Depreciation costs do not exceed 2% and of energy costs 9%.

Table 5. Structure of direct costs

Elements	Amount in 000 dinars		Structure (%)	
	I	II	I	II
Material	979.876	1.101.596	68.10	74.32
Fluid and Energy	102.775	126.922	7.14	8.56
Workers wage	202.385	157.276	14.07	10.61
Costs of sold goods	125.857	68.862	8.75	4.65
Depreciation costs	28.025	27.559	1.95	1.86
Total	1.438.918	1.482.215	100.00	100.00

Source: internal documentation

Review of the financial results based on income statement, where according to the Accounting and Auditing Law, and its amendment, the income and expenses of operations are segmented on business income and expenses, financial income and expenses and other income and expenses *(Rodić et al, 2003)*. The aim of reviewing the financial result is the assessment of financial result as a difference of two opposite flow of income and expenses. As task

analysis are given: Analysis of the structure of financial results; Analysis of risk factors in the achievement of financial results and threshold profitability. Such a breakdown of financial results provide information from which income group encourages financial results, as can be seen from Table 6 Total gross financial result was positive in both observed, but in the first year due to very high financial results from other income, while in the second year, was improvement in operating result. The financial performance analysis shows the speed of change in financial results and lower profitability evaluation points. In this analysis does not fit the other income and expense because they are temporary and part-time and as such cannot be the basis for achieving long-term financial results. This analysis includes operating income and expenses, financial income and expenses, and financial results from operations. The problem with this analysis comes in the parsing of operating expenses on a fixed and variable component.

Table 6. Analysis of Financial Results

Position	Amount in 000 dinars		Structure (%)	
	I	II	I	II
Business income	1.475.796	1.533.873	97.02	97.29
Financial income	1.326	35.885	0.09	2.28
Other income	43.952	6.795	2.89	0.43
Total income	1.521.074	1.576.553	100.00	100.00
Business expense	1.438.918	1.482.215	94.99	95.72
Financial expense	67.526	59.647	4.46	3.85
Other expense	8.340	6.596	0.55	0.43
Total expense	1.514.784	1.548.458	100.00	100.00
Financial result from business income	36.878	51.658		
Financial result from financing	-66.200	-23.762		
Financial result from other income	35.612	199		
Financial result from regular operating	-29322	27896		
Total gross financial result	6.290	28.095		

Source: calculation by authors

Factor of the total risk in the first year is very high with a minus sign for negative gross financial result or occur as a result of higher financial risk in that year. The percentage utilization of operating revenue for the realization of a neutral financial result amounts 87.24% in the first year, while the second was reduced to 4.43%. Although in both years, operating income percentage of utilization is very high it is good that follow the positive trend of decline, because as this indicator is more away from 100% achieving a risk of neutral financial result is lower. The elasticity rate of achieving a neutral operating results rose from 12.76% in first to 17.19% in the second year, which is also a positive trend, as the higher this rate, the less likely that the company will have negative operating result.

Table 7. Risk analysis of achieving the financial results and lower break-even point of profitability

Description	Amount in 000 dinars	
	I	II
Business income	1.475.796	1.533.873
Variable expenses	1.186.687	1.233.368,4
Margin coverage (1-2)	289.109	300.504,6
Fixed and mostly fixed expenses	252.231	248.846,6
Net financing expenses	66.200	23.762
Business result (3-4)	36.878	51.658
Gross financial result from operations (6-5)	-29.322	27.896
Total business risk factor (3/6)	7,83	5.82
Total financial risk factor (6/7)		1.85
Overall risk factor (8*9)		10.77
Percentage of cover margins in business income cover	19.59	19.59
Required business income for achievement of neutral business result	1.287.549,77	1.270.273,61
Required business income for neutral gross financial result	1.625.477.28	1.391.570,19
% of business income utilization for realization of neutral business result	87.24	82.81
The elasticity rate of achieving a neutral business results	12.76	17.19
% of business income utilization for realization of neutral gross financial result	110.14	90.72
The elasticity rate of achieving a neutral gross financial result	-10.14	9.28

Source: calculation by authors

Economic principles of operation are expressed through the following principles: 1) Labor productivity; 2) Production economy; 3) Business profitability.

Labor productivity is an effort to accomplish a certain production with minimal expenditure of labor, but at the same time the quality of the product remains satisfactory.

Table 8. Indicators of business success

Productivity indicators	Year	
	I	II
Productivity		
Gross profit/ Average number of employees	17.14	65.95
Net income/ Average number of employees	15.42	55.04
Economical		
Total income*100/total expenditure	1.004	1.018
Profitability		
Total income / Total engaged funds	2.46	1.98
Total engaged funds / Total income	0.40	0.50
Net income *100 / Total engaged funds	0.91	2.94

Source: calculation by authors

Labor productivity, regardless of the manner of calculation, was maximum increased by decreasing the number of employees, and only afterwards thanks to better business results.

Production efficiency shows a level of efficiency changes in the value creation process. It the level of useful effect of expenditure production factors in the manufacturing process. Slaughterhouse was operating on the border of efficiency, but better situation in second year of observation was a consequence of favorable operating result and significant increase in financial income.

Profitability is an indicator that shows the level of business enterprise cost effectiveness, as the ratio profit towards assets employed is greater profitability is higher and vice versa. Indicators of profitability from the point of slaughterhouse are good for with certain commitments were achieved better business results (index 125 and 323). The third indicator, otherwise surprisingly high, is a consequence of the very small net profit in the first year.

Conclusion

By its size this company is in a group of middle companies and operates in intensely competitive environment. The number of employees and the level of their qualification structure meet the needs of production and business processes of the company. Its production facilities are on satisfactory level, but the production volume in both groups had a trend of growth. The company operates in accordance with the requirements of the Law on Environmental Protection, and in accordance with quality systems ISO 9001:2000 and HACCP. The financial result for both years was positive, but in the second year increased by 46.66% compared to the previous year. Positive total gross financial result in the first year was a financial result due from other income, and in the second year from regular operating. Recommended measures of business policies are focused on increasing investment in marketing, approaching new products to customers, increasing the volume of production, the introduction of new standards and striving towards maximum rationalizing costs.

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ORGANIZACIONO-EKONOMSKA OBELEŽJA KOMPANIJE ZA PROIZVODNJU I PRERADU MESA

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Rezime

Suštinu ovog rada čine tumačenja organizovanja otrganizaciono-ekonomskih obeležja proizvodnje i prerade mesa u vodećoj kompaniji za proizvodnju i preradu mesa u Srbiji. Objedinjene su relacije koje se odnose na organizaciono-ekonomski i tehničko-tehnološki segment poslovanja.

Ključne reči: *organizacija i ekonomika proizvodnje mesa, uslovi i rezultati proizvodnje.*

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