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SUSTAINABILITY OF AGRICULTURE IN DANUBE BASIN AREA¹*Vesna Popović², Radojica Sarić³, Marijana Jovanović⁴***Summary**

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

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

JEL: *Q 01*

Introduction

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

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acceptable. However, the world's population continues to grow and change diet rapidly, so the food security issue once again comes to the forefront⁵. Scientists are looking for technological solutions to provide sustainable intensification of global agriculture based on *Producing more with less* model of increasing returns on existing agricultural land with environmentally suitable use of inputs.

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

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

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

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

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

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

Data and Methodology

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

Results and Discussion

Agricultural production systems and practices in Danube basin area

Much of the high quality agricultural resources and food processing capacities of the Republic of Serbia are concentrated in the Danube basin area (Popović *et al.*, 2011b: 380-386). The main indicators of agricultural development in selected municipalities⁶ of three different Danube farmland areas are presented in Table 1.

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

	UAA/ Total area, 2010, (%)	UAA structure, 2010 (%)			LU/ 100ha UAA, 2006	Agricu ltural popu lation, 2002, (%)	Culti vable land/ hold ing, 2002, (ha)	Holding population, 2002. (%)		Holdings with agri cultural and mixed incomes, 2002, (%)	Share of agricultu re ¹ in the NDP ² , 2005, (%)
		Arable land	Orcha rds & vineya rds	Mead ows & Pastu res				Over 50 years old	Prima ry edu cation, or less		
Upper Danube area											
<i>Sombor</i>	86.3	92.7	0.8	6.4	26	11.7	3.51	40.6	48.3	28.6	32.5
<i>Apatin</i>	69.9	89.4	1.0	9.6	14	9.2	2.07	43.4	46.2	22.5	18.9
<i>Bač</i>	73.7	90.1	0.5	9.4	14	18.4	4.14	39.9	53.6	35.5	51.6
<i>Bačka Palanka</i>	84.0	94.6	1.3	4.1	23	10.6	3.19	43.5	48.0	28.2	20.0
Belgrade – Novi Sad Metropolitan area											
<i>City of Belgrade</i>	67.8	80.4	9.1	10.5	41	2.3	1.72	43.9	41.8	18.9	3.5
<i>City of Novi Sad</i>	73.6	89.9	3.0	7.1	21	1.9	2.46	42.9	32.0	13.9	4.9
<i>Beočin</i>	47.4	61.6	9.1	29.3	33	6.6	2.59	37.6	50.6	23.0	8.9
<i>Irig</i>	76.4	82.3	8.6	9.1	23	19.6	3.58	41.4	54.6	38.8	82.4

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

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

¹Agriculture, hunting, forestry, water management, fishery; ² Net domestic product at city/municipality level; ³2004.

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

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

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

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

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

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

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

on the territory of the City of Belgrade⁷. Most of this land is located in Pančevački rit – the fertile alluvial terrace near the city core where a highly intensive production of field crops and vegetable takes place using hydro-meliorations. It is a great comparative advantage of Belgrade compared to other European cities. PKB corporation is the main supplier of raw materials for the developed food industry of Belgrade. The production of milk alone reaches 68 million litres per year⁸. The surroundings of Smederevo and the slopes of Avala, Kosmaj and Fruška Gora mountains are covered by orchards and vineyards, and the more numerous family owned vineries and distilleries for producing brandy made from fruits and grapes strengthen the infrastructure of the Wine Roads of the Danube basin area. Organic production of grain and industrial crops for processing, and organically produced fruits and vegetables, honey and medicinal plants and spices have good sales prospects in the market niches of Belgrade – Novi Sad metropolitan area. But, organic production is performed mainly at small family farms. Poorly equipped with organic inputs and insufficiently integrated into the food chain, they generate low profits and discourage new entrants (März et al., 2011: 8-13, 24). Organic agro-ecotourism in HNV oasis on the urban fringe offers particular opportunities for ensuring viability of small organic farms (City of Belgrade Ecological Ring project⁹).

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

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

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

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

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

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

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

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

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

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

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

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

Policy Framework for Sustainable Agriculture in the Danube Basin Area

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

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

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

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

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

Of special importance for sustainable agriculture in Danube area is the Community legislation on soil, water, pesticide and fertilizers management. Proposed Soil Framework Directive (CEC, 2006b), as an integral part of Soil Thematic Strategy (CEC, 2006a) aims to establish a common approach for the protection and sustainable use of soils by addressing the main causes of soil degradation – erosion, organic matter decline, salinisation, compaction, contamination, landslides and soil sealing. Water Framework Directive (2000/60/EC) aims to achieve good status in all bodies of surface water and groundwater by 2015 (2027 at the latest), through implementation of River Basin District Management Plans and Joint Programme of Measures¹⁰. Agricultural sector is observed as a source of organic and nutrient pollution, and the application of good agricultural practice will contribute to water as well as to soil protection. The Framework Directive on the sustainable use of pesticides stipulates that minimum requirements for Integrated Pest Management will become mandatory for all farmers at the latest by 2014, (Directive 2009/128/EC). Also, a proposal for a new *regulation on fertilisers* is expected by the end of 2012, (EurActiv, 2011).

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

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

¹⁰ Danube River Basin District Management Plan was established in 2009. (ICPDR, 2009: 51-85). EP 2012 (59) 1 (73-87)

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

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

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

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

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

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

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

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

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

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

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

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

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

Conclusion

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

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

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ODRŽIVOST POLJOPRIVREDE U PODUNAVLJU

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Rezime

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

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

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