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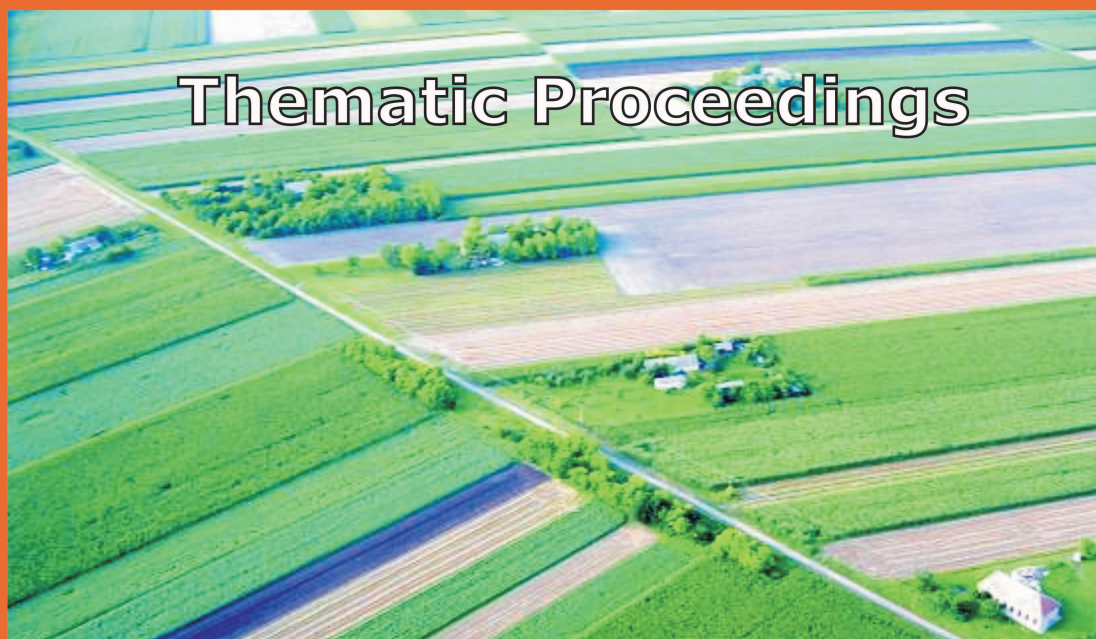
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FRUIT PRODUCTION AS A FACTOR OF RURAL AREA DEVELOPMENT IN SERBIA

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INTRODUCTION

Fruit growing as a specific plant production activity can contribute highly to the economic development of the region, which is particularly pronounced in upland areas. Environmental predispositions of these parts of Serbia provide them with certain comparative advantages over other areas, while, on the other hand, these areas are predominated by farms of chiefly mixed or fruit growing and livestock – farming type. In addition, long fruit growing tradition is generally the main characteristic of these areas. The most frequent and sometimes even crucial motives are the economic ones because fruit production can lead to considerably higher production values per hectare compared to common subsistence forms of farming, which often has a decisive effect on farms and fruit production intensification.

In agricultural land structure of Serbia the share of orchards is 4.7%, it is 6.8% in the central part of Serbia and in some upland areas it even exceeds 15% (the orchard proportion in the region of Cacak is 15.2%).

MATERIAL AND METHOD

Standard statistical methods and official and internal statistics data bases for the region of Serbia were used in the research. The analysis of fruit production by fruit species, total production and yield in Serbia, part of central Serbia and in the Moravicki District, was made to compare and study fruit production for the region of Cacak. Based on the analysis and a case study for the region concerned, current and future development trends were presented and methods of further fruit growing intensification by fruit species were focused on.

RESULTS AND DISCUSSION

Prior to analysing fruit production in Serbia, it is essential to underline that the fruit production development (the increase in total production and yield per ha) has a

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significant effect on the economic development of the region and is manifested through the well-known facts:

- a) the proportion of the fruit production value in the total agricultural production value is considerably higher than its proportion in agricultural acreage;
- b) fruit growing has an important economic impact for the total agricultural development of the region;
- c) fruit production development stimulates the development of processing capacities and further finalisation of fruit products;
- d) a high number of workers are being employed in the fruit production and processing sector (full-time and supplementary employment) due to the fact that fruit growing is a labour-intensive activity;
- e) a positive contribution is being made to a more thorough utilisation of agricultural land, particularly in the uplands, and a reduction in certain erosion types; and
- f) fruit exports gain substantial foreign exchange earnings and have a positive effect on the total trade balance.
- g) Fruit production covers entire Serbia and depending on environmental advantages and favourable agro-environmental conditions certain fruit species are the leading ones in certain regions.

According to the fruit production statistics for the 1999-2005 period, the distribution of fruit species in Serbia is as follows: plum 49.0%, apple 20.9%, sour cherry 9.0%, followed by pear 6.4%, peach 5.7%, sweet cherry 2.8%, apricot 2.7%, walnut 2.3% and quince 1.2%.

Based on the bearing tree number in Serbia the fruit species percentage is as follows: plum 51.6%, apple, 18.1 %, sour cherry 11.2%, pear 6.7%, peach 4.7%, sweet cherry 2.3%, walnut 2.2 %, apricot 2.0 % and quince 1.2 %.

As regards fruit species production in central Serbia the highest proportion is that of plum 54.5 % and apple 16.2 %, followed by sour cherry 9.1 %, pear 6.2 %, peach 5.2 %, sweet cherry 2.8 %, apricot 2.5 %, walnut 2.2 % and quince 1.3 %.

With respect to the bearing tree number in central Serbia plum has the highest share of 57.1 %, followed by apple 14.4 %, sour cherry 11.2 %, pear 5.8 %, peach 4.1 %, sweet cherry 2.3 %, apricot 1.8 %, walnut 2.1 % and quince 1.2 %.

It should be stressed here that in the fruit production in Serbia small fruit species, particularly raspberry, strawberry and blackberry, are rated very highly, whereas the production of other small fruits is of lower scope. Raspberry is produced mainly in well-known raspberry growing areas (of the region of Arilje, Valjevo,

Podrinje, Kopaonik etc.) at an area of about 15,000 ha with its production amounting to 78,500 t. Strawberry is cultivated on smaller acreages of about 8,700 ha and its production is 31,000 t. Blackberry production has experienced a substantial production increase in the last several years and its average production for the period analysed is about 18,000 t.

Fruit production in the central part of Serbia and the upland region as well, is mostly predominated by plum, apple, sour cherry and small fruit species. Other fruit species are also distributed but at a slightly lower rate than the former ones. The region analysed is mostly characterised by a high number of bearing trees which are frequently low-yielding trees or old orchards whose profitable production life has long terminated. Such a situation and a frequently low percentage of highly-intensive plantations in this region of Serbia lead also to relatively low average yields.

An average plum yield achieved is about 9 kg per tree or 3.3 t per hectare, which is far lower than the European average (Vlahovic et al., 2005). Similar yields are also produced by other fruit species due to a high number of bearing trees which are mostly extensive in growing character and which achieve low yields compared to the European average. As regards raspberry production average yields are also low, totalling 5.2 t/ha, and regarding strawberry, they are only 3.6 t/ha, as opposed to as much as thrice higher yields achieved in the intensive plantations.

Table 1 Apple production in Serbia over the 1999-2005 period

Region	Number of apple trees		Production in tons		Yield per tree in kg	
	Average	CV	Average	CV	Average	CV
Republic of Serbia	14,433,849	2.1	175,772	30.1	12.2	29.7
Central Serbia	9,805,889	2.4	111,200	29.3	11.4	28.6
Vojvodina	4,627,960	2.0	64,572	34.9	13.9	34.3
Moravicki District	757,042	3.4	8,651	38.8	11.4	38.9
Cacak Municipality	289,845	10.5	3,972	36.7	13.7	33.6

The highest share in fruit production in Serbia is that of plum, followed by apple. Tables 1 and 2 analyse some parameters of the production and simultaneously give a comparative overview of the production for different regions. In the Moravicki District, the Municipality of Cacak as the greatest fruit producer has had a leading role in fruit production, alongside the municipalities of Gornji Milanovac (with predominating plum, apple, and other fruit production), Lucani (small fruits, apple, plum, etc.) and Ivanjica (small fruits predominating over other fruit species).

Table 2 Plum production in Serbia over the 1999-2005 period

Region	Number of apple trees		Production in tons		Yield per tree in kg	
	Average	CV	Average	CV	Average	CV
Republic of Serbia	42,882,077	1.1	398,930	36.1	9.4	36.1
Central Serbia	40,154,580	0.9	363,259	36.8	9.1	37.4
Vojvodina	2,560,831	1.7	35,671	30.2	13.9	39.6
Moravicki District	3,026,907	3.4	26,241	37.2	8.7	37.1
Cacak Municipality	1,095,355	5.9	10,688	36.5	9.8	36.1

Source: Republic Statistics Bureau, Municipalities in Serbia

Owing to its characteristics, the region of the Municipality of Cacak can be considered a good example of analysing fruit production in the rural regions of Serbia. It is characterised by hilly, upland but also lowland areas along the Zapadna Morava River. In the Municipality, there is a substantial percentage of rural population (about 35 % of the total population) living in 56 villages, each engaged in fruit production to a greater or lesser extent.

Agricultural farming is organized on 12,865 farms, which is the total number in the region of Cacak according to the 2002 census (Table 3). The statistics show that the number of individual farmers has decreased, the number of farms without individual farmers has increased, meaning that the farms have earned their income from off-farm activities.

The data show that in the region of Cacak the most numerous farms are non-agricultural ones, amounting to 8,500, followed by 2,081 agricultural farms, 1,828 mixed-type farms and 456 ones without income.

Table 3 The number of agricultural farms and their acreage property

Region	Number of agricul. farms	Acreage property in ha			Used land in ha		
		Total	Arable	Average	Total	Arable	Average
Moravicki District	31,448	128,139	64,701	2.06	129592	66,179	2.1
Cacak Municipality	12,865	32890	19,703	1.53	33.266	20,203	1.57

Source: Agriculture – 2002 Census of population, households and flats

Transition-related changes and property privatisation in the Cacak region have brought about loss of employment for some people, close-down of larger-scale companies and dismissal of surplus labour due to which the Municipality region

has active (capable of working) population that can be engaged in labour-intensive fruit production.

Fruit production in the region of Cacak takes place in the villages of the hilly to upland area (Vrncani, Jancici, Rosci, Miokovci, Gornja Gorevnica, Milicevci, Prislonica, Lipnica, Jezevica, Kulinovci, Loznica, Pridvorica, Banjica, etc.) well-known for their fruit production activities. Intensive orchards can be, however, also found in the villages of the lowlands (Konjevici, Zablace, Baluga, Stancici, Katrga, Donja Gorevnica, Vapa, etc.). It should be underlined here that apple production has “moved” from hilly to lowland regions in the past several years.

As a way of illustration, plum is grown in all 56 villages, and the total plum production is often not capable of satisfying certain more serious requirements with respect to exporting greater amounts of collected plum. The actual state of agriculture (unsuitable fruit varieties, great planting distances, training systems formed in an off-hand manner, low application level of basic cultural and pomological practices, lack of the irrigation system) is frequently the consequence of low intensification as well as lack of production organization. This results in very low fruit yields achieved in some orchards, including plum yields (3-4 t/ha), and the unsatisfactory fruit quality.

If modern growing technology in plum production with planting distances not exceeding 5 x 5 m is employed, yields of 16-25 t/ha can be achieved (Milosevic et al., 2007). Since Micic et al. (2005) report that in highly intensive plum orchards yields of 20-30 t/ha are produced; part of plum production in the Cacak region could be classified into highly intensive fruit production. A high difference in the yields obtained in plum plantations ranging from 3 to 25 t/ha indicates that this part of fruit production in rural regions of Serbia lacks organisation and control, orientation and, consequently, specific results.

The apple growing example is different from the plum growing one. Although there is extensive production here as well, it takes place at a very low scale and is focused mostly on the production for one's own needs. The greater part of this production is market-oriented, taking place in highly intensive plantations where modern cultural practices are used and excellent yields achieved (40-50 t/ha). This has resulted to a great extent from the existence of 2 associations of fruit, mainly apple, producers: The Association of Fruit Growers of the Cacak Region and the Association of Apple Producers “The Cacak Apple”. These two associations have contributed to better organisation of fruit production. The characteristic of apple production (similarly as with the plum) is that it mostly takes place on smaller acreages (very few apple plantations cover the areas over 3 ha, and the majority of growers produce apple on 0.5-2 ha). Through their association, these producers have become important market participants. They also owe their position to their engagement, with the support of the Ministry of Agriculture of the Republic of Serbia, in constructing an atmosphere-controlled cold-storage warehouse with the capacity of 12,000 t located on the main highway (the village of Baluga location)

in the vicinity of the majority of apple growers. The warehouse can, relatively rapidly provide all greater consumer centres with apple in this part of Serbia. Apple production has thus become exclusively market-oriented and is considered an important factor in the rural development of this part of Serbia.

The apricot as a fruit species can also become an important developmental factor. This fruit species is cultivated on a larger scale mostly in the hilly to upland region of the Municipality of Cacak. It is also characterised by lack of proper organisation methods, small farms and uneven and unstable yields. Certain localities, such as the villages of Miokovci and Prijedor are characterised by favourable agroenvironmental conditions for apricot cultivation. Furthermore, they have long apricot growing tradition, apply high level of cultural practices, produce high yields and excellent quality and have become recognised as 'the apricot region' in the Municipality of Cacak and on a much broader scale outside the Municipality. With the aim of improving apricot production management and organisation methods, 'The Apricot Days' event is going to take place in the village of Miokovci this year. The apricot can thus become an important recognisable 'brand' for these rural areas, facilitating their development.

Upland and rural areas of Serbia have the capacity to intensify the production of industrial fruit species (raspberry, blackberry, sour cherry) and make it an important factor of further development. The primary production of this fruit species is accompanied by the construction of processing facilities. In the region of Cacak there are 4 high-capacity cold-storage warehouses and a few low-capacity ones, whereas in Arilje (bordering on the municipalities of Lucani and Ivanjica), well-known for its raspberry production, the total number of cold-storage warehouses is about 35, 26 of which are cold-storage warehouses and about 9 are low-capacity ones (Petrovic et al., 2003). The pronounced small-fruit demand in the world market has induced changes in the structure of the fruit produced towards the decrease in plum and apple shares and increase in raspberry, blackberry, strawberry shares, which is particularly evident in Ivanjica and Lucani. There is often a huge lack of irrigation systems. Additionally, rapid introduction of standards is essential in this production, because the production is primarily designed for the Western European market and takes place in a very large number of mostly small-scale farms. Production, yield and quality increases would secure safer positions in the world market trade in these fruit species, producing more substantial and stable yields which would make a further contribution to the development of the rural regions in this part of Serbia.

CONCLUSION

Based on the fruit production analysis for the Serbian rural region examined, the following can be concluded:

Data on tree number, production and yields serve as an illustration of the distribution of certain fruit species produced, but extensive cultivation systems are still the predominating ones; Unfavourable fruit-tree age structure is prevailing; Yields per fruit tree or unit of area are low and very fluctuating; Numerous reasons (social, economic, technical) have brought about the small scale of fruit plantations;

Katar Singh (1999) identifies the main rural development determinants for life quality of rural population: natural resources, human resources (the employed), capital, technology, and institutions and organisations. The development of fruit production can possibly influence some conditions for better life in rural area.

Intensive fruit production development can result in the increased activation of available labour potentials and employment growth. The primary fruit production development affects other fruit production and processing segments, opening up the potential for the development of the rural areas, which can have an economic impact on poverty reduction and living standard increase. Up-to-date intensive fruit production involves environmental improvement and preservation with fruit production as part of multifunctional agricultural production.

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