

DETERMINANTS OF FAMILY FARMS IN THE REGIONS OF SERBIA

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Abstract

The paper analyses family farms as important subjects in agricultural production in the region of Sumadija and Western Serbia, Eastern and Southern Serbia and the region of Belgrade, where 76% of the total number of family farms in Serbia are situated. Most family farms have a mixed production. The survey comprised 516 family farms in these three regions. The authors used different methods, including questionnaires, analyses, syntheses and deduction. Moreover, the authors used the publications issued by the Serbian Statistical Office and the data from the Census of Agriculture 2012. Family farms are main agricultural producers in these regions.

In general, farmers have a rather low level of agricultural and financial knowledge. These regions comprised 92% family farms with fruit production and 88% with livestock production.

The research has shown that surveyed farms are larger, have bigger production capacities and better infrastructure, as well as an additional source of income, when compared to most farms in these regions. Hence, the surveyed farms can serve as a representative sample.

Family farms are important subjects in agricultural production. They base their income on diversified agricultural production and specialisation of certain farm enterprises. The differences between the regions are quite expressed. Family farms have not fully achieved their potential. A better coordination of the Agricultural Advisory Service and farms is necessary to improve agricultural production and achieve better results.

Keywords: agriculture, determinants, family farms, regions.

Introduction

According to the data from the Serbian Census of Agriculture conducted in 2012, 99.5% of all farms in the Republic of Serbia are family farms. There are 628,552 family farms in Serbia, 76.8% of which are situated in three regions – Sumadija & Western Serbia, Eastern & Southern Serbia and the region of Belgrade – 41.7%, 29.8%, and 5.3%, respectively. These regions utilise 1,828,527 ha of agricultural land, which is 53% of all agricultural land in Serbia. Ninety-two percent of these family farms have fruit production, and 88% livestock production.

Agriculture plays a very important role in Serbia. On average, agriculture makes 10% of GDP, engages 21% of the total number of employees and makes 23% of total exports, thus being one of the most important sectors of the economic aspect (Jolovic, Njegovan, & Cavlin, 2014). An adverse farm ownership structure where small farms prevail, obsolete production technologies and outdated machinery, a lack of adequate infrastructure, irrigation and

draining systems, limited capacities and smaller amounts of money allocated to this sector than to others – these are all constraints that prevent agriculture from achieving its full potential (Njegovan, Filipovic, & Pejanovic, 2009); (Pejanovic & Njegovan, Current issues in agriculture and villages in the Republic of Serbia, 2009); (Bozic & Muncan, 2015) and some of them are main characteristics of family farms in Serbia.

It is important to perceive the potentials of Serbian agriculture from the social-economic aspect. Demographically, villages are emptying out. Some studies imply that in a couple of years one in four villages will lose its population. Rural areas have been experiencing a “demographic breakdown”, and there has been a decline in the number of people in many cities and towns in Serbia ever since the 2000s. A decline in farmer population has the main influence on the population structure. The share of active (employed) and the share of supported population have also been reduced (Jelic & Surculija, 2012). Pejanović and Njegovan (2009) in their research ascertain that demographic emptying out is particularly pronounced in villages remote from urban centres, or poorly connected with them (Pejanovic & Njegovan, Current issues in agriculture and villages in the Republic of Serbia, 2009). Sixty percent of the villages are losing their population in the process of emigration. Simultaneously, the process of de-agrarisation is also taking place.

The goal of this paper is to indicate the main determinants (number of household members, education of farmers, main and an additional source of income, equipment with basic production assets, irrigated area and financial literacy) of those family farms situated closer to major centres, with bigger farm machinery, a better infrastructure and easier access to information, from which one can assume they have better conditions for making sustainable production. Such farms are the target-group of this research. The results should serve as guidelines when helping farmers to make their production sustainable. The survey comprised three regions: Sumadija & Western Serbia, Southern & Eastern Serbia, and the region of Belgrade. A total of 516 family farms met all the aforementioned criteria and therefore were included into the survey, making a representative sample. The position of these farms is better than the position on a large number of farms that do not collaborate with PSSS (Agricultural Advisory Service of Serbia), primarily in terms of easier access to necessary information.

For having successful agriculture in any country, it is important to build institutions and professional services to support the development of the agricultural sector. This research was conducted with support of PSSS. The surveyed family farms have been collaborating with PSSS for years, and this is reflected in transferring new know-how and solving current issues farmers are facing.

Materials and methods

The subject-matter of this research is family farms in Serbia with their main characteristics. The research was conducted in 2017, comprising three regions in Serbia (Sumadija & Western Serbia, Southern & Eastern Serbia, the region of Belgrade), covering 344 villages in 83 municipalities. The survey was carried out by 73 data collectors (advisors) out of 167 advisors currently employed by PSSS and distributed in 21 offices that cover the whole territory of the respected regions (Institute for Science Application in Agriculture, Report, 2017). The advisors in PSSS actively and continuously monitor agricultural production of 3,005 family farms chosen according to the farm selection criteria (Official Gazette of the Republic of Serbia, 2014). By selecting these farms for the survey, the researchers covered the whole territory of the respected regions, and made proper sample dispersion, proportionally to the area and the number of farms covered by each PSSS, which resulted in

an approximate number of questionnaires needed for the survey. Thereby, they formed a homogenous sample compared to the results of the Census of Agriculture, as well as some mutually comparable regional indicators. It enabled the researchers to use a comparative method and synthesise the characteristics of the regions and the characteristics of the sample itself. The obtained indicators were analysed by using the method of quantitative analysis, where the researchers used logical connection between the indicators to draw conclusions. Field data were collected in a written form and then entered into computers and processed in Microsoft Excel.

The sample comprised 165 farms with predominant mixed crop-livestock production, 142 livestock farms and 43 farms with crop production. These three types of farms constituted 68% of the whole sample. The sample also comprised 99 farms with fruit production, 15 with fruit and wine production, 38 farms with vegetable production, 8 beekeeping farms and 6 farms with some other type of production.

The method of descriptive statistics was also used to analyse main characteristics of family farms, which made a starting point for getting a clearer picture of the situation and having better understanding of part of family farms in Serbia. This research also relies on the results of the Serbian Census of Agriculture 2012.

1. Results and Discussion

A total of 76.62% of family farms is situated in the region of Sumadija & Western Serbia, Southern & Eastern Serbia and the region of Belgrade. Table 1 shows the percentage of farms involved in the survey, given by the number of household members, and makes a comparison between the results of the survey and the Census of Agriculture 2012. Most family farms in Serbia are farms with one or two household members, whose agricultural production has an existential character, due to a lack of labour force. The survey comprised only 14% farms with 1-2 members, which is at the same time the percentage of such farms in the total number of farms monitored by PSSS. The average number of household members in the sample was 4.56, out of which 2.74 were constantly involved in farming activities. On the surveyed farms, labour force and potential for having additional sources of income were satisfactory.

Table 1. Farms by number of household members, according to the results of the survey and the 2012 Census (%)

Number of household members	Regions			Total sample	Census
	Belgrade	Sumadija and Western Serbia	Southern and Eastern Serbia		
1-2	8.57	14.29	14.42	13.95	65.00
3-4	48.57	32.60	37.98	35.86	30.00
> 5	42.86	53.11	47.60	50.19	5.00

Source: Results of the survey and the Census of Agriculture 2012

In 85.66% of cases, farm holders are men, 9.5% of which are older than 65. In the rest of 14.36% farms, farm holders are women, and 32.43% of them are older than 60. In the total sample, 12.79% of farms are farms of holders older than 65 (men) or older than 60 (women). The average age of the surveyed farmers is 48.69.

Table 2. Degree of vocational education, given by region and total for all three regions (%)

Vocational education	Regions			Total
	Belgrade	Sumadija and Western Serbia	Southern and Eastern Serbia	
With/without primary education	17.14	32.96	22.60	27.71
Secondary education	66.83	56.42	66.83	61.24
Agricultural/veterinary secondary school	5.71	8.79	9.62	14.06
Other secondary school	61.12	47.63	57.21	47.18
Faculty/College	16.03	10.62	10.57	11.05
Faculty/College of agriculture/veterinary	2.86	4.76	3.85	4.26
Other faculty/college	13.17	5.86	6.72	6.79
Total	100	100	100	100

Source: Results of the survey

The educational background of farmers is less favourable than the background of urban population. There is a much higher percentage of people with no education or with primary education in rural population than in urban, and a pronouncedly small percentage of people with college diploma or university education (Bogdanov & Babovic, Labour force and diversification of income on farms in Serbia-, 2012). Table 2 shows the educational background of the surveyed farmers. Most of the surveyed farmers have secondary education, about 61.24%. Only 14.06% of the total number of the surveyed farmers finished agricultural or veterinary secondary school. Farmers with only primary education or no education at all make up 27.71%, and a total of 88.95% farmers do not have university or college education. In the total sample, there were 4.26% farmers who had graduated from the college of agriculture, or the faculty of agriculture/veterinary. The data imply that only 18.32% farmers have vocational expertise in agriculture or veterinary, whereas most of them (14.06%) acquired that knowledge during secondary education. Moreover, one can see that in the region of Belgrade there are more farmers with a university / college degree than in the other two regions. Those farmers, however, do not have a degree in agriculture. Most farmers with no education or with primary education live in the region of Sumadija & Western Serbia. Bogdanov (2007) also points out that the educational background of members of farms with mixed production are more favourable when compared to those on farms with other, more specialised, types of production (Bogdanov, Small rural households in Serbia and rural non-agricultural economy, 2007). This sample mostly comprised mixed farms specialised, to a greater or lesser extent, in certain farm enterprises.

Petrović and Janković (2010) point out that the work of agricultural advisory services is focused on giving advice and information on using subsidies, taking loans, legislation, farm accounting and applying for national or international funds (Petrovic & Jankovic, 2010). Hence the sample was there to investigate farmers' activity of keeping track of expenses and income. About 91% of the farmers have been acquainted with farm accounting. Of the total number of the farms, 25% do not keep records of expenses and income, whereas 42% are not able to do it themselves and need help from a trained person, and in most cases, those persons

are advisors from PSSS. On the other hand, 33% of the farmers do the bookkeeping themselves. All the decisions they make in order to achieve economically efficient production are based on calculations of revenues and expenses of different farm enterprises. About 68% of the farmers make those calculations with the help of advisors, 9% make them without help, and other do not make calculations at all. What further supports these results is the fact that about 56% of the farmers have not undergone any training on book-keeping and analysing expenses and income, or making farm calculations. Farmers have not been trained to do these activities without help and make good business decisions. A quarter of all the surveyed farms has not been acquainted with business plans and their purpose, and business plans are necessary when applying for money from different funds. As for EU pre accession funds, 85% of the farmers have heard for these funds, and yet 65% of those farmers do not know how to apply for them. These results show that the farmers rely to a great extent on the help from advisors and they will need it even more when IPARD programme comes.

It is necessary to enable farmers to be as much independent and run a sustainable farm, relying on their own knowledge of the basics of financial farm management. This can be achieved by providing farmers with trainings on economic matters. Pejanović *et al.* (2013) mention that some advanced farmers have realised the necessity of updating their knowledge in order to be more competitive and therefore joined projects, such as FADN (Farm Accountancy Data Network) project. Participating in such projects, farmers can monitor their own business results, calculate and reduce costs by applying appropriate farming practices and keep financial records to have better insight in farm's cash flows, which can consequently improve their business (Pejanovic, Vasiljevic, Tomic, Ljiljanic, & Radisic, 2013).

At this moment there are not enough institutions in Serbia that would offer such service and charge for it. In such circumstances, a possible solution would be to expand the scope of work and activities of PSSS, an institution financed by the government, in order to further improve farm business. When introducing these new activities, experts from PSSS do not need to be included in all stages of the activities. Something can be done by farmers themselves or household members, and more complex activities should be done by advisors (Krstic, Jevtic, & Arsenovic, 2005). Advisors' help would therefore contribute to safer production, better quality, storage, processing and transportation of agricultural (Sindir, et al., 2008). In this regard, it is necessary to establish an adequate accounting and information system in order to record business change on farms and compile all the changes on the national level (Figurek & Vukoje, 2011). Experiences from some more developed countries confirm how important is to have different institutions and services that are actively and dynamically involved in the process of creation–research–education–information–transfer, therefore determining the direction of agricultural sector development (Krackovic, 2006). As mentioned, introducing latest technologies and high standards implies a high level of development, advanced agricultural sciences and technologies, as well as a developed system of education at all levels, as one of the most efficient form of knowledge transfer to farmers (Skoric, 2014)

Regarding farmers' income, what is mostly represented is income from farming, pension and wages (regular and seasonal work). Table 3 shows types of income, average number of hectares of use arable land and distance of family farms from the nearest regional center.

Table 3. Agricultural family farms: type of income, used arable land and distance

Type of income	Share of households in total sample (%)	Average used total arable land (ha)	Average used own arable land (ha)	Average used rent arable land (ha)	Distance from nearest city (km)
Income only from farming	50.97	13.9	8.40	5.47	13.46
Income from farming and pension	10.47	14.5	7.67	6.84	13.00
Income from farming and wage (private or government job)	33.33	10.8	6.86	3.90	11.34
Income from farming and other income (seasonal job, mechanization services...)	5.23	15.4	8.94	6.50	15.17

Source: Results of the survey

Half of the farms generate their income from agriculture, having production on about 14 ha, on average. The other farmers have an additional source of income – pension (10.47%), wages (33.33%) or other type of sources (5.23%). Being closer to larger centers enables farmers to generate higher income by having an additional job in the city, which is supported by the result of the survey. Wages are an additional source of income in 33.33% of the surveyed farms, and those farms are very close to cities. On the other hand, there are some farms, remote from larger centers that generate additional income by seasonal employment, leasing farm machinery, etc. According to the World Bank report (2007) on the Republic of Serbia, there are 43.5% of farms that have additional income – pension, wages or other forms of income (World Bank, 2007).

When it comes to production capacities, the results of the research show that many farms are under-equipped, but certainly better equipped than the majority of farms in Serbia. About 5.81% farms have a cooler or a drying facility, and 15.2% of farms owns a glass-house or a plastic glass-house (Tab. 4). Out of 284 dairy farms, 53.52% do not have milking equipment or have only a portable milking machine. Taking into account all these parameters, one can clearly see that most of family farms are under-equipped in terms of production capacities. Only 32.56% of the farms irrigate their plots, and not all of the plots, but 33% on average (Tab. 5). According to the Census of Agriculture conducted in 2012, only 14% of farms in these regions use the irrigation system. Having in mind the aforementioned indicators, it can be said that registered farms whose production is monitored by PSSS are more advanced and modern in terms of comparative criteria.

Table 4. Number of family holdings with coolers, drying facilities, glasshouses and poly-tunnels (%)

Buildings	Belgrade region		Sumadija and Western Serbia		Southern and Eastern Serbia		Total	
	Sample	Census	Sample	Census	Sample	Census	Sample	Census
Coolers	0.58	0.05	2.33	1.68	1.55	0.07	4.46	1.80
Drying facilities	0.19	0.04	1.55	0.14	0.19	0.1	1.93	0.28
Glasshouses	0	0.01	0.19	0.04	0	0.02	0.19	0.07
Poly-tunnels	0.39	0.30	8.14	4.61	6.40	2.98	14.93	7.89

Source: Results of the survey and the Census of Agriculture 2012

The surveyed farms have diversified production with four enterprises, on average. Primary production on most of these farms is characterized by unequal investments, use of uncertified seed (especially when it comes to wheat production) and reduced material investments. Technical assistance is especially required in primary production for timely implementation of farming practices. Only about 20% of farms process their produce and place final products in the market. Most family farms process milk, fruit or meat.

Table 5. Number of family farms with irrigated area (%)

	Belgrade region		Sumadija and Western Serbia		Southern and Eastern Serbia		Total (regions)	
	Sample	Census	Sample	Census	Sample	Census	Sample	Census
Family farms	0.97	0.42	17.64	6.45	14.15	6.53	32.75	13.39
Irrigated area	0.11	0.33	3.67	1.16	2.57	0.78	6.34	2.27

Source: Results of the survey and the Census of Agriculture 2012

Over the last couple of years, family farms have been forced to make the financial risks in order to finance their production. Some research has shown there are different levels of financial literacy among the farmers, which may have serious consequences on future (Campbell, 2006). Financing of agricultural production in Serbia in the entire period of transition relied on loans, since the budget allocated to agriculture was not big enough for current needs or for development, and farmers did not have enough savings to invest in their own production (Radovic, 2014). It is important to mention that farmers face certain difficulties when decide to take a loan to finance their production. Similar results have been recorded in some research on a related subject-matter conducted by the Institute of Agricultural Economics, comprising the sample of 286 farms (Parausic & Cvijanovic, Agriculture in Serbia- financial support programmes of the government and commercial banks, 2007). Farmers pointed out the following problems they faced:

- Unfavourable loan conditions with high interest rates and rather complicated administrative procedures;
- Fear from taking loans, for many reasons: insecure sale, late payments, no pre-agreed sales;

- Insufficient expertise when perceiving basic economic indicators of farmers' business. Those indicators should reflect the farmers' ideas and be incorporated into well-designed business plans, which are there to show the potential of the farm, and make it be taken more seriously when applying for funding.

Seventy-four percent of the total number of the surveyed farmers said they did not take loans to finance their production. Almost 85% of farmers were not burdened with loans at the time, and only 12% took a loan to finance their production. Half of the farmers wanted to invest their own money (mainly profits from farming) to expand production capacities. A total of about 49% of farmers planned to expand their production either by taking a loan or combining a loan with their own money. One tenth of that percentage goes to those farmers who finance production from their own sources.

Apart from the aforementioned problems, Paraušić and Cvijanović (2014) also point out some additional obstacles to development of these farms which farmers are oblivious to, such as undeveloped human resources (poor knowledge and skills, a low rate of entrepreneurship for introducing innovations, business expansion, no desire/interest in gaining knowledge or in cooperation) (Parausic & Cvijanovic, Economic size of holding in Serbia and measures for their strengthening , 2014).

Conclusions

The surveyed farms have 4.56 members on average and a significant potential to be engaged in activities that bring an additional source of income. Half of those farms have an additional source of income – wages, pension, or some other form of income, whereas others generate their income solely by farming – mostly diversified and specialised only in certain farm enterprises.

Secondary education is predominant among the surveyed farmers, 61.24%. With no education or with primary education is 27.71% of the farmers, and only 4.26% finished college or agricultural faculty. The region of Belgrade is a region that has a larger number of higher-educated farmers than the other two regions. Most of the farmers with no education or with primary education, live in the region of Šumadija & Western Serbia. A large number of farmers do not have the necessary knowledge or skills to run the existing production efficiently and economically.

Most farms are under-equipped, and only 20% of farms go to a higher level of product finalization, by processing milk, fruit or meat. The majority of the farms do not possess a necessary level of production capacities, but they are surely above average when compared to all farms in Serbia. About 53% of dairy farmers do not have their own milking equipment or they only have a portable milking machine.

A significant obstacle for the farmers is rather unfavourable sources of funding, in the first-place unfavourable loan conditions with high interest rates and rather complicated administrative procedures. Moreover, limiting factors are also insecure sale, late payments and no pre-agreed sales.

The Agricultural Advisory Service of Serbia is currently the most important coordinator and an indispensable subject in agriculture for achieving better results and creating sustainable farms. Farms have still not achieved their full potential. The surveyed farms collaborate with PSSS and therefore are in a better position than others, which mean they have easier access to agricultural knowledge and information, and better overall potential for running this type of business.

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