

Structural Changes in Agriculture: Implications for the Economy of the Republic of Serbia

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Abstract

Agriculture of the Republic of Serbia plays an important role in the national economy, making it significantly different from agriculture of developed countries. Its contribution to the national economy is reflected in a still significant share in the gross domestic product, total employment, and trade balance. Despite the insufficient utilization level of available natural resources, agriculture in Serbia is a backbone of the economic development of rural areas. The research goal of the paper is to examine structural changes in Serbian agriculture in the following aspects: changes in the employment structure, plant and animal production, as well as a change in the share of agriculture in the gross domestic product and trade balance of Serbia. The analysis has been carried out in the period from 2002 to 2017 based on the data of the Statistical Office of the Republic of Serbia. Research results show that the Serbian agriculture has suffered significant changes in the analysed areas, resulting in its decreasing share in the overall employment and gross domestic product, but also in the slight increase of its share in the value of exports and imports.

Key words: agriculture, structural changes, national economy, rural areas

Introduction

Agriculture has lately been exposed to significant changes caused by numerous factors. Years-long exploitation of agricultural potential for the purposes of contributing to economic growth has resulted in changes within the cross-sectoral level of the economy.

Furthermore, the changes have also taken place within the structure of agriculture itself. Nowadays, agriculture still represents a sector of significant importance in the economy of the Republic of Serbia and it is crucial in rural areas for improving the standard of living, alleviating poverty, providing markets for the industry and service sector expansion, as well as contributing to the economic development.

In spite of structural changes that led to industrialization, the agricultural sector still has an undeniable importance in the Serbian economy, with an impact on the overall economic development of the country. Structural changes in agriculture, rural areas and regions, as well as in economic activities related to the production and trade of agricultural products most often occur in response to periodic changes in general economic and political conditions (McMillan & Rodrik, 2011). These changes can be observed from the aspect of human, natural resources and agricultural production.

Structural changes can be considered as a result of a process in which economies show their ability to survive in conditions of high competition and respond to new market challenges (Alvarez-Cuadrado & Poschke, 2011).

Structural changes represent a change in the relative importance of economic sectors over a certain period of time, measured by their participation in the national product and overall employment (Ark, 1995). Given a whole set of factors that lead to a change at different levels, it is difficult to distinguish a single and unique factor as a driver of structural changes (Lu & Lin, 2013). Moreover, structural changes result as a combination of a number of determinants (Krstić et al., 2015).

Considering the significant economic and social role that agriculture has in the Serbian society, the authors primarily analyse changes in the structure of employees in agriculture and their relation to the total number of employees in Serbia, in the period from 2002 to 2017. Furthermore, the participation of agriculture in the gross domestic product and the balance of payments in Serbia are analysed, as well as changes in agricultural production, in plant and animal production, respectively. The data of the Statistical Office of the Republic of Serbia for the observed period were used as the information platform.

Structural changes in the agriculture of the Republic of Serbia

The employment structure in the agriculture of the Republic of Serbia

Despite the significant population outflow from rural areas in the last decades, Serbian agriculture continues to play a significant role in the employment of a large part of rural population.

In addition to the direct engagement of farmers in performing basic agricultural activities, agriculture indirectly ensures employment and the existence of a vast number of inhabitants. These are people who are not directly employed in agricultural production, but are engaged in production and trade processes and whose basic role is to enable the uninterrupted development of agricultural production (production of agricultural machinery, artificial fertilizers, etc.) (Dragin et al., 2010).

Migration of rural population from the agricultural to other sectors of the economy has left far-reaching consequences for agriculture and farmers. First of all, this was reflected in agricultural production itself considering that the outflow of farmers and thus a decline in economic activities should be compensated by higher productivity growth. Also, the outflow of rural population has demolished demographic balance in terms of age, education and gender, given that the remaining agricultural population is mostly elderly, female and with insufficient level of education (Raduški, 2009). As a result of an intensive process of industrialization and deagrarization in Serbia, women had dominant participation in the total number of active farmers in central Serbia at the end of the last century. Vojvodina is an exception given a dominance of cropping which mostly requires engagement of male workers (Todorović & Vojković, 1999).

The agriculture in Serbia still accounts for a large share of active agricultural population, which is well above average in developed countries. However, this participation has been reduced in recent years as a result of the outflow of agricultural population and the disruption of the age and gender structure of the remaining farmers (Subić, 2005). Decreasing number of farmers was evident even in the period of economic crises when agriculture mainly absorbs redundancies from other sectors. Despite a declining trend being recorded, this indicator is slightly higher than in other transition countries. The share of agriculture in the total employment in Serbia remains high, making Serbia one of the "most agricultural" European countries (Ministry of Agriculture, Forestry and Water Management, 2011). Reasons can be found in the unsatisfactory economic structure of the country and insufficient opportunities for the transition from agriculture to non-agricultural activities. In addition to Serbia, some European Union member countries have a similar employment structure with a large share of farmers in the total employment, such as Bulgaria, Romania, Lithuania, Poland, etc. (Ministry of Agriculture, Forestry and Water Management, 2009).

The number of farmers in Serbia has been reduced not only by their outflow to non-agricultural sectors, but also by insufficient interest of young people to engage in agriculture and the inability to achieve a competitive position on the market with the existing production methods.

Demand for labour in agriculture has been lowered due to the use of modern agricultural mechanization and new technology in food production, but there is also a growing diversification of activities in agricultural holdings in the direction of tourism, crafts and services (Ministry of Agriculture, Forestry and Water Management, 2013).

Table 1 shows the number of employees in agriculture within Agricultural production, hunting and related service activities, Forestry and logging, and Fishing and aquaculture, for the period from 2002 to 2017.

Tab. 1. Employment in agriculture in Serbia, for the 2002-2017 period

Year	Total number of employees in all sectors (agriculture, manufacturing, service sector)	Employees in agriculture	Employees in agriculture as % of total employment in Serbia	Agricultural production, hunting and related service activities	Share in total the employment in agriculture	Forestry and logging	Share in total the employment in agriculture	Fishing and aquaculture	Share in total the employment in agriculture
2002	1,676,835	80,888	4.82%	68,238	84.36%	7,457	9.22%	3,948	4.88%
2003	1,611,632	74,445	4.62%	63,276	85.00%	7,174	9.64%	2,884	3.87%
2004	1,580,140	70,073	4.43%	59,694	85.19%	6,179	8.82%	3,026	4.32%
2005	1,546,471	65,058	4.21%	54,523	83.81%	6,149	9.45%	3,215	4.94%
2006	1,471,750	59,395	4.04%	49,380	83.14%	5,782	9.73%	3,173	5.34%
2007	1,432,851	55,145	3.85%	45,578	82.65%	5,336	9.68%	3,177	5.76%
2008	1,428,457	49,528	3.47%	40,007	80.78%	5,252	10.60%	3,247	6.56%
2009	1,396,792	46,129	3.30%	36,872	79.93%	5,113	11.08%	3,107	6.74%
2010	1,354,637	37,392	2.76%	31,580	84.46%	4,767	12.75%	1,045	2.79%
2011	1,342,892	34,815	2.59%	29,142	83.71%	4,621	13.27%	1,053	3.02%
2012	1,341,114	33,002	2.46%	27,120	82.18%	4,838	14.66%	1,043	3.16%
2013	1,338,082	32,715	2.44%	26,849	82.07%	4,841	14.80%	1,025	3.13%
2014	1,323,831	31,288	2.36%	25,507	81.52%	4,771	15.25%	1,009	3.22%
2015	1,896,295	36,700	1.94%	28,832	78.56%	6,431	17.52%	1,438	3.92%
2016	1,920,679	33,313	1.73%	25,367	76.15%	6,556	19.68%	1,390	4.17%
2017	1,977,357	33,067	1.67%	25,100	75.91%	6,642	20.09%	1,325	4.01%

Source: Statistical Office of the Republic of Serbia (2005-2018). *Statistical Yearbook*.

Based on Table 1, the overall employment in Serbia gradually decreased from 2002 to 2014, followed by the same trend in agricultural employment. However, the number of employees in agriculture continued to decrease until 2017, while total employment showed a positive change. The number of employees in agriculture in the observed period was reduced by 47,821 workers. Their participation in the total employment in Serbia was reduced from 4.82% in 2002 to 1.67% in 2017. As for the employment structure, the majority of employees in agriculture (around 80%) are engaged in Agricultural production, hunting and related service activities. Employment in Forestry and logging as a share in the total employment in agriculture has been increasing over the years, from 9.36% in 2002 to 20.09% in 2017. Fishing and aquaculture include around 4% of employees in Serbian agriculture.

Crop and animal production in the Republic of Serbia

Crop production traditionally dominates in the total value of agricultural production in Serbia. The share of crop production is mainly around two thirds of the total value, while animal production accounts for one-third.

Table 2 shows the values of agricultural goods and services in Serbia from 2007 to 2017. All numbers are expressed in producer prices of previous periods and represent the physical volume of production.

According to the table, the volume of agricultural production in the observed period varies significantly, mainly due to adverse climate changes. The value of agricultural goods and services in 2008 compared to the previous year increased by 27%.

The period of slight volume growth continues after that, but in some years changes in the agricultural production value had a negative value (2009, 2012, and 2015). The highest growth was recorded in 2008, then in 2011 (12%), and the highest decrease in 2015 (-8%).

Considering its values, agricultural production achieved its maximum in 2016. Such movements are the result of large oscillations in the value of crop production since it accounts for two thirds of the total value of agricultural production. In the observed period crop production also reached its highest value in 2016. The highest growth in crop production was recorded in 2008 (28%), but also in 2010 (24%), while the remaining years recorded weaker growth, and even negative (2009, 2012, 2015) (Statistical Office of the Republic of Serbia, 2017). Table 2 also shows that the year in which the crop and total agricultural output reached the highest values is 2016 as a result of continuous growth (with slight oscillations) throughout the observed period.

Tab. 2a. Agricultural output at current producer prices in Serbia in the period 2007-2012, in mil. Dinars

Year	2007	2008	2009	2010	2011	2012
Agricultural output	330,174	417,832	407,851	466,811	519,959	502,684
Agricultural goods output	320,756	407,406	396,221	455,753	509,125	491,597
Crop output, total*	217,274	278,825	265,101	328,981	359,103	324,451
Cereals (incl. seeds)	90,749	134,575	110,384	146,733	175,221	138,325
Industrial plants	26,549	32,309	30,737	44,619	46,655	52,806
Fodder plants	12,761	14,147	14,586	17,601	17,184	18,693
Vegetables and horticultural products	22,585	24,879	28,753	42,903	27,246	28,986
Potato (incl. seeds)	8,318	8,314	9,747	17,695	17,870	12,342
Fruit	33,929	39,324	37,040	41,159	50,859	53,932
Vine	21,796	24,758	33,316	17,873	23,713	18,925
Other herbal products	587	521	538	399	355	443
Animal output, total**	103,482	128,581	131,119	126,772	150,022	167,146
Livestock	69,001	87,759	95,853	89,606	102,774	113,463
Cattle	21,439	24,736	26,669	24,797	29,059	31,377
Pigs	32,955	46,734	51,192	45,392	48,768	58,641
Horses	129	118	105	61	61	377
Sheep and goats	6,524	6,771	7,363	8,516	9,315	7,801
Poultry	7,954	9,401	10,523	10,839	15,572	15,266
Products of livestock pr.	34,482	40,822	35,266	37,166	47,248	53,684
Milk	25,352	30,397	25,480	26,943	34,212	36,777
Eggs	8,288	9,704	8,649	8,608	10,810	14,678
Other animal products	842	721	1,137	1,615	2,226	2,229

Source: Statistical Office of the Republic of Serbia. (2017). Economic accounts for agriculture in the Republic of Serbia, 2007-2017. Belgrade

* The value of crop production includes the production of cereals, industrial plants, fodder plants, vegetables and products of horticulture, fruit and other non-mentioned agricultural goods (Statistical Office of the Republic of Serbia (b), 2016)

** The value of animal production includes the production/breeding of livestock, poultry and other animals and livestock goods. The production of livestock goods includes the production of milk, eggs and other non-mentioned agricultural goods (Statistical Office of the Republic of Serbia (b), 2016)

Tab. 2b. Agricultural output at current producer prices in Serbia in the period 2013-2017, in mil. Dinars

Year	2013	2014	2015	2016	2017
Agricultural output	565,521	584,299	534,779	589,817	543,746
Agricultural goods output	552,078	569,276	520,965	574,817	529,890
Crop output, total*	378,832	390,747	351,927	419,400	357,056
Cereals (incl. seeds)	174,602	178,776	139,584	164,831	113,759
Industrial plants	51,487	54,392	48,500	58,939	58,443
Fodder plants	16,626	23,688	17,553	27,062	20,984
Vegetables and horticultural products	27,374	28,813	35,588	40,579	32,537
Potato (incl. seeds)	19,102	13,024	13,641	13,892	11,686
Fruit	61,567	56,879	73,669	74,991	76,995
Vine	27,534	34,621	22,794	38,568	42,111
Other herbal products	539	552	595	534	537
Animal output, total**	173,245	178,528	169,038	155,417	172,834
Livestock	118,892	123,133	111,012	104,280	120,477
Cattle	32,406	32,114	31,703	30,352	31,039
Pigs	60,982	65,764	57,097	54,272	66,198
Horses	203	151	77	366	383
Sheep and goats	8,121	10,107	8,971	5,998	8,415
Poultry	17,178	14,994	13,162	13,291	14,440
Products of livestock pr.	54,353	55,395	58,026	51,136	52,356
Milk	38,017	38,459	37,309	35,047	35,387
Eggs	13,395	14,970	15,507	13,740	14,504
Other animal products	2,940	1,965	5,208	2,348	2,464

Source: Statistical Office of the Republic of Serbia. (2017). Economic accounts for agriculture in the Republic of Serbia, 2007-2017. Belgrade

* The value of crop production includes the production of cereals, industrial plants, fodder plants, vegetables and products of horticulture, fruit and other non-mentioned agricultural goods (Statistical Office of the Republic of Serbia (b), 2016)

** The value of animal production includes the production/breeding of livestock, poultry and other animals and livestock goods. The production of livestock goods includes the production of milk, eggs and other non-mentioned agricultural goods (Statistical Office of the Republic of Serbia (b), 2016)

On the other hand, animal production and agricultural services reached their highest values in 2014. However, the year with the highest growth rates in all analysed areas is 2008 (Statistical Office of the Republic of Serbia, 2016).

Based on Table 2, crop production had the dominant share in the value structure of agricultural goods and services in the period from 2007 to 2017 (around 66%), while animal production accounted for 32% on average, and agricultural services with about 2%. Cereals were dominant in the value of crop production (44%), then fruit production (included in total plant production with 15%), and production of industrial plants by 14%. The share below 10% in crop production is noticeable in vegetables and products of horticulture (9%), wine (8%) and fodder plants (5%), while the lowest share was recorded for potatoes (4%). In the value structure of animal production, the dominant share was recorded for cattle breeding with about two thirds (69% on average), and livestock products accounted for around 31%. The highest average share in cattle breeding in the observed period referred to pig breeding (51%), then livestock (28%), poultry breeding (13%), sheep and goat breeding (8%), while the breeding of horses was less than 1%. From the aspect of animal goods and participation in its value, the most important product was milk (70%), followed by eggs with a share of 25%, while all other livestock products participated with less than 5% (Statistical Office of the Republic of Serbia, 2018).

Agricultural production in Serbia is mainly intended for sale to other agricultural holdings, entities outside agriculture, and exports. Only a small part of the production of agricultural holdings is intended for its own consumption, accounting on average for 7.5% in the observed period. However, in some years this participation was even lower. Thus, its own consumption in 2014 amounted to 5.2%, and in 2015 it was 5.9% of the total value of agricultural production (Statistical Office of the Republic of Serbia, 2018).

When it comes to total sales from agricultural holdings, it was 80% on average of agricultural production in the observed period from 2007 to 2017. On the other hand, the consumption of agricultural goods within the units, and for the needs of various agricultural activities (for example, the use of crop products for animal nutrition purposes) ranged between 8% and 11% (Statistical Office of the Republic of Serbia, 2018).

Share of agriculture in the gross domestic product of the Republic of Serbia

The gross value added (GVA) and accordingly gross domestic product (GDP) of Serbia have changed their structure in the last few years as a consequence of structural changes in the economy and its sectors.

Although the nominal GVA of agriculture has been increasing, its share in total GVA of Serbia has been reduced due to the more intensive value growth in other sectors, primarily the service sector (Nikolić et al., 2010). Positive results that agriculture has been constantly pursuing were crucial in the post-economic crisis period to mitigate the inevitable decline in the GDP.

Figure 1 shows the growth rates of Serbian GVA in agriculture for the period from 2008 to 2017. Therefore, the cumulative growth of the agricultural GVA was achieved by 11.9% in the observed period, while the average annual rate growth was 1.1%. The largest decline was recorded in 2012 (-28.1%), while in 2013 it increased by 38.8%. In the last observed year, 2017, the GVA in agriculture recorded a decrease (-10.5%) (Statistical Office of the Republic of Serbia, 2017).

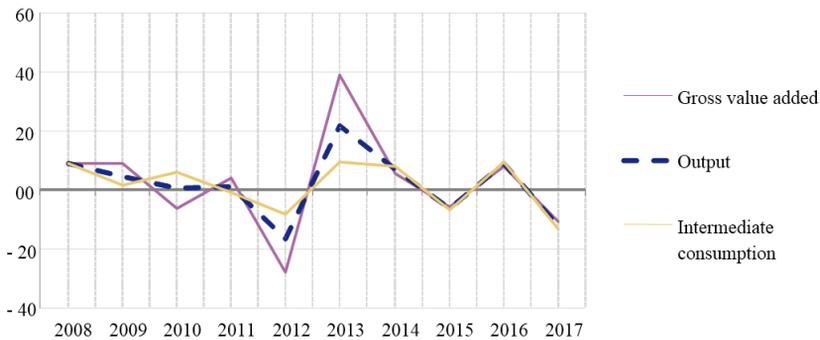


Fig. 1. GVA growth rates of agriculture in Serbia, 2008-2017, in %
(Source: Statistical Office of the Republic of Serbia, 2017. Economic accounts for agriculture in the Republic of Serbia, 2007-2017. Belgrade)

Figure 2 shows the share of agriculture in the GDP of Serbia for the 2007-2017 period. The share of agricultural GVA in GDP of Serbia in the observed period shows slight fluctuations with an average value around 6.5%. The largest share of 7.1% was recorded in 2008 and 2011 (which were the crisis years), and the smallest share was recorded in 2017 (5.7%).

Share of agriculture in the trade balance of the Republic of Serbia

Commercial liberalization, both at regional and global level, has created a global environment suitable for the growth and expansion of world trade. New technologies, such as computers, telecommunications and other media, have contributed to the integration of the world market (Singh, et al., 2015).



Fig. 2. Share of the agricultural GVA in the GDP in Serbia, in %
 (Source: Statistical Office of the Republic of Serbia, 2017. Economic accounts for agriculture in the Republic of Serbia, 2007-2017. Belgrade)

Foreign trade is an important indicator of economic development of the country and it brings many benefits to both exporting and importing countries. While exporting countries earn by exporting surplus of their products, importing countries have access to better products and thus affect the living standard of the population. The main determinants of exports are the presence of entrepreneurial spirit, access to marketing, transport and other services, but also the state trade policy and policies of an exchange rate. On the other hand, import is mostly influenced by income per capita, prices of imports, public policies related to trade and exchange, rate and availability of foreign currencies (Seyoum, 2009).

There are numerous reasons in favour of international trade, such as cost efficiency, the use of advanced technology, new production methods, specialization, improvement of living standards, etc. International trade also allows businesses to access resources that are not available in their countries. However, in addition to providing consumers with a wide range of different products, international trade increases revenue and employment.

By encouraging the development of agriculture, manufacturing and service sectors, foreign trade offers greater employment opportunities in these sectors. Also, foreign trade stimulates market competition and thus leads to the improvement of production technology, production process and product quality.

Table 3 shows the values of agricultural export and import in Serbia, in million dinars for the period from 2003 to 2017. Therefore, the value of export and import in Serbia in the observed period was growing, both in total and in agriculture. In the first half of the analysed period (from 2003 to 2009), the value of import was about twice higher than the value of export, while in the second half of the analysed period (from 2010 to 2017) the values of export and import were close.

The share of agriculture in the total export of Serbia increased from 2.55% in 2003 to 5.93% in 2017. Also, agriculture slightly increased its share in the total import (3.34% in 2017 compared to 0.60% in 2003). Agriculture, hunting and services accounting for almost 95% had the dominant share in the trade balance within the primary sector, while the rest included farming, forestry and fisheries.

Conclusion

The agriculture in Serbia faces many challenges that caused different changes in its structure. The key challenge faced by the agricultural and economic policy makers of Serbia is how to ensure a sustainable agricultural development process that will respond to the challenges of developed modern technology. Therefore, it is extremely important to ensure productivity growth, strengthen the agricultural market, stimulate investment in research and development, improve links between agriculture and non-agricultural sectors in rural areas, invest in human resources in order to encourage their engagement in agriculture and further education in the field, encourage key branches of crop and animal production with a special focus on expansion of animal production, and ensure regional cooperation of stakeholders.

Considering the importance that farmers have in planning, organizing and implementing the entire process of agricultural production, their advancement would result in multiple positive effects on the Serbian agriculture. The development of human resources would undoubtedly contribute to increasing the efficiency of agricultural production, raising the quality of products and occupying a strategic position in an extremely competitive international market.

In addition to meeting the need for quality, diversity and food in sufficient quantities, agriculture is expected to contribute to overall economic development and poverty reduction, to face increased competition for alternative uses of limited land and water resources, to adapt to climate changes and contribute to the conservation of biodiversity and the restoration of sensitive ecosystems.

Tab. 3a. Export and import of agriculture in Serbia, in mill. Dinars for the period 2003-2010

	2003	2004	2005	2006	2007	2008	2009	2010
Export								
Republic of Serbia, total	158,782	207,035	299,919	428,051	514,866	603,550	559,851	762,974
Agriculture, forestry and fishing	4,048	7,671	13,698	20,482	20,864	21,695	36,058	56,646
<i>Agriculture, hunting and services</i>	3,787	6,863	12,841	19,436	19,796	21,145	35,775	56,083
<i>Forestry and logging</i>	261	633	765	974	974	470	226	480
<i>Fishery</i>	/	175	92	72	94	80	57	83
Import								
Republic of Serbia, total	429,503	629,838	702,280	878,227	1,115,746	1,340,088	1,064,271	1,280,676
Agriculture, forestry and fishing	2,588	17,212	18,461	21,831	21,807	27,812	26,489	38,544
<i>Agriculture, hunting and services</i>	2,480	14,213	15,294	17,477	17,638	22,758	25,511	37,376
<i>Forestry and logging</i>	108	896	815	1,688	2,353	2,637	429	575
<i>Fishery</i>	/	2,103	2,352	2,666	1,816	2,417	549	593

Source: Statistical office of the Republic of Serbia (2005-2018). Statistical Yearbook

Tab. 3b. Export and import of agriculture in Serbia, in mill. Dinars for the period 2011-2017

	2011	2012	2013	2014	2015	2016	2017
<i>Export</i>							
Republic of Serbia, total	860,084	990,742	1,244,715	1,307,883	1,453,767	1,653,758	1,827,893
Agriculture, forestry and fishing	68,822	85,006	73,685	86,997	102,797	118,255	108,307
<i>Agriculture, hunting and services</i>	68,219	84,425	72,989	85,931	101,288	116,599	105,883
<i>Forestry and logging</i>	525	496	569	766	1,201	1,452	2,315
<i>Fishery</i>	78	85	127	300	308	204	109
<i>Import</i>							
Republic of Serbia, total	1,452,140	1,665,009	1,749,932	1,815,996	1,978,653	2,101,528	2,354,803
Agriculture, forestry and fishing	42,347	50,764	50,600	55,787	65,853	66,411	78,638
<i>Agriculture, hunting and services</i>	41,209	49,483	49,087	54,017	63,903	63,954	75,639
<i>Forestry and logging</i>	491	440	574	710	856	887	590
<i>Fishery</i>	647	841	939	1,060	1,094	1,570	2,409

Source: Statistical office of the Republic of Serbia (2005-2018). Statistical Yearbook

However, one of the challenges that agriculture will be exposed to in the coming period is sustainable production of food.

Climate changes will bring higher average temperatures, changes in precipitation, more frequent extreme phenomena, numerous threats to sustainable food security. In order to meet these challenges, a coordinated action of the private and public sector and civil society is needed, which will have to be adapted to specific circumstances.

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Структурне промјене у пољопривреди: импликације за економију Републике Србије

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Сажетак

Пољопривреда у Републици Србији има важну улогу у националној економији, чинећи је значајно другачијом од пољопривреде развијених земаља. Допринос пољопривреде националној економији огледа се у још увијек значајном удјелу у бруто домаћем производу, укупној запослености и трговинској равнотежи. Упркос недовољном степену искоришћености расположивих природних ресурса, пољопривреда у Србији чини окосницу економског развоја руралних подручја. Циљ истраживања је испитивање структурних промјена у српској пољопривреди у сљедећим аспектима: промјене у структури запослености, промјене у биљној и животињској производњи, као и промјена удела пољопривреде у бруто домаћем производу и трговинском билансу Србије. Анализа је извршена у периоду од 2002. до 2017. на основу података Завода за статистику Републике Србије. Резултати истраживања показују да је пољопривреда у Србији претрпјела значајне промјене у анализираним подручјима, што је резултирало њеним смањеним удјелом у укупној запослености и бруто домаћем производу, али и мањим порастом удјела у вриједности извоза и увоза.

Кључне ријечи: пољопривреда, структурне промјене, национална економија, рурална подручја

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