
COMPARATIVE ANALYSIS OF SERBIAN AGRICULTURE AND AGRICULTURE OF OTHER HIGH MIDDLE-INCOME COUNTRIES

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ABSTRACT

The goal of countries that have excellent comparative advantages for the development of agriculture, such as Serbia, is rural development and the general development of agriculture as an economic branch. This is logical, given the great importance of food available to everyone. According to the World Bank classification, Serbia belongs to the group of countries with high middle income. The aim of this paper is to present the impact of the economic development of the observed countries on the production of food. Methodologies applied for this research are: single correlation and single and multiple regression models and indicators such as global food security index, gross domestic product per capita, share of agriculture in gross domestic product for the year 2022 will be used.

Introduction

Serbia is a European country that strives to be a member of the European Union [EU]. As a third of the regulations of the EU are precisely in the field of agricultural policy, it is important to point out the importance of agriculture as an economic branch in the EU, and in all other countries as well.

Achieving adequate rural development, economic growth and competitiveness of agricultural products while improving standards and preserving the environment are

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only possible with the integration and implementation of the Common Agricultural Policy standards of the EU. For these purposes, in recent years, Serbia has started to implement systematic and structural reforms of the agricultural sector by adopting and implementing the Strategy for Agriculture and Rural Development. Serbia has started the process of harmonizing and harmonizing legislation with the regulations of the EU thanks to the financial assistance of various programs and funds of the EU. However, this process is extremely difficult and long, and therefore Serbian agriculture is still faced with numerous challenges that slow down economic growth and development (Stojanović et al, 2018).

Materials and methods

Considering the importance of agriculture, as an economic branch, this work aims to: present the agricultural policy of Serbia, with special reference to its financing; to indicate to what degree the economic development of a country, measured through the gross domestic product per capita, affects the food production and the development of agriculture as an important economic branch, especially in relation to other countries with high middle incomes. For these purposes, the state of agriculture in Serbia and neighbouring countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Bulgaria) will first be explained, and then statistical processing and analysis of secondary data related to economic development and the development of agriculture expressed through the global index of food security, with the aim of proving the initial hypotheses that indicate which indicators can affect the development of agriculture in given countries.

The main indicator used in the analysis is the overall global food security index (Global Food Security Index [GFSI]), which consists of four components: affordability, availability, quality and safety, and sustainability and adaptation. GFSI observes 113 countries, including Serbia and the other observed countries of the EU. This index brings shared data related to consumers' ability to buy food, their reaction to sudden price increases; the ability of a country to ensure continuity in the domestic supply of agricultural products; health and nutritional correctness of food; and the state's ability to reduce the impact of climate change on agricultural production. Two years ago (2022), Serbia was in 61st place with a score of 61.4 (the minimum score is 0 and the maximum is 100). Compared to 2012, when this index began to be calculated, Serbia has improved in the score by as many as 8.0 points (Economist Impact, 2022). As for the gross domestic product [GDP], Serbia had 63,501.75 million dollars in 2022. Per capita, the gross domestic product of Serbia [GDP per capita] was 9,393.6 US dollars. The share of agriculture in the total economic activity in Serbia was about 6.8%, while the percentage of the rural population was 43% (World Bank, 2023).

Agricultural policy of Serbia and surrounding countries

Serbian agricultural policy

In the last couple of decades, Serbian agriculture has been facing numerous problems and challenges. The closure of the Yugoslav economy, the disintegration of the former Socialist Federal Republic of Yugoslavia [SFRY], the loss of markets between the former members of the SFRY, international sanctions, severed foreign trade ties in the nineties of the 20th century, are just some of the factors that caused a serious economic crisis, a decline in economic growth and the collapse of a market system. Unemployment and poverty appeared.

Serbia's agriculture is extremely promising, both because of the geographical terrain, favourable climatic conditions, educated population, and because of its strategic position. Despite the large number of "small" agricultural farms, Serbia has large areas of arable land of exceptional quality (Stanković et al, 2023). As successful agricultural production is based on "healthy" land on which exceptionally high-quality food products can be obtained over a long period of time (Stolze, Lampkin, 2009), it can be said that Serbian agriculture is an extremely promising branch. Although in the middle of the last century, with industrialization and post-war recovery, it began to lose its importance due to the development of other economic branches, agriculture is once again becoming one of the most important economic branches because people's health is in the first place, and a man who takes care of his own health and the health of his family values food security more (Nikolić et al, 2017).

Regarding the financing of agriculture, it should be noted that due to the strong seasonal production and the biological nature of the production, the possibility of self-financing agriculture is at a very low level, so there is a strong need for loans. Due to the specifics mentioned, an agricultural loan is usually more favourable than other commercial loans in the sense that it has a lower interest rate and a longer repayment period, and a grace period is often approved during which neither the principal nor the interest is repaid (Đurić, 2021).

In Serbia, the participation of farmers in GDP, gross added value, employment, export is extremely high, despite the unsatisfactory results. For the results to change for the better in the future, it is necessary to create a favourable institutional environment and harmonize the agrarian budget of the Republic of Serbia with the Common Agrarian Policy of the EU. Unfortunately, the agricultural budget of the Republic of Serbia still does not meet all the needs of agriculture and rural development in Serbia.

If the participation of agriculture in important indicators of economic development is already high, the question arises why the results are unsatisfactory? The answer lies precisely in Serbia's ability to produce large quantities of quality food, in Serbia's geographical position, and arable land of exceptional quality, in an area with favourable climatic conditions. The low economic strength of Serbian producers is precisely the limiting factor that makes it impossible for agricultural production to rise to a level

that would be satisfactory, and therefore the state must implement measures of state interventionism to help agriculture achieve better results.

Table 1. Participation of different types of financial incentives in the financing of the agricultural policy of the Republic of Serbia for 2022

Purpose/program activity/type of subsidies	The amount in RSD for the year 2022	Share of subsidies in the agricultural budget (in %)
Direct payments	41 249 678 000	80.59%
Measures of rural development	9 037 586 930	17.66%
Credit support for agriculture	672 000 000	1.31%
Special incentives	226 000 000	0.44%
Total	51 185 264 930	100%

Source: Službeni glasnik RS, 2022

Agriculture is a risky economic branch considering that due to bad weather conditions, agricultural products can be destroyed and, accordingly, income can be significantly reduced. All this can have a negative impact on the entire food supply chain, so it is necessary to help farmers in the form of direct payments. The structure of the agricultural budget is similar from year-to-year, but direct payments are the dominant part in every country. Direct payments include incentives for crop and livestock production, and can be in the form of premiums, incentives, and rebates. Considering the above, direct payments provide security to farmers both in Serbia and other countries with high middle incomes and in the countries of the EU. They give farmers greater freedom in decision-making, but also contribute to environmental protection, sustainable management of natural resources and the fight against climate change, all in accordance with EU standards. Direct payments in Serbia are still related to food production. Direct payments related to plant production are largely harmonized with the measures in the EU considering that they are paid according to the area of arable land and only for the first 20 hectares (Directorate for Agrarian Payments, 2024).

The measures of rural development that participated in the budget for 2022 with 10.47% related to incentives for improving the competitiveness of agricultural production, preserving the environment, and limited natural resources, improving the quality of life in rural areas, educating the population living in rural areas on the topic how to increase the efficiency and productivity of their production, but also for the implementation of the rural development strategy. Expenditures for rural development measures for 2022 are presented in *Table 2* (Službeni glasnik RS, 2022.).

Table 2. Incentives for rural development of the Republic of Serbia for 2022

Incentives for rural development	The amount in RSD for the year 2022	Participation of individual incentives for rural development (in %)
Improving competitiveness	6 980 978 930	77.24%
Preservation and improvement of the environment and natural resources	731 701 000	8.09%
Incentives for diversification of income and improvement of quality of life in rural areas	432 905 000	4.79%
Incentives for the preparation and implementation of local rural development strategies	2 000	0.001%
Incentives for the improvement of the system of creation and transfer of knowledge	892 000 000	9.87%
Total	9 037 586 930	100%

Source: Službeni glasnik RS, 2022

Various research conducted in Serbia have shown that the degree of poverty is much more pronounced in rural than in urban areas. Among the most vulnerable in Serbia are multi-member families from rural areas, the unemployed and people with disabilities (Kopanja, 2016). The rural development of Serbia, based on the principles of sustainable development, therefore becomes an imperative for overall economic development.

To compare Serbian agriculture with neighbouring countries, countries with a similar geographical position, climatic conditions and soil quality as Serbia were included in the further analysis. All these countries are on the World Bank's list of upper-middle-income countries. In the rest of the text, indicators for the year 2022 will be mentioned, such as: GFSI, GDP per capita, participation of agriculture in the overall economic structure of a given country and the percentage of the rural population.

Basic facts about selected countries and indicators

Albania is a country that is mainly engaged in agricultural production. As much as 56% of the population lives in rural areas, while 36% of the population is engaged in agriculture (World Bank, 2023). There are about 400 million hectares of natural pastures in Albania. Historically, in Albania, fertilizer was almost never used to increase the productivity of pastures considering their quality. However, the big problem in this country is small farms with 10 to 30 animals, while there is a trend to create medium-sized farms with around 150 animals. (Agriculture and Rural Development Agency, 2022).

Regarding the GFSI, Albania was not ranked in 2022, nor in previous years. GDP of Albania in 2022 was 18882.1 million US dollars, while GDP per capita was 6802.8 US dollars. Agriculture participated in the economic structure of Albania with 18.6%, while at the same time in 2022, in Albania was 36% of the rural population (World Bank, 2023).

Bosnia and Herzegovina has exceptional natural features that enable it to develop sustainable and high-quality agricultural production. However, the huge agricultural

potentials have only been partially utilized despite exceptional natural, technical, and human resources (as much as 50% of the rural population). Unfortunately, most agricultural products are imported due to insufficient investments in the agricultural sector. Considering the exceptional characteristics of the climate and soil in Bosnia and Herzegovina, it is necessary to consider a plan to attract foreign investments to further develop agriculture. The advantages of Bosnia and Herzegovina in terms of agricultural production are certainly favourable climatic and geographical conditions, a long tradition in agriculture, a qualified workforce, and a developed education system (Agency for the Promotion of Foreign Investments in Bosnia and Herzegovina, 2012).

Bosnia and Herzegovina is not on the list of 113 countries that calculate the GFSI. The GDP of Bosnia and Herzegovina in 2022 was 24473.91 million US dollars, while GDP per capita was 7568.8 US dollars. The share of agriculture in the overall economic structure of Bosnia and Herzegovina is only 4.7%, while 50% of the population is rural. (World Bank, 2023).

Montenegro is a small country that covers about 14,000 km². As much as 37% of the total area of the country is agricultural. Agriculture in Montenegro is mostly labour-intensive and represents the main source of income for about 50,000 households. It is characterized by a low level of mechanization but also a small use of chemicals, which is considered suitable for the development of organic agricultural production (Sustainable agriculture for sustainable Balkans, 2023).

Montenegro, like Albania and Bosnia and Herzegovina, is not on the list of 113 countries that calculate the GFSI. The GDP of Montenegro in 2022 was 6095.98 million US dollars, while GDP per capita of Montenegro was 9893.5 US dollars. The share of agriculture in the economic activity of Montenegro was 6.3%, while the percentage of the agricultural population was 32% (World Bank, 2023).

North Macedonia is a country that faces numerous challenges in relation to agricultural production. On the total surface of the country of about 26 thousand km², agricultural land is about 1.2 million ha, while about half of the total population is rural. The average size of an agricultural holding in the Republic of North Macedonia is 1.8 ha, while 3168 hectares of agricultural land are intended for organic production, which is 0.25% (Agency for Financial Support in Agriculture and Rural Development, 2022). The main problems that North Macedonia faces in terms of the development of agricultural production are small area of households, low use of mechanization and therefore lower productivity and efficiency; lack of an adequate agricultural advisory service; emigration of the population from rural areas; deterioration of the quality of agricultural land due to its inadequate use.

According to the GFSI, North Macedonia is also not ranked. The GDP of North Macedonia in 2022 was 13563.13 million US dollars. GDP per capita of North Macedonia in 2022 was 6591.5 US dollars. The share of agriculture in the total economic activity of North Macedonia was 8.1%, while the agricultural population was 41% (World Bank, 2023).

Bulgaria employees more than 6% in the agricultural sector. Agriculture is a very important branch in terms of potential export - roses, lavender oil, honey, pork, and poultry. About 41% of the total Bulgarian territory (4.5 million hectares) is agricultural land. Rural areas occupy 22% of the Bulgarian territory where 13% of the population (about 900 thousand people) live. The number of farms is around 130,000, of which 76,372 were registered in 2021 (European Commission, 2021). The Rural Development Strategy of Bulgaria aims to promote the sustainable development of the agricultural sector by supporting sustainable farm income and increasing competitiveness. Bulgaria and the Common Agricultural Policy of the EU use different measures and interventions to improve living and working conditions in rural areas.

The GFSI ranks Bulgaria in 2022 at 29th place, with a total score of 73.0. This result is 9.5 points better than in 2012, when the GFSI was first calculated (Economic Impact, 2022). Regarding the indicators calculated by the World Bank, the GDP in 2022 was 89040.40 million US dollars and the GDP per capita GDP was 13772.5 US dollars (World Bank, 2023).

Results

Methodology and hypotheses

The aim of this paper is to answer the question of whether the economic development of the observed countries affects food production and whether economic development affects the reduction of the participation of agriculture in the economy. The following questions will be answered in the further work:

1. Does the economic development of a country expressed through gross domestic product per capita [GDP per capita] affect the food production, which is measured by the global food security index [GFSI]?
2. Does the economic development of a country expressed through the gross domestic product per capita [GDP per capita] affect the participation of agriculture in the overall economic structure of that country, measured by the participation of agriculture in the gross domestic product?
3. Does the economic development of a country expressed through the gross domestic product per capita [GDP per capita] and the participation of agriculture in the overall economic structure affect the food production, which is expressed through the global food security index [GFSI]?

Based on these questions, three hypotheses were defined:

H1: The economic development of a country has an impact on the food production.

H2: The economic development of a country has an impact on the position of agriculture.

H3: The economic development of a country and the participation of agriculture in the economic structure affect the food production.

The analysis used data on GDP per capita, GFSI and the share of agriculture in the GDP of countries with higher middle incomes according to the World Bank classification for the year 2022, among which Serbia was analysed. As many as 24 mentioned countries are on the list of Economic Impact, which calculates the global index of food security, while all observed countries - 52 of them - are subject to observation by the World Bank, so data on GDP per capita and the share of agriculture in the total are available economic structure (Economic Impact, 2022; World Bank, 2023).

For the purposes of statistical analysis, secondary data were used, which were analysed using the SPSS software package. Analysis of the normality of the distribution of the given sample for each observed variable, single bivariate correlation and single and multiple regression analysis were conducted.

For easier comparative analysis, *Table 3* was created, where all the data presented in the previous text are given. The aim of this analysis is to compare Serbia as an upper-middle income country with other countries on the same World Bank list. The advantages of this analysis are that it is mostly about countries that have similar economic development compared to Serbia, but different prerequisites for the development of agricultural production. In this way, it will be pointed out whether and to what extent economic development affects the development of agriculture.

Table 3. GFSI, GDP per capita (current US dollars) & Agriculture, forestry and, fishing, value added (% of GDP)

Country	GFSI (score)	GDP per capita (current US dollars)	Agriculture, forestry, and fishing, value added (% of GDP)
Serbia	61.4	9 393.6	6.8%
Albania	/	6 802.8	18.6%
Bosnia and Herzegovina	/	7 585.4	4.7%
Montenegro	/	9 893.5	6.3%
North Macedonia	/	6 591.5	8.1%
Bulgaria	73.0	13 772.5	4.4%

Source: Economic Impact, 2022 & World Bank, 2023

Statistical analysis

The statistical analysis was performed on a sample of 52 countries ranked by the World Bank in the group of countries with upper middle income. Before the analysis, the authors performed an examination of the normality of the sample distribution. The analysis showed that all observed variables have a normal distribution ($\text{Sig} > 0.05$), which can be seen in *Table 4*.

Table 4. Tests of normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
GFISI score	.167	24	.081	.965	24	.542
GDP per capita	.162	24	.103	.942	24	.180
Agriculture, forestry, and fishing, value added (% of GDP)	.085	24	.200*	.981	24	.912
a. Lilliefors Significance Correction						
*. This is a lower bound of the true significance.						

Source: Authors' calculations according to Table 3

To determine the impact of economic development on the food production, but also on the position of agriculture and rural areas in the observed countries, the authors used correlation and linear regression methods.

First, an analysis of the impact of economic development on the food production was performed using the Pearson correlation coefficient r (Table 5). As can be seen in the given table, the correlation between these two indicators is high and amounts to $r=+0.635$. Given that the significance of this coefficient is $\text{Sig}=0.01 < 0.05$, it can be concluded that this correlation is statistically significant. In the further process of confirming the first hypothesis, a regression model was presented to confirm this correlation. The estimated value of the regression coefficient is shown in Table 6.

Table 5. Correlations

		GDP per capita (current US dollars)	Agriculture, forestry, and fishing, value added (% of GDP)	GFISI (score)
GDP per capita (current US dollars)	Pearson Correlation	1	-0.383**	0.635**
	Sig. (2-tailed)		0.005	0.001
	N	52	52	24
Agriculture, forestry, and fishing, value added (% of GDP)	Pearson Correlation	-0.383**	1	-0.105
	Sig. (2-tailed)	0.005		0.625
	N	52	52	24
GFISI (score)	Pearson Correlation	0.635**	-0.105	1
	Sig. (2-tailed)	0.001	0.625	
	N	24	24	24
**. Correlation is significant at the 0,01 level (2-tailed).				

Source: Authors' calculations according to Table 3.

Table 6. Regression model: coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	53.911	3.024		17.829	0.000
	GDP per capita	0.001	0.000	0.635	3.860	0.001
a. Dependent Variable: GFSI score						

Source: Authors' calculations according to Table 3.

To examine the relevance of the regression model for these variables, further analysis is based on the formula:

$$y_i = b_0 + b_1x_1 + \varepsilon_i \quad (1)$$

where y is the dependent variable – which in this case is the GFSI score; b_0 - section on the y axis; b_1 - slope coefficient and x - independent variable, which in this case is GDP per capita. In this case, the regression model formula looks like this:

$$\text{GFSI score} = 53.911 + 0.001 * \text{GDP per capita} \quad (2)$$

The slope coefficient $b_1=0.001$ shows that an increase in GDP per capita by 1 US dollar causes an average increase in the GFSI by 0.001. A measure of the representativeness of this model can be presented by analyzing the coefficient of determination $R^2=0.404$, which says that 40.4% of the variance of the GFSI score can be explained by variations in GDP per capita.

Like this linear regression model, another regression model will be presented in the same way, but this time the impact of the economic development of a country on the position of agriculture in the economic structure will be analysed. For these purposes, the GDP per capita will be used as an independent variable and the share of agriculture in the GDP as a dependent variable. As in the previous model, it will first be determined whether there is a correlation between these variables, using the Pearson method (*Table 5.*).

As seen in *Table 5*, the correlation coefficient $r=-0.383$, which means that it is a moderate correlation with a negative sign. Given that the significance of this correlation is $Sig=0.005$, and the correlation hypothesis is accepted for $Sig \leq 0.05$, it can be concluded that the correlation coefficient score is statistically significant. In the further process of confirming the second hypothesis, a regression model was presented to confirm this correlation. The estimated value of the regression coefficient is shown in *Table 7*.

Table 7. Regression model: coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	12.672	1.861	6.809	.000
	GDP per capita	-.001	.000	-2.932	.005
a. Dependent Variable: Agriculture, forestry, and fishing, value added (% of GDP)					

Source: Authors' calculations according to Table 3.

To examine the relevance of the second regression model, the further analysis starts again from formula (1). In this case, the regression model formula looks like this:

Agriculture, forestry, and fishing, value added (% of GDP) =

$$= 12.672 - 0.001 * GDP \text{ per capita} \quad (3)$$

The slope coefficient $b_1 = -0.001$ shows that an increase in GDP per capita by 1 US dollar leads to a decrease in the share of agriculture in GDP by 0.001. The measure of the representativeness of this model can be presented by analysing the coefficient of determination $R^2 = 0.147$, which says that 14.7% of the variation of the variable participation of agriculture in the GDP is explained by changes in the GDP.

To prove the third hypothesis, a multiple (three-dimensional) linear regression model should be performed, where the independent variables will be the GDP per capita expressed in US dollars and the share of agriculture in the GDP, and the dependent variable will be the GFSI. The model is presented in *Tables 8-10*.

Table 8. Model summary

Model	R	R ²	Adj. R ²	Std. Error of the Estimate
1	0.661	0.437	0,383	4.6131490

Source: Authors' calculations according to Table 3.

Table 9. ANOVA^b

Model	Sum of squares	df	Mean Square	F	Sig.
1 Regression	346.326	2	173.163	8.137	0.002 ^a
Residual	446.904	21	21.281		
Total	793.230	23			

^a Predictors: (Constant), Agriculture, forestry, and fishing, value added (% of GDP), GDP per capita.

^b Dependent variable: GFSI score

Source: Authors' calculations according to Table 3.

Table 10. Three-dimensional linear regression model: coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	49.476	5.013		9.869	0.000		
	GDP per capita	0.001	0.000	0.720	3.983	0.001	0.821	1.218
	Agriculture, forestry, and fishing, value added (% of GDP)	0.450	0.407	0.200	1.106	0.281	0.821	1.218
	Dependent Variable: GFSI score							

Source: Authors' calculations according to Table 3.

Table 8 shows that the corrected coefficient of determination $Adj. R^2=0.383$. This means that 38.3% of the variation in the GFSI variable can be explained by joint changes in GDP per capita and the share of agriculture in GDP. The fit between the independent and dependent variables in this model is met because $F=8.137$ and $Sig.=0.002\leq 0.005$. According to table 10, the regression coefficient that shows statistical significance is GDP per capita ($Sig=0.001\leq 0.005$). And in this three-dimensional model, formula (1) is used, so the multiple model will have the following appearance:

$$GFSI\ score = 49.476 + 0.001 * GDP\ per\ capita +$$

$$+0.450 * Agriculture, forestry, and fishing, value added (\% of GDP) \quad (4)$$

As already stated, only GDP per capita has statistical significance because $Sig.=0.001\leq 0.005$. Given that it is a multiple regression model, the problem of collinearity should also be considered. Therefore, the Tolerance and VIF columns from the Collinearity Statistics section of Table 10 will be included in the analysis. Since $Tolerance>0.1$ and $VIF<10$, it can be said that this regression model meets the conditions related to collinearity.

Discussion

This study aimed to answer the question of whether the economic development of the observed countries affects food production and whether economic development affects the reduction of the participation of agriculture in the economy. Three hypotheses were put forward that we examined through the analysis of data on GDP per capita, GFSI and the share of agriculture in GDP for countries with high middle incomes according to the classification of the World Bank for the year 2022. In this section, we will discuss the key findings and their implications.

Based on a comprehensive analysis, it can be concluded that there is a statistically significant strong positive correlation between economic development and the food security. The analysis proved the first hypothesis, which is logical considering that

economic development is expected to affect food production. Therefore, first hypothesis can be adopted.

As the analysis confirmed that economic development has a positive effect on food production, it is logical that the share of agricultural production in the total GDP decreases with economic development and an increase in the standard of living. In this analysis, the second hypothesis was proven, which states that with the increase in the standard of living, the participation of agriculture decreases due to the increase in the participation of the secondary and tertiary sectors.

The third hypothesis (H3) is that economic development and the participation of agriculture in the economic structure together influence food production. Multiple regression analysis showed that joint changes in GDP per capita and the share of agriculture in GDP explained 38.3% of the variation in the global food security index (Adj. $R^2=0.383$). The model is statistically significant ($F=8.137$, $Sig=0.002$). However, only GDP per capita has a statistically significant effect ($Sig=0.001$), while the share of agriculture in GDP did not show a statistically significant effect ($Sig=0.281$). These results indicate that economic development is the primary factor affecting food security, while the share of agriculture in the economic structure does not have a significant direct impact.

Conclusions

The results of this research carry important messages for economic policy makers in the observed countries:

1. it is necessary to encourage economic growth - increasing GDP per capita should be a priority, as it directly contributes to improving food security.
2. development of other economic branches - reducing dependence on agriculture through the development of other sectors can contribute to the stability and sustainability of the economy.
3. infrastructure development - improving food distribution infrastructure can have positive effects on all four aspects of the GFSI.

Although this model explains a significant part of the variation in the GFSI, there are other factors that could be important, such as political stability, climate change, education and health policy. Future research should include these factors to get a more complete picture of the determinants of food security.

Agriculture is not an isolated economic activity from the emergence of innovations. On the contrary, thanks to the innovations implemented in agriculture, a huge amount of food was successfully produced before, while today food production is on higher level.

Regarding the ranking on the list of Economic Impact, it can be said that Serbia stands quite well compared to other countries with higher middle incomes. Serbia could reach the development of the other countries, but Serbia needs to work more and harder on harmonization of regulations with the regulations of the EU.

Conflict of interests

The authors declare no conflict of interest.

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