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# IMPACT OF INVESTMENTS ON FOOD SECURITY ACCESS: CASE OF EU AND NON-EU MEMBER COUNTRIES

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## ARTICLE INFO

Original Article

Received: 01 February 2023

Accepted: 10 June 2023

doi:10.59267/ekoPolj2304937K

UDC 338.439.544(4-672EU)

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### Keywords:

*food security, investments, access, countries of the former Yugoslavia, EU*

**JEL:** F63, Q11, Q14, Q18

## ABSTRACT

Agriculture around the world faces a number of challenges. The aim of this paper is to investigate the impact of gross investments and agriculture investments on the level of food security in the member countries of the European Union (EU) and non-EU member countries. In the paper as a method of research hierarchical regression analysis was used. The results of the research showed that there is a statistically significant influence of gross investments and agriculture investments on the level of food security in the EU and non-EU member countries. The largest amount of gross investments and investments in agriculture was recorded in Croatia and Slovenia, as a EU members countries, which have the highest level of food security. On the other hand, the lowest volume of gross investments and investments in agriculture was recorded in Bosnia and Herzegovina, as non-EU member country, which has the lower level of food security.

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## Introduction

The term food security originated at the World Food Conference and food security definition at the time had the focus on food availability and price stability. Therefore, the primary focus was primarily on food supply problems, that is, on ensuring adequate supply and, as far as possible, price stability of basic agricultural and food products at the national and international level (FAO, 2003).

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Later, in 1983, FAO expanded this concept by including the issue of access to food by vulnerable people. This emphasizes that food security “should ensure that all people at all times have both physical and economic access to the basic food products they need” (FAO, 2003: 27). Subsequently, the World Bank Report on “Poverty and Hunger” from 1986 further broaden the concept of food security as the definition included “access by all people at all times to sufficient food necessary for an active and healthy life” (FAO, 2003: 27). At the same time, it was found that poverty and lack of income, rather than food supply, were the main obstacles to access to food. Thus, at the World Food Summit in 1996, the concept of food security was expanded (Diaz-Bonilla, Thomas, Robinson, Cattaneo, 2006). The definition of food security that is most frequently used was created in 1996 at the World Food Summit, and it indicates that “food security, at the individual, household, national, regional and global levels, is achieved when all people, at all times, have physical and economic access to sufficient quantities of safe food of adequate nutritional value to meet their nutritional needs and preferences necessary for an active and healthy life” (FAO, 1996: 1).

Important policy goal of all countries is reducing food insecurity for all individuals which can be achieved in a variety of ways: increasing world food supply, improving access to food, and increasing consumer food purchasing power (Chavas, 2017; Koveljentić, et al., 2021). So in order to design adequate policies and programs necessary to improve the diets of people, it is necessary to understand the factors that cause malnutrition and how they affect vulnerable groups and households. Through understanding the factors that influence food security, it is necessary to direct policies towards reducing the impact of these factors on hunger and malnutrition. In addition, it is necessary to direct policies towards determining the adequate price of resources and their efficient allocation together with investments in human and natural resources (Babu, Gajanan, Sanyal, 2014).

The food production in the last 40 years has been achieved largely thanks to the investments in agriculture and application of new technology, which has had the effect of increasing productivity and reducing production costs. However, despite investments in agriculture and the usage of new technologies in agriculture that have increased production, there is still food shortages around the world in developing countries, large number of poor and food insecure.

Nowadays, about 700 million people are still poor and they are mostly in rural areas. In addition, despite significant advances in reducing undernourishment and improving nutrition levels, nearly 800 million people are chronically hungry, while 2 billion lack micronutrients (FAO, 2018). Undernourishment and poverty are the main causes of illness and death that occur every day in the world (Ruiz, 2010).

So, in order to reduce food insecurity, it is necessary to implement significant reforms and investments that will have a positive influence on economic growth. Economic growth stimulates economic development and involves a number of structural changes. He represents a key factor in reducing malnutrition and food insecurity, but only

if it provides opportunities for the poor, who do not have enough capital and who are uneducated (Mergos, Papanastassiou, 2017). Investments in agriculture have a positive impact on the growth and development of agriculture and therefore also on food security. The importance of investments was especially pointed out during 2015, when the United Nations announced the Sustainable Development Goals for 2030, which envisages the elimination of hunger, achieving food security and promoting sustainable agriculture. In order to achieve these goals, investments that will enable the improvement of agricultural production capacities are needed. They can generate a wide range of development benefits, as they enable the development of certain sectors and the improvement of their market position.

The aim of the research is to analyze the impact of gross investments and agriculture investments on the level of food security in the countries of the former Yugoslavia viewed from the point of membership to European Union (EU). The countries of the former Yugoslavia which are members of EU: Slovenia and Croatia. On the other hand, countries of the former Yugoslavia which are not members of EU: Serbia, Bosnia and Herzegovina, North Macedonia and Montenegro. The impact of investments on the level of food security has not been researched enough in this countries and these research are important given the challenges of maintaining food security in the EU and non-EU countries.

The paper is divided into four sections. In the first section the impact of investments on food security is explained. Second section refers to the material and statistical method that was used in the paper. In the third section results of the research are shown. In the last section discussion and conclusion are presented.

### **Investments and Food Security**

In the second half of the twentieth century there was an increase in agricultural productivity and economic growth which led to large-scale food security, however this did not happen in some parts of developing countries.

For developing countries, it is characteristic that natural potentials are insufficiently used, there is a low level of specialization in farm production, as well as an extremely low level of employee motivation, due to low average wages. The equipment of modern machines is not at the required level, which results in reduced yields. The participation of individual agricultural farms and their symbolic organization into cooperatives is dominant and there is also a low level of production intensity.

The main constraints for farmers in developing countries are the little available capital, insufficient use of the technology and market risks. In order to increase production, profits and productivity in developing countries, investments are needed. In the past, policy practices were directed to increasing output and agriculture productivity. However, agriculture now has to be internationally competitive and sustainable. Farmers, need to be profitable and meet environmental standards and regulations, while they are buried with information about new technologies from various government and industry

sources. So in response to agricultural policies that include environmental conditions farmers need to change their production and management practices (Kuyvenhoven, Ruben, Roseboom, 2001).

Agricultural investment plans in developing countries must consider their impact on agriculture and food security, and also their contribution to economic growth, job creation and poverty reduction. In these countries, agricultural policies are required to adopt a systemic approach, which sets out investments and policies at the farm level within sector-level strategies and programs.

Investments in agriculture are key to eradicating hunger and reducing the number of poor, as it affects multiple dimensions of food security. They have a positive effect on increasing productivity, which leads to an increase in rural incomes and lower food prices, thus making food available to the poor, which also increases their food security. Lower prices of basic food products allow consumers to improve their diet, by consuming a variety of foods. Investment in agriculture can also reduce the vulnerability of food supply to shocks, thereby promoting stability in consumption (FAO, 2012). An increase in investments in agriculture is one of the most influential strategies for achieving food security, especially in rural areas where the majority of the world's poor live. This is supported by the fact that GDP growth in agriculture has proven effective in reducing poverty, as agriculture accounts for a large share of GDP and most of the poor live in rural areas (World Bank, 2008). Investments in agriculture that lead to infrastructural changes, modernization of agriculture, lead to the development of rural areas and raising the quality of life of rural communities, and create synergy effects of joint action of local authorities and farmers (Kulenović, Ivanković, 2016).

The importance of investments and their impact on food security has been pointed out by numerous authors in their research papers. Usman, Ahmed, Javed (2017) analyzed R&D investment in agriculture and their effect on agricultural productivity and food security. Gaffney et al. (2019) found that investments in agricultural innovation by both the public and private sector can ensure production of an adequate food supply, alleviate poverty, achieve better health and nutrition for a growing population and conserve natural resources. Coleman, Berger and Brewin (2019) state that public and private investments in agriculture are identified as global priorities in the Sustainable Development Goals. Fuglie (2016) states that investments in agricultural R&D is an important tool to foster agro-productivity and food security. Lobell, Baldos and Hertel (2013) found that investments in climate adaptation in agriculture represent a good opportunity for climate mitigation, it also benefits poverty reduction and enhances food security.

Investments in agriculture are considered high-risk, because the expected effects can largely depend on environmental conditions that investors cannot influence. Agricultural production significantly depends on natural resources, climate, adoption of new technologies, which can lead to greater or lesser fluctuations in annual production, greater market risk and farmers income instability. So the production process is mostly related to land, which causes certain technological-organizational and economic-political problems.

In developing countries agriculture participates to a large extent in the formation of the national income and also it is the main source of accumulation for the development of industry. Agriculture was neglected in the beginning of industrialization, and its share decreases along with the development of industry. In the countries of the former Yugoslavia, agriculture is largely represented in the creation of total gross value added, regardless of whether they are members of the EU. Agriculture of the former Yugoslavia countries is characterized by small and noncompetitive economies, fragmented land, large number of old farms, low level of adoption of technology and low productivity. Such agriculture is noncompetitive, and in its current state it cannot be a factor in sustainable development and maintaining food security (Kovljenić, Raletić Jotanović, 2020).

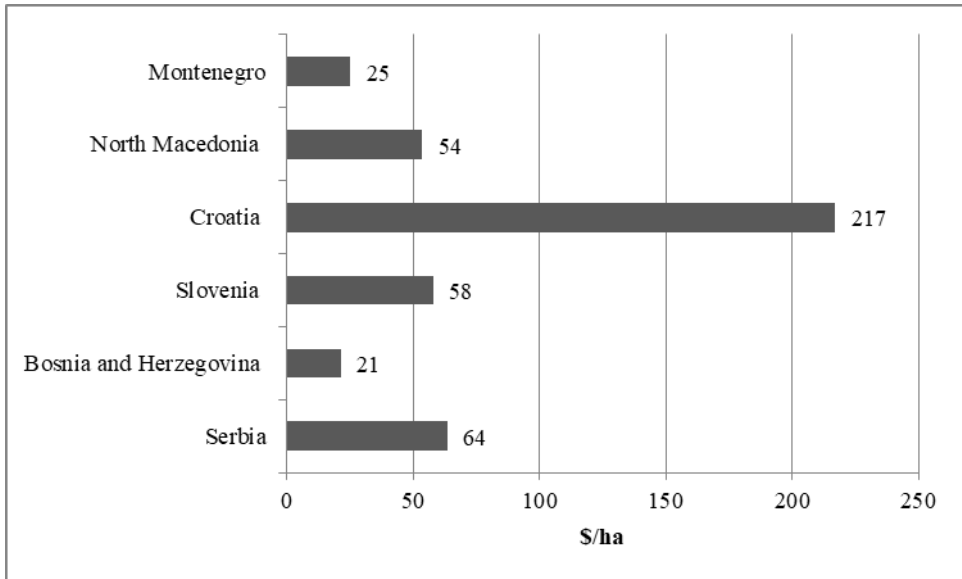
In the countries of the former Yugoslavia, regardless of whether they are members of the EU, problems with investment in agriculture are numerous and varied depending on different periods of agricultural development. The state of agriculture was significantly affected by:

- sanctions of the international community;
- policy of depressed prices of agri-food products in the Socialist Federal Republic of Yugoslavia;
- disintegration of the SFRY after which there was an economic recession,
- occurrence of hyperinflation;
- reduction of agricultural production in the period from 1992-1995 and
- inequality of allocations between the funds intended for the agrarian budget and agriculture contribution to the creation of GDP.

In addition to budget allocations in the countries of the former Yugoslavia for agriculture, countries also have access to European Union funds – IPARD (Pre-Accession Assistance for Rural Development). From the former Yugoslavia countries, only Bosnia and Herzegovina is not a beneficiary of IPARD funds, as this option is only available to candidate countries. However, the new regulations provide for the deletion of candidate status as a precondition for the use of all five IPA components, so that potential candidate countries, such as Bosnia and Herzegovina, would be able to use pre-accession funds for agriculture and rural development.

**Figure 1** shows the average agricultural investments in the countries of the former Yugoslavia in the period from 2006 to 2018. Based on **Figure 1**, it can be concluded that in the observed period, the highest average investments in agriculture were recorded in the Croatia (217 \$/ha), and the lowest were recorded in Bosnia and Herzegovina (21 \$/ha). Croatia is the member of EU, while Bosnia and Herzegovina isn't member of EU. Compared to Croatia, other countries of the former Yugoslavia, have significantly lower amounts of investment in agriculture. After Bosnia and Herzegovina, a lower amount of investment was recorded in Montenegro. North Macedonia and Slovenia have approximately the same level of average investments in agriculture in the observed period.

**Figure 1.** Average agricultural investments in the countries of the former Yugoslavia for the period from 2006 to 2018 (\$ per ha)



*Source:* Authors' calculations based on national statistics (2006-2018)

Given the process of rapid urbanization, increasing population, restraints of agriculture land, decreasing crop production and biodiversity, demand for food has significantly increased. So investments in agriculture are necessary. Investments in agricultural sector especially in new technologies lead to an increase in production. Also investments have a powerful knock-on effect to the rest of the economy by: creating jobs in neighbouring sectors such as food processing and input supply as well as directly in farming, increasing the supply of affordable food, stimulating and supporting wider economic growth and development (Tripp, 2005).

### Material and methods

The paper analyses the six countries of the former Yugoslavia (Serbia, Bosnia and Herzegovina, Slovenia, Montenegro, Croatia and North Macedonia) over a 13-year period (2006-2018). The countries of the former Yugoslavia which are members of EU are Slovenia and Croatia, while countries of the former Yugoslavia which are not members of EU are Serbia, Bosnia and Herzegovina, Montenegro and North Macedonia. This research includes data obtained from several sources: FAOSTAT database (FAOSTAT, 2020), World Bank (The World Bank, 2020), as well as the national statistics of the countries of the former Yugoslavia (Statistical Office of the Republic of Serbia, 2020; Agency for Statistics of Bosnia and Herzegovina 2020; Republic of Slovenia Statistical Office, 2020; Croatian Bureau of Statistics, 2020; State Statistical Office Republic of North Macedonia, 2020; Statistical Office of Montenegro—MONSTAT, 2020).

In order to examine the the impact of gross investments and investments in agriculture

on food security in the countries of the former Yugoslavia, multiple regression analysis was used. The level of food security was operationalized as a percentage of malnutrition and in the regression analysis, this is a dependent variable.

Investments in agriculture were observed through total realized investments in fixed assets by technical structure. Gross investments were observed through total realized investments in fixed assets by technical structure, investor's activity and head office.

The analysis showed that the dependent variables do not have a normal distribution, therefore it was necessary to further transform the data. The Log transformation brought the data closest to the normal schedule, because that is where the least skewness and the least kurtosis occurred.

The relationship between the dependent variable  $y$  and the independent variable  $x_1, x_2, \dots, x_m$  is represented by linear regression relations:

$$Y = \alpha * x_1^{\beta_1} * x_2^{\beta_2} \dots x_m^{\beta_m} / \log$$

$Y$  - percentage of malnutrition

The set of independent variables includes:

$x_1$  – expenditure on food and non-alcoholic beverages;

$x_2$  – poverty rate (%);

$x_3$  – real consumer price index;

$x_4$  – gross investments (per capita);

$x_5$  – investments in agriculture (\$ per ha);

$x_6$  – rural population (growth in %).

### Results of research

Results of research, descriptive statistic and multiple regression analysis will be shown in this section.

**Table 1** shows the results of descriptive statistics. Within the obtained results, it is important to point out that the lowest percentage of malnutrition was recorded in Slovenia and Croatia (values in all years were less than 2.5). Slovenia stood out in relation to the other countries of the former Yugoslavia, with the lowest poverty rates in the observed period (the average rate was 13 %). Croatia stood out as the country with the largest investments in agriculture (average agricultural investments was 217 \$/ha).



**Table 1.** Descriptive statistics

|   | Minimum | Maximum | Mean    | Standard Deviation | Skewness | Kurtosis |
|---|---------|---------|---------|--------------------|----------|----------|
| Percentage of malnutrition  | 2.39    | 6.10    | 3.37    | 1.33               | 1.11     | -.440    |
| Expenditure on food and non-alcoholic (annual average in dollars) | 2039.52 | 4597.85 | 3629.17 | 606.99             | -.07     | -.54     |
| Poverty rate (%)  | 4.90    | 31.10   | 19.08   | 6.09               | -.25     | -.64     |
| Real consumer price index   | 88.55   | 137.25  | 102.77  | 5.05               | 4.08     | 28.55    |
| Gross investments (constant 2010 dollars)                         | 244.87  | 4620.09 | 1705.44 | 1078.68            | 0.88     | -.28     |
| Investments in agriculture (constant 2010 dollars)                | 21.05   | 957.11  | 200.27  | 211.62             | 2.26     | 5.14     |
| Rural population (growth in %)                                    | -1.79   | .49     | -.6745  | .5239              | .035     | -.122    |

Source: Authors' calculations

In *Model 1*, the set of independent variables included: poverty rate, real consumer price index, expenditure on food and non-alcoholic beverages and investment in agriculture.

The regression model was statistically significant ( $R^2=0.742$ ;  $F(77, 4)=56.384$ ;  $p<0.000$ ; Durbin-Watson (DW)=2.357). Based on a set of independent variables, it is possible to explain the dependent variable. The percentage of explanation of the variance of the dependent variable is 74%.

**Table 2.** Results of regression analysis (Model 1)

| Model 1   | $\beta$ | Standard error | T      | Significance |
|---|---------|----------------|--------|--------------|
| (constant)  |         | .813           | -1.655 | .102         |
| LG10Poverty rate                                      | .560    | .045           | 9.496  | .000         |
| LG10Real consumer price index                         | .163    | .352           | 2.788  | .007         |
| LG10Expenditure on food and non - alcoholic beverages | -.563   | .091           | -9.586 | .000         |
| LG10Investment in agriculture                         | -.210   | .017           | -3.547 | .001         |

Source: Authors' calculations

In *Table 2 (Model 1)*, based on the results of regression analysis, it can be concluded that the poverty rate, real consumer price index, expenditures on food and soft drinks and investments in agriculture explain the percentage of malnutrition in the countries of



the former Yugoslavia, regardless of whether they are members of the EU. The highest contribution to the explanation of the dependent variable is given by the poverty rate in the positive direction and expenditures on food and non-alcoholic beverages and investment in agriculture in the negative direction. At the same time research results show that the real consumer price index explains the malnutrition rate to a lesser extent. The poverty rate statistically significantly in a positive direction explains the rate of malnutrition in the countries of the former Yugoslavia. Expenditures on food and non-alcoholic beverages make an equal contribution in the negative direction, with an increase in expenditures, the malnutrition rate decreases. This information can be supplemented by a real consumer price index, which shows that as the real index increases, so does the percentage of malnutrition. The examined rate is explained in a negative direction by investments in agriculture, with the growth of investments, the rate of malnutrition decreases.

In *Model 2*, the set of independent variables included: gross investments, expenditure on food and non-alcoholic beverages, poverty rate and percentage of growth of rural population.

The regression model was statistically significant ( $R^2 = 0.732$ ;  $F(77, 4) = 39.699$ ;  $p < 0.000$ ;  $p < 0.05$ ; Durbin-Watson (DW) = 1.969). Based on a set of independent variables, it is possible to explain the dependent variable. The percentage of explanation of the variance of the dependent variable is 71%.

**Table 3.** Results of regression analysis (Model 2)

| Model 2   | $\beta$ | Standard error | T      | Significance |
|---|---------|----------------|--------|--------------|
| (constant)  |         | .422           | 8.811  | .102         |
| LG10Gross investments                                 | -.096   | .041           | -2.359 | .022         |
| LG10Expenditure on food and non - alcoholic beverages | -.896   | .123           | -7.291 | .000         |
| LG10Poverty rate                                      | .335    | .057           | 5.879  | .000         |
| LG10Percentage of growth of the rural population      | .055    | .022           | 2.535  | .014         |

*Source:* Authors' calculations

Based on the results given in *Table 3 (Model 2)*, it can be concluded that gross investment, poverty rate, expenditure on food and non-alcoholic beverages, and rural population growth rate explain 71% of the percentage of malnutrition in the countries of the former Yugoslavia, regardless of whether they are members of the EU. Each of the independent variables explains the dependent variable statistically significantly ( $p < 0.001$  and  $p < 0.05$ ). The highest contribution to the explanation of the dependent variable is given by the poverty rate in the positive direction, as well as expenditures on food and non-alcoholic beverages in the negative direction. Based on these findings, it can be concluded that malnutrition in the countries of the former Yugoslavia can be explained on the basis of the poverty rate. On the other hand, the growth of expenditures

on food and non-alcoholic beverages, as well as the growth of gross investments, reduces malnutrition. At the same time, a higher percentage of rural population growth in a positive direction explains the dependent variable.

### Discussion

The results of research show that:

- Gross investments affect the level of food security in countries of the former Yugoslavia, regardless of whether they are members of the EU.
- Agricultural investments impact the level of food security in countries of the former Yugoslavia, regardless of whether they are members of the EU. In the presented models, investments in agriculture showed greater statistical significance, in comparison to gross investments.

Data from national statistics showed differences between countries of the former Yugoslavia in the amount of investments and food security, and the regression results indicated the statistically significant impact of investments on food security in all countries of the former Yugoslavia, regardless of whether they are members of the EU. Largest amount of gross investments and investments in agriculture was recorded in Croatia and Slovenia, which also have the highest level of food security. Croatia recorded the highest amount of investments in agriculture per hectare, in comparison to the other former Yugoslavia countries. Both Croatia and Slovenia are members of EU. According to the gross investments per capita, Slovenia stands out as the country that in the observed period from 2006 to 2018 recorded the largest amount of gross investments. After Croatia, Serbia records a higher amount of investments in agriculture per hectare, compared to other former Yugoslavia countries. However, Serbia has a significantly lower level of gross investment per capita and a lower level of food security. North Macedonia records approximately the same level of investment in agriculture per hectare as Slovenia. However, in terms of gross investment per capita, it records a lower level compared to other former Yugoslavia countries. In North Macedonia, lower food security was recorded compared to the level recorded in Croatia and Slovenia. A significantly lower level of investment in agriculture per hectare was recorded in Montenegro, compared to other countries of the former Yugoslavia. According to gross investments per capita, in the last years of the analysis in 2017 and 2018, a higher amount of investments was recorded, compared to Serbia, North Macedonia and Bosnia and Herzegovina. However, over the years, a higher number of food insecure people has been recorded, and thus a lower level of food security. The results of the research showed that the lowest volume of gross investments and investments in agriculture was recorded in Bosnia and Herzegovina, which also has the highest number of food insecure.

Bearing in mind the results of the research, it can be concluded that differences in food security exist between EU members countries (Slovenia and Croatia) and non-EU members countries (Serbia, Bosnia and Herzegovina, Montenegro and North

Macedonia). So, it can be concluded that part of Yugoslavia, which consists of the present-day countries of Slovenia and Croatia, and which are EU members countries, have the the highest amount of investments and the highest level of food security. On the other hand, the countries of the former Yugoslavia that are non-EU members countries have a lower volume of investments and a lower level of food security, in comparison with EU members countries. Countries of the former Yugoslavia that are non-EU members countries, Serbia and North Macedonia, have a medium level of investments and medium level of food security. While, the remaining two of the non-EU members countries, Bosnia and Herzegovina and Montenegro, have a lower level of investments and lower level of food security.

In the future, in order to increase the level of food security, in the countries of the former Yugoslavia, agriculture will be required to increase productivity which will enable meeting the growing demand for food. In order to increase productivity, investments in agriculture are necessary, especially in non-EU members countries, where lower investments were recorded, namely Bosnia and Herzegovina and Montenegro. Investments will have a positive impact on productivity which will also affect the increase in food security in non-EU members countries of the former Yugoslavia. Also, it is not disputed that productivity in agriculture is basically determined by the level of economic development of the country and resource-ecological conditions (Zekić, Gajić, Lovre, Trkulja, 2004).

It is important to emphasize that smallholder farmers in countries of former Yugoslavia remain in the dark regarding investments and usage of modern technologies. So there is a need for informing farmers on the importance of improved farming practices, adaptation to new technologies and better utilization of land through coordinated efforts of agricultural research with developmental organizations. This is particularly important in developing countries, because agriculture remains a central element of the economy and investments are the key to the agricultural growth needed to reduce poverty (Dhehibi, Rudiger, Moyo, Dhraief, 2020). In non-EU members countries of the former Yugoslavia, the agricultural sector is economically and socially important for its contribution to achieving food security and employment.

### **Conclusion**

In most countries of the former Yugoslavia, regardless of whether they are members of the EU, agricultural production still has a high level of production for its own needs. This is primarily a consequence of the limited production capacity of small family farms, which do not produce more than their own needs, but also the lack of opportunities to sell sporadic surpluses of agricultural products. Therefore, the task of each country is to promote investments in agriculture in order to increase the agricultural farms productivity, modernize production and increase the quality of agricultural products, with the ultimate goal of achieving an appropriate level of food security.

Based on the results of research and obtained data, international policies, national policies, and strategies can be created in such a way to increase the amount of investments in agriculture and the level of food security. Recognizing the importance of investments is extremely important for the purpose of increasing food security in Montenegro and Bosnia and Herzegovina, because as non-EU members countries they have the lowest investments in food security. As for Slovenia and Croatia, which are EU members countries, and which according to the results of the research, have recognized the great influence of investments on food security, they should maintain such tools that recognize the role of investments in food security.

Agriculture plays a paradoxical role in the development process. In developing countries, such as countries of the former Yugoslavia, increase in productivity is required in order to improve rural incomes, maintain food production and food security. These contributions of agriculture to economic development require a specifically defined policy framework that offers appropriate incentives to farmers to improve productivity (OECD, 2001). It is also necessary that policies and investments, in addition to focusing on agricultural development, be focused on the development of other activities available to the poor in rural areas in countries of the former Yugoslavia. This includes expanding coverage of basic health, food and education services, social protection, as well as safety nets for the poor (FAO, 2017). All this can generate significant benefits for the agricultural sector and increase its contributing to economic growth and poverty reduction.

There are a number of factors influence the extent to which the poor benefit from investments that create changes in agricultural productivity through and adoption of new technology. The results indicate that agricultural modernization has a positive effect on both measures of economic growth and human development (Self, Richard, 2007). Investments have a positive impacts on employment and food prices. Employment is of critical importance to the livelihoods of the poor. Especially investments in new technology increases demand for labour, which is of great importance to the poor in countries of the former Yugoslavia, regardless of whether they are members of the EU. Adoption of new technology have a positive effect on increasing productivity, which leads to an increase in rural incomes and lower food prices, thus making food available to the poor, which also increases their food security. However, an increase in production can also lead to a decrease in prices to the extent that producers' incomes fall. Thus, where productivity increases due to technology match or even outpace the corresponding fall in prices, both net consumers and net producers can benefit (Tripp, 2005).

Given that agriculture is a major driving force for the former Yugoslavia countries, regardless of whether they are members of the EU, and the connection between agriculture, economic growth, and food security, greater investment in agriculture are necessary. Economic growth is particularly important in reducing poverty and food insecurity, and agriculture is an important driver of economic growth. Investments in agriculture are especially important in less developed countries for stimulating economic growth and poverty reduction. Agriculture investments create the basis for increasing agricultural production, reducing food insecurity, increasing food supply and increasing incomes.

The research has certain limitations related to data availability. Future research will be directed towards greater coverage of data and the inclusion of additional factors such as political factors that affect food security.

### Conflict of interests

The authors declare no conflict of interest.

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