



27th International Scientific Conference
Strategic Management
 and Decision Support Systems
 in Strategic Management
SM2022

Subotica (Serbia), 20th May, 2022

Mina Kovljenić

Faculty of Economics in Subotica
 Novi Sad, Republic of Serbia
 e-mail: mina.sk90@yahoo.com

Jelena Nestorov Bizonj

Cooperative Union of Vojvodina
 Novi Sad, Republic of Serbia
 jelenanb@yahoo.com

RESOURCE USE AND FOOD SECURITY IN THE REPUBLIC OF SERBIA

Abstract: Achieving food security and resources sustainability have a high priority in agrarian policy that universal for all economies. Today modern agriculture has many complex challenges, so a sustainable agriculture approach is needed. Agriculture now must produce more food, using available natural resources efficiently and sustainably, including a reduction of post-harvest losses and waste, and developing agriculture more resilient to climate change. The Republic of Serbia has a good quality of agricultural land, favorable ratio of available land per capita, and favorable climate conditions for agricultural production. However, Serbia has a large number of small farms with fragmented property, family workforce, low level of technical equipment and capital, which have a high production costs and irrational use of resources. The aim of this paper is to examine the impact of resource use on the level of food security in the Republic of Serbia. The survey data were taken from the FAOSTAT database, World Bank, as well as the national statistics of the Republic of Serbia and hierarchical regression analysis was used. The results of the research have shown that resource supply has a statistically significant impact on the level of food security in the Republic of Serbia.

Keywords: Food security, agriculture resources, Republic of Serbia

1. INTRODUCTION

The concept of food security has evolved over the past 40 years. According to the FAO Committee on World Food Security: “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 1996). The last revision to this definition happened at the 2009 World Summit on Food Security which added a fourth dimension – stability – as the short-term time indicator of the ability of food systems to withstand shocks, whether natural or man-made (FAO, 2009). The four pillars of food security are availability, access, utilization, and stability (FAO, 1996).

Food security can be considered a basic human right, which cannot be achieved by millions of people. Fears of food insecurity and resource scarcity are not new. Over the last decades the consumption increases have made evident a growing demand for natural resources including energy, minerals and agricultural natural resources (such as arable land, water), and have brought back the specter of resource scarcity and food insecurity. Current food systems are generating negative outcomes such as degradation of land, water, biodiversity loss, excessive greenhouse gas emissions, persistent malnutrition and hunger, and failure to eradicate poverty, particularly related to rural population (FAO, 2014; FAO, IFAD & WFP, 2015). Today, more than enough food is produced to feed the global population, but the food insecurity problem still exists (there are large differences between countries, even within the same country and even the same household). Bearing in mind the above, agriculture will face a number of challenges while trying to maintain sustainable use of agriculture resources, so there needs to be a transition to more sustainable food systems (FAO, IFAD & WFP, 2015; Bilali, Callenius, Strassner, Probst, 2018).

In the Republic of Serbia, agriculture plays an important role in the overall employment, overall export, as well as in the economic structure which confirms the share of agriculture in GDP. The share of agriculture in GDP in recent years ranged around 8%, while in 2020 it amounted to 6,3% (Statistical Office of the Republic of Serbia, 2022). The

agriculture of Serbia has been exposed to numerous internal and external challenges in recent decades. In agriculture of Serbia there is a lack of agricultural infrastructure, a large number of small size holdings and fragmentation of land, unsatisfactory condition of equipment and machinery and unfavorable age and educational structure of the labor force in agriculture which negatively affect the agriculture resource use. Also, unstable political circumstances, a long period of economic transition and changes in economic policies in agriculture, climate changes, and others, have significantly affected the state of agricultural resources which are the basis for maintaining food security in the future. Bearing in mind all the above, the aim of this paper is to examine the impact of resource use on the level of food security in the Republic of Serbia.

2. AGRICULTURAL RESOURCES AND FOOD SECURITY

Globally, agriculture faces a number of challenges from ecosystem degradation, climate change, which significantly affect resource scarcity. Also, the recent increase in certain types of crises, such as COVID-19, and Russia-Ukraine war, has also raised concerns about the potential negative impacts on food security.

During the second half of the 20th century the rate of growth of demand was lower than the potential growth of supply. That, based on large productivity increases associated with application of new technology, reduced production costs, and a massive increase in the use of fertilizers and pesticides. However, in agricultural production, a massive increase in the use of fertilizers and chemicals in the soil system, increased degradation of resource quality. Also, arable land per capita is declining and will decrease in the future. According to some calculations, arable land will decline from about 0.25 ha to 0.08 ha per person (Uphoff, 2012). Increasing land scarcity in the world and particularly in developing countries facing high climate risks, enhance the policy relevance of the links between access to land, tenure security and food security (Godfray et al., 2010). Smallholder production and shrinking holding sizes characterize many developing countries and a growing share of smallholders are net buyers of food. Urban transformation renders uncertain tenure rights on agricultural lands near urban centers where competition for land is high (Holden, Ghebru, 2016). For that reason, secure access to sufficient land is an important means of achieving food security especially in rural areas engaged in agricultural activities. Except land, supply of water, which is essential for agricultural production is becoming less reliable as well as less available for farmers. Energy costs will be much higher in the 21st century will almost certainly be higher than in the 20th century, making energy-intensive production more costly (Uphoff, 2012).

Given the environmental, social, and economic costs of the “linear” nature of the modern food production system are significant transition to circular agriculture practices is needed. The adoption of circular agricultural practices is particularly suited for labour intensive smallholder farming. Circular agriculture focuses on using minimal amounts of external inputs, regenerating soils and minimizing the impact on the environment. It can also help ensure a reduction in land-use, reduction of post-harvest losses, chemical fertilizers and waste, which makes it possible to reduce global CO₂ emissions. In Europe, it is estimated that a circular approach to food systems could reduce the use of chemical fertilizers by 80 percent (UN, 2021). All of the above can positively affect on preservation of basic resources for production, and thus on the higher level of food security.

The Republic of Serbia has rich land resources, rich biodiversity and favorable climatic conditions for agriculture. However, extreme weather conditions, in certain periods and areas, lead to instability of agricultural production. Also, labor productivity is low and yields are well below potential, mostly due to a lack of financial resources and modern technology (Ristić, 2018). According to the Agricultural Census data from 2012, Serbia has 631.522 farms listed. The average size of land per agricultural holding is 5.4 hectares. Of the listed holdings in agriculture, 99.6% were holdings of individuals, that use 82% of the area, with an average size of land 4.5 ha; and 0.4% of holdings are owned by legal entities, that use 16% of the area and have an average size of 210 ha of land per farm. From the results of the list, it can be seen that holdings that use up to 5 hectares of land make 77.7% of the total number of listed holdings. The average farm size in Serbia lags significantly behind the same indicator in the EU, where according to the data from the census of agriculture in the EU in 2010, agricultural households use in average 17.9 hectares of land (Nestorov-Bizonj, Kovljenić, Erdelji, 2015).

On small farms with fragmented holdings and the existing structure of production, there are high production costs and inefficient use of agriculture resources, with the inability to achieve efficient use of land, especially in the low-intensive production of classic arable crops, which are mostly represented on small farms. In addition, the average farm in Serbia is characterized by a low level of technical - technological equipment, an extremely small number of livestock per unit of agricultural land, and other indicators that make it difficult to increase productivity and profitability in production. In the Republic of Serbia yields in primary field crops, as well as in the production of meat and milk are significantly lagging behind the same indicators in the EU. For example, one producer in Serbia produces food for 18 inhabitants, in Germany 143, France 70, Austria 55 (Vlahović, Tomić, Ševarlić, 2009).

The association of farmers with small holdings in agricultural cooperatives and their joint appearance on the market can significantly improve the use of agriculture resources and the availability of the market to farmers and thus improve production security and productivity. According to McNerney (2016) cooperatives and producer organizations play a fundamental role in ending poverty and improving food security and nutrition; that is why they are cooperatives acknowledged as key actors in implementing the 2030 Agenda for Sustainable Development, adopted by the United Nations, 2015. Efficient cooperatives enable their members to overcome many constraints by increasing their access to

agriculture resources and services, market and economic opportunities, enhancing social inclusion, and giving their members a voice to defend their own interests.

Access to land is an important indicator of household welfare in agrarian economies with limited off-farm employment opportunities. Rural households may derive income from agricultural, as well as nonagricultural activities, and they may obtain food by producing it themselves or buying it from the market. Hence, the link between household food production and food security is stronger in environments that are poorly integrated into markets. Particularly where food and labor markets are poorly developed and production of low value-added products dominates. Agricultural production risks affect income risk and may cause various forms of income diversification strategies to smooth income over time (Holden, Ghebru, 2016). Food insecurity may be seen as part of a wider concept of livelihood insecurity. Poor people spend a large share of their income on food and the inability to balance food consumption, significantly affect the level of their food security.

The complexity of defining food insecurity also makes its measurement empirically challenging (Holden, Ghebru, 2016). The FAO indicator of the Prevalence of Undernourishment (PoU) is defined as “the percentage of a population whose food intake in terms of dietary energy in kilocalories is insufficient to meet requirements on a continual basis” (Molotoks, Smith, Dawson, 2021). It is an internationally recognized indicator routinely used by international agencies, governments, and NGOs alike since 1998 and is evaluated with reference to a mean daily calorie threshold. This is described as a Minimum Dietary Energy Requirement (MDER) as established by nutritionists, and a probability distribution of habitual Dietary Energy Consumption of a representative individual in a population (Molotoks, Smith, Dawson, 2021).

The impact of resource use on the level of food security has been the subject of research in numerous papers. Alawode, Olaniran and Abegunde (2018) have analyzed how farmers’ age, education, tenure security, soil type and fertility, land use, household income, total holdings size, and household size had a significant effect on farmers’ participation in the land market. Research results have shown that land market index, age, tenure security, household size, cropping pattern, land improvement techniques, and number of farm plots were found to significantly affect the food security status of farming households. Thus, a strong linkage was established between land use, land market, and food security. Phami, He, Liu, Ding, Silva, Li and Qin (2020) used linear regression technique in the paper and the results showed that household size, food price, drought, shock, household income per month, number of laborers, gender of the household head, and farmland areas are important factors for household food insecurity. Kassie, Ndiritu Wagura and Stage (2014) analyzed the link between gender of household head and food security in rural Kenya. They found that female headed households are less secure in terms of food and that they could be more food secure, if they had the male headed households’ observable resources and characteristics. The analysis has further revealed that that female headed households’ food security is influenced by many factors: household wealth, social capital network, land quality, input use, access to output markets, information and water sources. Matkovski, Đokić, Zekić and Jurjević (2020) analyzed the share of the added value of agriculture in GDP, value of agricultural production per capita, share of export of agricultural products, and land productivity as factors that determine the level of food security in the countries of Western Balkans.

3. MATERIAL AND METHODS

The data for the research were taken from the World Bank, FAOSTAT database and national statistics of the Republic of Serbia. The data required for the research cover the period from 2010 to 2020. Multiple regression analysis was used in the article and the obtained data were analyzed in the statistical package SPSS 21 for Windows OS.

$$\ln Y = \alpha + \beta_1 \ln x_1 + \beta_2 \ln x_2 + \beta_3 \ln x_3 + \beta_4 \ln x_4 + \beta_5 \ln x_5 + \varepsilon$$

where:

Dependent variable is:

Y - number of malnourished, which is calculated through the indicator - Prevalence of undernourishment.

The set of independent variables includes:

x_1 - Resource supply (ratio land/work);

x_2 - Fertilizer consumption (kilograms per hectare of arable land);

x_3 - Share of agriculture, forestry, and fishing (% of GDP);

x_4 - Agriculture, forestry, and fishing, value added per worker (constant 2015 US\$);

x_5 - Rural population (% of total population)

4. RESULTS

The results of the regression analysis will be presented in the next part.

Model 1, encompassed the set of the following independent variables: resource supply, fertilizer consumption and share of agriculture, forestry, and fishing. The regression model is statistically significant ($F(10, 3) = 7,871$; $p < 0,000$; Durbin-Watson = 1,800) and percentage of explanations dependent variable is 77%.

Table 1: Regression results (Model 1)

Variables	Coefficient
(Constant)	5,830***
Resource supply	-0,487**
Fertilizer consumption	-0,010
Share of agriculture	0,085
R	0,878
R Square	0,771
Adjusted R square	0,673
Std. Error of the Estimate	0,01050

*** Significant at the 0.01 level (2-tailed). ** Significant at the 0.05 level (2-tailed).

Source: Authors' calculations, based on World Bank (2022), FAOSTAT (2022) and Statistical Office of the Republic of Serbia (2022).

The results of regression analysis show that resource supply has a significant impact on the level of food security. Lower resource supply leads to an increase in the number of malnourished. Higher share of agriculture leads to increase in food insecurity. It is expected because developing countries have a relatively larger contribution of agriculture in GDP. Also, lower fertilizer consumption leads to increase in number of malnourished.

Model 2, encompassed the set of the following independent variables: resource supply, share of agriculture and agriculture, forestry, and fishing, value added per worker. The regression model is statistically significant ($F(10, 3) = 8,121$; $p < 0,000$; Durbin-Watson = 1,743) and percentage of explanations dependent variable is 77%.

Table 2: Regression results (Model 2)

Variables	Coefficient
(Constant)	5,938***
Resource supply	-0,503***
Share of agriculture	0,095
Agriculture, forestry, and fishing, value added per worker	-0,034
R	0,881
R Square	0,777
Adjusted R square	0,681
Std. Error of the Estimate	0,01038

*** Significant at the 0.01 level (2-tailed). ** Significant at the 0.05 level (2-tailed).

Source: Authors' calculations, based on World Bank (2022), FAOSTAT (2022) and Statistical Office of the Republic of Serbia (2022).

Similar results were shown in Model 2, where resource supply has a significant impact on the level of food security. Results show that lower agriculture, forestry, and fishing, value added per worker and higher share of agriculture lead to increase in food insecurity in Republic of Serbia.

Model 3, encompassed the set of the following independent variables: share of agriculture, fertilizer consumption, rural population and agriculture, forestry, and fishing, value added per worker. The regression model is statistically significant ($F(10, 4) = 8,079$; $p < 0,000$; Durbin-Watson = 1,077) and percentage of explanations dependent variable is 84%.

Table 3: Regression results (Model 3)

Variables	Coefficient
(Constant)	0,158
Agriculture, forestry, and fishing, value added per worker	-0,068

Share of agriculture, forestry, and fishing	0,089
Rural population	3,395**
Fertilizer consumption	0,007
R	0,918
R Square	0,843
Adjusted R square	0,739
Std. Error of the Estimate	0,00939

*** Significant at the 0.01 level (2-tailed). ** Significant at the 0.05 level (2-tailed).

Source: Authors' calculations, based on World Bank (2022), FAOSTAT (2022) and Statistical Office of the Republic of Serbia (2022).

The results of regression analysis show that rural population has a significant impact on the level of food security. Rural population growth has a negative impact on number of malnourished. Lower fertilizer consumption, lower agriculture, forestry, and fishing, value added per worker and higher share of agriculture lead to increase in food insecurity in Republic of Serbia.

5. DISCUSSION

The results of regression analysis show that resource supply and rural population have a significant impact on the level of food security in the Republic of Serbia. In contrast, fertilizer consumption, agriculture, forestry, and fishing, value added per worker, and share of agriculture have a lower impact on the level of food security in the Republic of Serbia.

As the results of the research showed, the supply of agriculture resources significantly affects the number of malnourished in Serbia, and the most important resource in agricultural production is land. In recent years growing demand for food, has generated intense agricultural production and the growing risk of land degradation processes. Due to these great pressures on natural resources, as well as to deforestation, unplanned use of land, etc., the land fund has been degraded and reduced. Because of the above-listed negative impacts on land resources, land losses resulting from erosion, contribute to the negative trend of decreasing the area of agricultural, forest and water lands.

Regional differences in agriculture of the Republic of Serbia are very pronounced, and existing land resources (0.54 ha of agricultural land per capita) provide additional income and ensure food security. However, the average agricultural holdings in Serbia are characterized by a low level of technical and technological equipment, an extremely small number of livestock individuals and agricultural indicators, and other indicators that hinder productivity and profitability in production (Nestorov-Bizonj, Kovljenić, Erdelji, 2015). The low productivity in production negatively affects the price competitiveness of production, which puts an average agricultural producer in a difficult position on the market which makes it difficult to maintain food security.

The high level of rural poverty and unemployment is most often closely related to the high reliance of rural areas on agriculture. In Serbia the importance of individual holdings is great, however, the economic importance of these holdings is at odds with their potential. They are based on the work of the family workforce, which is accompanied by senilization, feminization and deagrarization, all of which result in reduced work potential. In addition, these holdings operate mainly within the limits of simple reproduction, with pronounced elements of natural or simple commodity production (Kovljenić, 2017). So, initiatives and efforts of all key actors of sustainable rural development are necessary for restructuring and improving the economic base of rural areas, because the insufficient influence of certain social groups can lead to greater poverty and food insecurity.

The Strategy of Agriculture and Rural Development defines the goals for the development of agriculture and rural areas of the Republic of Serbia which realization is expected by 2024: production growth and producer income stability; growth of competitiveness and technological improvement of the agricultural sector; sustainable resource management and environmental protection; improving the quality of life in rural areas and reducing poverty; effective management of public policies and improvement of the institutional framework development of agriculture and rural areas (Ministry of Agriculture, Forestry and Water Management of Serbia, 2014). Achieving these goals is essential for maintaining and increasing the level of food security in the future. One of the options for maintaining an appropriate level of food security is transition toward circular agriculture. The move to circular agriculture requires more involvement in the promotion of smallholder farming. Circular agriculture with more diversity of production is associated with better health and nutrition, in contrast to export-oriented mono-crop production which has often led to increased food insecurity. Also, circular agriculture is more labour intensive compared to conventional farming, which offers a strategy to stimulate the economy in rural areas. The adoption of circular farming practices can make an important contribution to poverty reduction and food security and create new employment opportunities, particularly in rural areas (UN, 2021).

6. CONCLUSIONS

Results of this analysis have shown that resource supply and rural population have a significant influence on the level of food security in the Republic of Serbia. The results of the research are in line with previous research (Alawode, Olaniran and Abegunde (2018), Phami, He, Liu, Ding, Silva, Li and Qin (2020), Kassie, Ndiritu Wagura and Stage (2014), Matkovski, Đokić, Zekić and Jurjević (2020)) which showed that there is a significant impact of resource use on the level of food security.

Access to land is an important indicator of household welfare in agrarian economies with limited off-farm employment opportunities. For rural areas, it is characteristic that the link between household food production and food security is stronger when environments are poorly integrated into markets. Also, poverty is mostly concentrated in rural areas.

Current and future resource challenges to food security call for research and knowledge to better characterise the availability of agriculture resources, ways to develop rural areas, and ways for optimizing sustainable resource management for food security.

For Serbian agriculture, characterized by small holdings with fragmented land, family workforce, high production costs and irrational use of resources, the association of producers in agricultural cooperatives is the best way to make better use of their resources, and thus increase the level of food security. A large number of producers in Serbia are united in cooperatives, but there are still many producers who do not take advantage of cooperative organization. Economic policy measures in agriculture should encourage cooperative organization more.

Given the current state of agriculture resources and their importance for food security it is necessary to adopt a new concept of circular agriculture. The move to circular agriculture requires more emphasis on the promotion of smallholder farming and mixed agriculture practices. Circular agriculture with more diversity of production is associated with better health and nutrition, in contrast to export-oriented monocrop production which has often led to increased food insecurity. Also, circular agriculture is also more labour intensive compared to conventional farming, which offers a strategy to stimulate the economy in rural areas. The adoption of circular agriculture practices can thus make an important contribution to poverty reduction and food security and create new employment opportunities, particularly for rural areas.

The Republic of Serbia has no state measures that encourage the rational use of resources, so in order to maintain food security in the future, it is necessary to create appropriate agriculture policies. These agriculture policies need to be directed towards better use of agriculture resources, through the applications of sustainable agricultural practices, encouragement of cooperative organization, and application of circular agriculture. Since the use of resources is influenced by numerous factors, the conducted research is the basis for future research that will include more factors that affect agricultural resources and food security.

REFERENCES

- Alawode O.O., Olaniran O.M., Abegunde V.O. (2018). Effect of land use and land market on food security status of farming households in South-Western Nigeria: Evidence from Oyo state. Conference: 1st Feed the Future Nigeria Agricultural Policy Project Conference At: Abuja, Nigeria.
- Bilali, H. E., Callenius, C., Strassner, C., Probst, L., (2018). Food and nutrition security and sustainability transitions in food systems. *Food Energy Security*, 8, 1-20. <https://doi.org/10.1002/fes3.154>
- FAO (1996). Rome Declaration on World Food Security and the World Food Summit Plan of Action. World Food Summit, 13– 17 November 1996. Rome: FAO.
- FAO (2009). Declaration of the World Food Summit on Food Security. Rome: FAO.
- FAO (2014). Building a common vision for sustainable food and agriculture - principles and approaches. Rome, Italy: FAO. Retrieved March 10, 2022 from FAO: <http://www.fao.org/3/a-i3940e.pdf>
- FAO, IFAD & WFP (2015). The state of food insecurity in the world 2015. Meeting the 2015 international hunger targets: Taking stock of uneven progress. Retrieved March 15, 2022 from FAO: www.fao.org/3/a-i4646e.pdf
- FAOSTAT (2022). FAOSTAT Data. Retrieved March 15, 2022 from FAO: <https://www.fao.org/faostat/en/#home>
- Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M., Toulmin, C., (2010). Food security: the challenge of feeding 9 billion people. *Science*, 327 (5967), 812–818. doi: 10.1126/science.1185383
- Holden, S. T., Ghebru, H. (2016). Land tenure reforms, tenure security and food security in poor agrarian economies: Causal linkages and research gaps. *Global Food Security*, 10, 21-28. <https://doi.org/10.1016/j.gfs.2016.07.002>
- Kassie, M., NdirituWagura, S., Stage, J. (2014). What determines gender inequality in household food security in Kenya? Application of exogenous switching treatment regression. *World Development*, 56 (C), 153-171. DOI: 10.1016/j.worlddev.2013.10.025
- Kovljenić, M. (2017). Efficiency of agricultural production in the Republic of Serbia. *Agroeconomics*, 75, 1-10.

- Matkovski, B., Đokić, D., Zekić, S., Jurjević, Ž. (2020). Determining Food Security in Crisis Conditions: A Comparative Analysis of the Western Balkans and the EU. *Sustainability*, 12 (23), 1-16. <https://doi.org/10.3390/su12239924>
- McInerney, E. (2016). Enhancing cooperatives' impact in the food and agriculture sector: key to implementing the Sustainable Development Goals (Draft). Retrieved April 11, 2022 from: <https://www.un.org/esa/socdev/egms/docs/2016/Coops-2030Agenda/McInerney.pdf>
- Ministry of Agriculture, Forestry and Water Management of Serbia (2014). Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. White City. Retrieved April 11 2022 from: <http://uap.gov.rs/wp-content/uploads/2016/05/STRATEGIJA-2014-2020-.pdf>
- Molotoks, A., Smith, P., Dawson, T.P. (2021). Impacts of land use, population, and climate change on global food security. *Food and Energy Security*, 10 (1), 1-20. <https://doi.org/10.1002/fes3.261>
- Nestorov-Bizonj J., Kovljenić M., Erdelji T. (2015). Agriculture and rural development strategy. *XX International Scientific Conference SM 2015. Strategic Management and Decision Support Systems in Strategic Management*, (pp. 57-66). Subotica: Faculty of Economics in Subotica.
- Phami, P., He, J., Liu, D., Ding, S., Silva, P., Li, C., Qin, Z. (2020). Exploring the Determinants of Food Security in the Areas of the Nam Theun2 Hydropower Project in Khammuan, Laos *Sustainability*, 12 (2), 1-14. <https://doi.org/10.3390/su12020520>
- Ristić, L. (2018). External challenges of agricultural development in the Republic of Serbia. In V. Leković, (Ed.), Institutional changes as a determinant of economic development of the Republic of Serbia, (pp.211-229). Kragujevac: Faculty of Economics, University of Kragujevac.
- Statistical Office of the Republic of Serbia (2022). Data. Retrieved March 15, 2022 from Statistical Office of the Republic of Serbia: <https://www.stat.gov.rs/publikacije/>
- UN (2021). Circular agriculture for sustainable rural development. Retrieved March 15, 2022 from UN: https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/PB_105.pdf
- Uphoff, N. (2012). Supporting food security in the 21st century through resource-conserving increases in agricultural production. *Agriculture & Food Security*, 1 (8), 1-12. <https://doi.org/10.1186/2048-7010-1-18>
- Vlahović, B. Tomić, D. Ševarlić M. (2009). The competitiveness of Serbian agribusiness - factor of success in the international market. Thematic collection. *Serbian agribusiness and European integration: where we are and how to proceed?* Novi Sad. 61-81.
- World Bank (2022). World Bank Data. Retrieved March 15, 2022 from World Bank: <https://data.worldbank.org/>