ENSURING FOOD SECURITY OF EU COUNTRIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

Iaroslav Petrunenko, National University "Odesa Law Academy"
Inna Grabchuk, Polissia Natoinal University
Tetiana vlasenko, National University of Life and Environmental Sciences of Ukraine
Elena Petrova, Mykolayiv National Agrarian University
Liudmyla Strikha, Mykolayiv National Agrarian University

ABSTRACT

Formation of a sustainable food system based on a coordinated social and environmental policy is a priority objective of the XXI century. Numerous global challenges and risks have a significant impact on food security, especially in developing countries. This requires systematic improvement of the food security policy of EU member states in the context of sustainable development. The purpose of the research is to assess the effectiveness of EU food security policy in the context of sustainable development in order to form recommendations for its improvement. The research methodology is based on a qualitative and quantitative analysis of indicators within the Sustainable Development Goals 2 of United Nation Statistics Database (2020) and Eurostat SDG 2 (2020) in terms of European regions. The concept of sustainability of food security and sustainable development, production-based approach to food security were the basis of the research. The results have revealed that there are inconsistencies between the sustainable development goals in the context of ensuring EU food security, in particular, in such directions as: coherence with migration policy, which increases inequality and problems of access to food for the population; limited domestic resources of EU countries (land for the development of organic production) to ensure the quality and safety of food (Ireland, Denmark, Germany and Finland); lack of effect of state funding of the agricultural sector's research and development in case of excessive allocation of funds to the industry; over-regulation of the development of technologies towards ensuring the growth of production due to the bias of the population about the potential risks. The theoretical significance of the study is to identify a new relationship between the concepts of food security, sustainable development and migration policy.

Keywords: Food security of the EU countries; Manufacturability of food security; Nutrition security; Sustainability of food security.

INTRODUCTION

Formation of a sustainable food system based on a coordinated social and environmental policy is a priority objective of the XXI century (Lang & Barling, 2012). The policies of advanced countries and developing countries should be consistent within the framework of Sustainable Development Goal 2 (Gil et al., 2019). According to UN, 8.9% of the world's population faces the problem of hunger (690 million), and Asia is among the main regions suffering from this problem (United Nation, 2020). This means food security risks for every tenth inhabitant of the planet; lack of affordable, safe food (United Nation, 2020). Sustainable development policy defines the main goal of sustainable food security -

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

equal access to food and reduction of starvation (Lyulyov et al., 2019). One of the important safety goals is the safety of products that causes health diseases, especially for children within EU: "the nutritional aspects of the SDGs aim to promote healthy and sustainable diets and ensure food security globally trends in childhood obesity are still alarming and far from any desirable target" (Grosso et al., 2020). Herewith, such a goal cannot be achieved due to income inequality, especially of the vulnerable groups (working women, migrant children). Numerous global challenges and risks have a significant impact on food security, especially in developing countries (Bazgă, 2015). The issue of food security is especially relevant in advanced countries because of food safety (genetically modified products, pesticides, biodiversity, fisheries, etc.) (Aiking & de Boer, 2004).

The purpose of the academic paper lies in assessing the effectiveness of the food security policy of EU states in the context of sustainable development in order to formulate recommendations for its improvement.

This manuscript contains a literature review on the development of food security concepts, a methodology based on the concept of sustainability, the results of a study of EU food security policy, discussions, conclusions and a list of bibliographic sources.

LITERATURE REVIEW

There are two concepts of sustainable food security in the scientific literature. They began to develop after the Second World War, increasing production in order to overcome the problem of insufficient consumption and hunger with a focus on agriculture, solving the problem of the nutritional system (Lang & Barling, 2012). Supporters of the first approach point to the need to double food production (Naylor et al., 2007; Waldron et al., 2017). However, this is contrary to other sustainable development goals, namely: Goal 6, clean water and sanitation; Goal 12, responsible consumption and production; Goal 13, climate action. Consensus of goals is the biggest challenge to the sustainability of the food system.

"Sustainable development is a new type of human strategy that meets current needs, without compromising the ability of future generations to meet their own needs" (Bazgă, 2015). The basic factors influencing the sustainable development of food markets include the environmental determinants of sustainable agricultural management (increased electricity consumption, increased energy losses, coal use) (Bilan et al., 2018). A significant factor of influence is the agricultural sector as a strategic factor of food security (Pawlak & Kołodziejczak, 2020).

Food security and sustainable agricultural development is subject to a wide range of general economic policies as well as agricultural development measures (Bazgă, 2015). The implementation of the sustainable food security concept in different countries will ensure the development of this paradigm. The interconnection between the economic stability of the country and agriculture is always determined by the most important factors of food security, namely: agricultural policy and productivity, sustainability results, price volatility, public-private partnerships and agricultural potential (Bazgă, 2015). Food security is defined as "Food security exists when all people at all times have physical or economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996).

The state ensures a sustainable level of food security and sustainable development in the case of sufficiency of available food and agricultural products in order to provide food for the population, while ensuring animal feed and water in case of natural disasters, crises, war, etc. The basic risks and challenges of food security can be classified into: 1) the availability of food; 2) price instability; 3) access of the population to food; 4) use of food; 5) food

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

stability. For example, a study by Ariffin et al. (2019) proves the relationship between the price of organic products, certification and purchasing behavior. Nejati et al. (2011) identify another significant factor in consumer behavior; the attitude of consumers to the environment, the subjective norms that give in a particular domestic consumer market. While environmental friendliness does not affect consumer behavior, subjective norms determine the intention to purchase environmentally friendly products. In contrast, Ariffin et al. (2019) have shown a small link between subjective norms and intentions to purchase organic food, while attitudes towards the environment have a significant impact on purchasing behavior. Thus, the scientific literature discusses the impact of various factors on consumer behavior, including determining the level of food security.

METHODOLOGY

This research is based on the concepts of food security sustainability and sustainable development (Lang & Barling, 2012; Bazgă, 2015) and the production-based approach to the population's food security. This approach is extended by integrating the concept of "virtuous food production and food systems" in order to preserve the environment (Grosso et al., 2020). This study uses an "anthropological approach in which overall research context is emphasized in the text" for a comprehensive understanding of food security and policy (Salamzadeh, 2020).Indicators within Sustainable Development Goals 2 of United Nation Statistics Database (2020) and Eurostat SDG 2 (2020a,b) in the context of European regions (Southern Europe, Europe, Eastern Europe, Northern Europe and Western Europe) and EU-27 countries have been used for analysis. A policy assessment based on food security indicators for 2001-2019 has been conducted, namely:

1. Prevalence of undernourishment (%)
2. Prevalence of moderate or severe food insecurity of the adult population (%)
3. Total population in moderate or severe food insecurity (thousands of people)
4. Prevalence of severe food insecurity of the adult population (%)
5. Total population in severe food insecurity (thousands of people)
6. Dependence of Agricultural factor income per annual work unit (AWU), Index 2010 = 100
7. Government support to agricultural research and development, million EUR
8. Area under organic farming, % of total utilised agricultural area (UAA)

This study is limited to EU food security policy, while in the global dimension, security issues vary significantly depending on the factors influencing food availability and consumer behavior.

RESULTS

The production system within EU has been modernized in the last few years, which has ensured safer and higher quality, certified production of products, providing a solution to the environmental aspects of sustainable development. The effectiveness of the developed sustainable development policy in the context of food security is assessed through the indicators of sustainable development goals; however, most indicators are not available for study due to lack of data. This significantly limits the quality analysis of food safety and security policy. The prevalence of malnutrition within different European countries was less than 2.5% (Table 1). For instance, in Albania, the number of malnourished people was 0.1 million in 2018, in Bulgaria 0.2 million, in Serbia 0.4 million, in Slovakia 0.3 million, in

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

Ukraine 1.6 million. Consequently, the problem of hunger within EU in advanced countries has been solved, while the problem is still urgent in developing countries.

TABLE 1
SDG 2 INDICATORS IN EUROPE, 2014-2019

	2014	2019
Prevalence of undernourishment (%)		
Southern Europe	<2,5	<2,5
Europe	<2,5	<2,5
Eastern Europe	<2,5	<2,5
Northern Europe	<2,5	<2,5
Western Europe	<2,5	<2,5
	2014	2019
Prevalence of moderate or severe food insecurity of the adult population (%)		
Southern Europe	11,194	9,807
Europe	9,883	7,882
Eastern Europe	11,344	10,348
Northern Europe	3,901	4,554
Western Europe	4,613	4,311
Total population in moderate or severe food insecurity (thousands of people)		
Southern Europe	5915,66	13693,79
Europe	32359,03	58892,89
Eastern Europe	9667,79	13843,06
Northern Europe	1615,41	5554,72
Western Europe	3609,84	3649,22
Prevalence of severe food insecurity of the adult population (%)		
Southern Europe	1,824	1,446
Europe	1,694	1,193
Eastern Europe	1,383	1,285
Northern Europe	2,047	1,230
Western Europe	1,921	0,846
Total population in severe food insecurity (thousands of people)		
Southern Europe	1232,18	977,24
Europe	3726,53	4140,45
Eastern Europe	1544,64	3770,35
Northern Europe	407,15	1057,48
Western Europe	774,61	626,34

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

One of the main reasons for this scenario is the volatility of prices for agricultural products in developing countries with resource economies, which are dependent on world markets. This creates national food insecurity and requires a relevant policy of protecting national farmers from currency fluctuations. The prevalence of moderate or severe food insecurity among the adult population within EU decreased from 2014 to 2019, namely: in Southern Europe by 1,387%, in Europe as a whole by 2,001%, in Eastern Europe by 0,996%, in Northern Europe by 0,653%, in Western Europe by 0,302%.

In Albania, the indicator of total population in moderate or severe food insecurity amounted to 120,86 thousand people in 2018, in Austria 41,52 thousand people, in Belgium 126,93 thousand people, in Bulgaria 131,87 thousand people, in the Czech Republic 42,13 thousand people, in Estonia 12,35 thousand people, in France 464,32 thousand people, in Hungary 79,22 thousand people, in Germany 553,05 thousand people, in Italy 649,82 thousand people, in the Netherlands 287,94 thousand people, in Norway 61,08 thousand people, in Poland 81,65 thousand people, in Moldova 161,65 thousand people, in Romania 666,71 thousand people, in Serbia 176,3 thousand people, in Slovakia 41,18 thousand people, in Slovenia 9,8 thousand people, in Spain 823,49 thousand people. Thus, the most advanced countries are acutely faced with the problem of food protection of the adult population, in particular, due to increased migration flows.

State support in the form of public funding for research and development of the agricultural sector is determined by the Index Agricultural factor income per annual work unit. Public funding is effective, up to a certain level (Figure 1). For instance, the experience of financing the agricultural sector in Ireland indicates that 22,7 million euros of investment correspond to the 19245 level of AWU. Lower levels of investment in Germany, Denmark, the Netherlands and the United Kingdom correspond to a much higher level of AWU. Thus, financing the development of the agricultural sector is effective in the context of ensuring food security to a certain level of investment, which corresponds to the stimulation of developments.

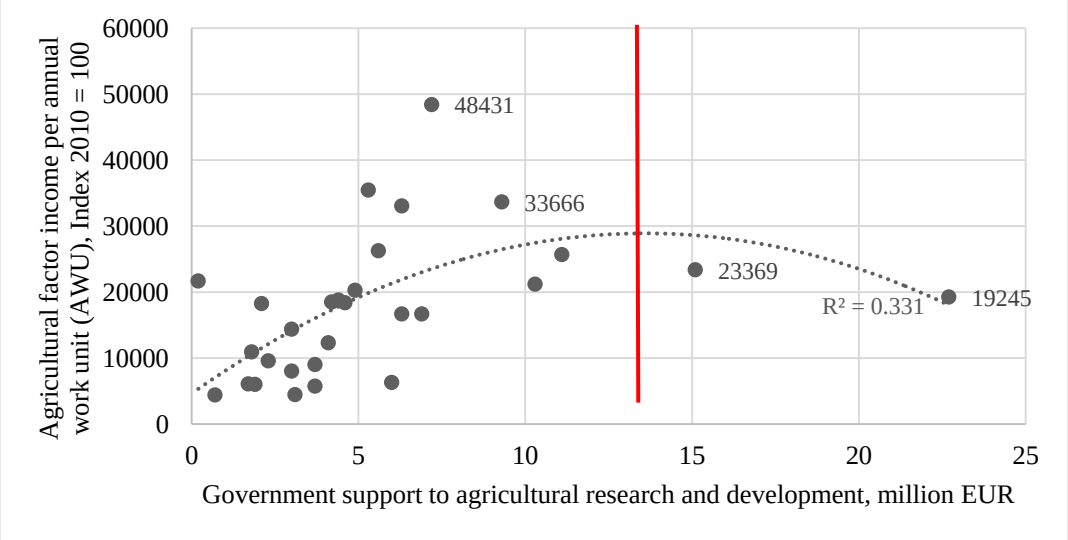

FIGURE 1

DEPENDENCE AGRICULTURAL FACTOR INCOME PER ANNUAL WORK UNIT (AWU), INDEX 2010 = 100 ON GOVERNMENT SUPPORT TO AGRICULTURAL RESEARCH AND DEVELOPMENT, MILLION EUR

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

In general, within EU, the area of land for organic production has been growing on average from 4% in 2001 to 9% in 2019 (Figure 2). Along with this, more advanced countries are characterized by a much higher level of organic space (Austria, Estonia, Sweden, the Czech Republic, Italy, Latvia, Finland, Denmark, Slovenia, Slovakia, Greece and Spain are characterized by a value higher than EU average from 9,66% to 25% in 2019).

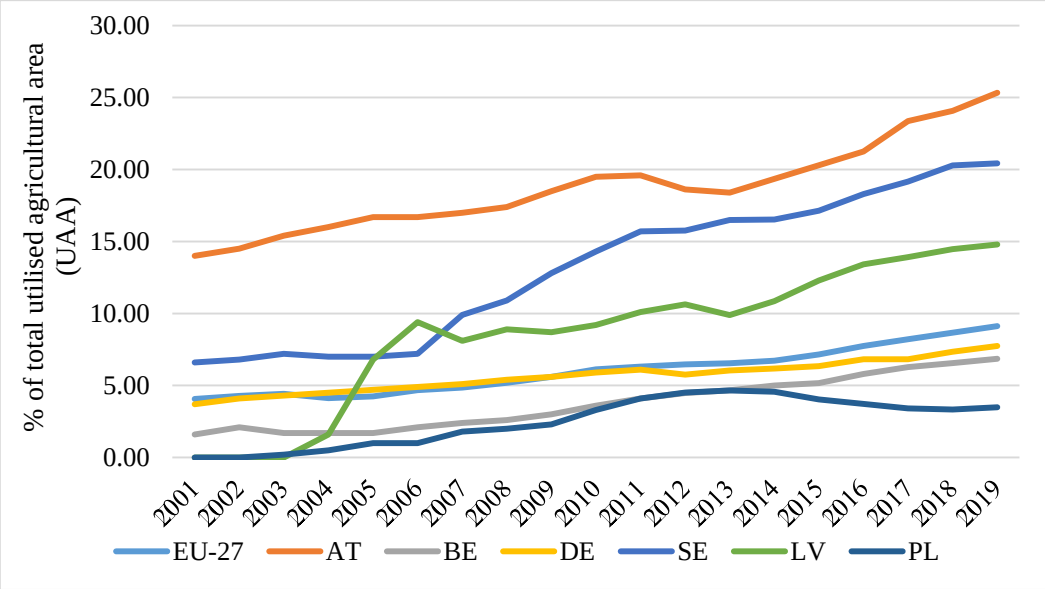

FIGURE 2

AREA UNDER ORGANIC FARMING, % OF TOTAL UTILISED AGRICULTURAL AREA (UAA)

The interconnection between the growth of organic land and public funding for developments and researches in the agricultural sector is less obvious. However, the low level of public funding has a positive effect on the area of organic farming (Figure 3). The policies of most countries towards development of the organic agricultural sector are effective, with the exception of Ireland, Denmark, Germany and Finland. The specialization of countries should also be taken into account, forasmuch as it determines the ability to develop organic potential.

The Common Agricultural Policy (CAP) include the EU bioenergy policy, trade policy, development aid policy, fisheries policy and, through different mechanisms, the EU's macroeconomic and immigration policies. Over the last 10 years, EU food security policy has aimed to stabilize domestic agricultural markets through the application of high tariff rates and export subsidies. This has led to an outflow of EU agricultural products to foreign markets, lower market prices and destabilized world markets. As a result, local markets in developing countries have suffered from such EU policies. Among the main challenges for poor countries are non-tariff barriers to trade in agricultural products, which are shaped in part by food requirements. EU subsidies for production and exports have helped EU farmers, but made it more difficult for local producers to compete in developing countries. EU policies have led to cheap imports of flour, beef or dairy products in many countries, including West Africa, the Middle East, the Caribbean and even India (dairy products).

In the 1970s and 1980s, the EU had a significant impact on the world food market and security through enlargement and new membership, subsidies and tariffs. During this period, the EU was a net exporter of agricultural and food products. However, there have been

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

significant CAP policy reforms since 199, driven by the need to reduce the subsidy budget and the need to change the pricing system. Pressure from third exporting countries (Australia, the United States, developing countries) also needed to change. The policy of agricultural support for poor countries has been criticized for increasing inequality and hunger. As a result, the EU has reduced subsidies for agricultural exports to developing countries. Export refunds were abolished in 2013, and from the beginning of 2020 the EU is obliged to completely eliminate export subsidies. EU farmers receive support through direct payments to support incentives for production and exports.

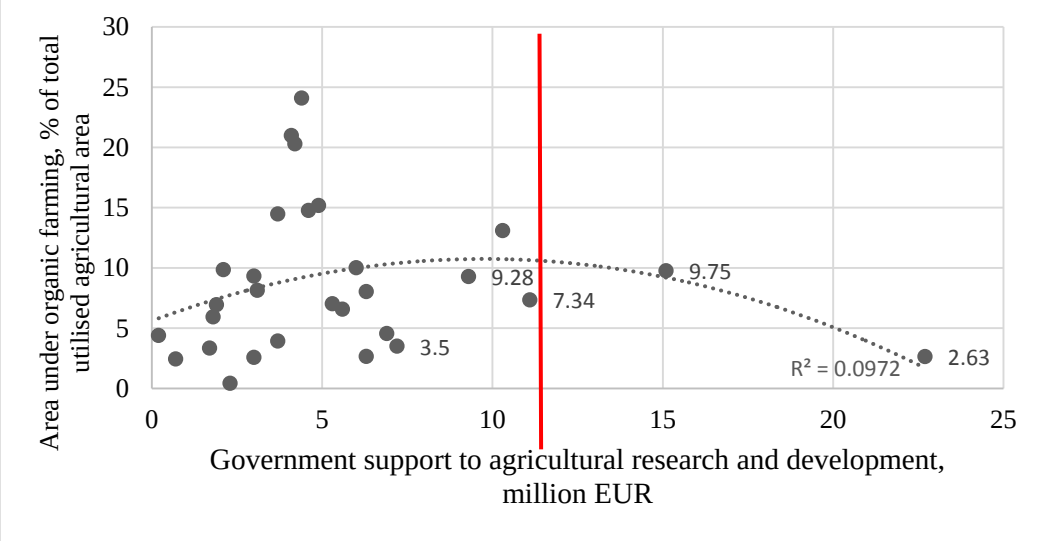

FIGURE 3

AREA UNDER ORGANIC FARMING, % OF TOTAL UTILISED AGRICULTURAL AREA (UAA) ON GOVERNMENT SUPPORT TO AGRICULTURAL RESEARCH AND DEVELOPMENT, MILLION EUR

For example, the level of state support for the agricultural sector in Eastern Europe has been declining in the last ten years. According to the Food and Agriculture Organization of the United Nations (FAO, 2020), the volume of public spending amounted to: in Hungary 144.996 billion dollars; in 2008 and 138.5 billion dollars; in 2017; in Poland 426.97 billion dollars. in 2008 and 464.8 billion dollars; in 2017; in Romania 150.8 billion dollars; in 2008 and 143.5 billion dollars; in 2017; in Slovenia 47.7 billion dollars; in 2008 and 44.3 billion dollars. in 2017.

Various agricultural programs launched within the EU to ensure food security have involved the use of various instruments of state support for rural development and organic farming. For example, in Poland, the strategic program for the development of the agricultural sector SAPARD (Rowiński, 2005) was aimed at developing the agricultural sector by encouraging beneficiaries to apply marketing strategies that are invaluable in terms of increasing their competitiveness, especially given the fact and in Eastern Europe, mass production too often tends to prevail over targeting certain market segments. In Hungary and Poland, agriculture has undergone rapid structural change directly under the influence of the European Union's Common Agricultural Policy (EU) and increased competition in the EU single market. The agriculture of these countries, as well as other countries in the Central and Eastern Europe (CEE) region, is characterized by lower investment compared to the

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

agricultural sector of the EU. EU policy uses state support instruments to finance investment in agricultural development in member states (Fogarasi et al., 2014). For example, the most important instruments to support agriculture in Hungary are state budget funding, namely investments in agricultural holdings, tax exemptions and early retirement programs.

However, for the last ten years, the EU has still affected the food security of developing countries. First, a significant amount of subsidies provided to EU farms (around € 56 billion per year) still has some impact on the global market due to the need to reduce risks and impact on wealth (Zheng & Gohin, 2017). Direct payments also slow down the consolidation of farms, and their absence could lead to a reduction in land and employment in the agar sector. Studies show a positive impact of direct payments on the productivity of the agricultural sector, while subsidies have a negative impact on the productivity of the industry (Kazukauskas et al., 2014; Rizov et al., 2013). In general, reforming EU agricultural policy reduces the asymmetry of food security in developing countries. Studies by the Prasetyo (2016) show an increase in support for farming through production in the United States and developing countries (Indonesia, China, and Russia). EU pricing policy has also affected the volatility of food prices (in the case of higher tariffs when falling prices on world markets for agricultural products and vice versa). "The global food price spikes of 2007-2008 and 2010 led to increased awareness of the complexity of food (in) security" (Candel & Biesbroek, 2018). This has led to the EU using a more integrated approach to food security policy. In general, changes in EU agricultural policy have less of an impact on global food security (Bureau & Jean, 2013). Instead, EU policy is focused on supporting research and development (Figure 3).

Sustainable food security policy contradicts with other sustainable development goals within EU. For instance, a sustainable migration policy provides the regulation of migration flows, ensuring equal income for migrants. However, in economic realities, migrants, especially from less developed European countries, receive lower wages; consequently, a significant amount of them are on social safety net. This contradicts Goal 2 of ensuring equal access to food through different wages. The problem of inequality, in particular gender one, also exacerbates the problem of achieving SDG 2. Notwithstanding, the ultimate goal of SDG 1, SDG 2, and SDG 10 lies in reducing poverty, inequality, food insecurity, and welfare; the complex communication structure exacerbates these related challenges. The growth of migrants' flows to the most advanced EU countries (Germany, Italy, the Netherlands, Spain, and France) exacerbates the problem of food protection and inequality. The policy, aimed at social inclusion of migrants, is not able to positively affect the reduction of food insecurity due to the initial output level of productivity, education of people from less developed countries.

DISCUSSION

The impact of EU long-term policy on global food security is characterized by a complex non-linear nature. EU policy influences world standards, for example, determines the policy of certification of organic products in developing countries upon accession to the EU. Ukraine, as a country in the process of European integration, is moving to regulatory standards and requirements for food certification. Among the new challenges is the impact of EU standards on food security policies in developing countries in the field of bioenergy and nutrition standards (Bureau & Swinnen, 2018).

The main trends in food security in developing countries are:

1. Increasing inequality and reducing the availability of food to the poor;
2. Pressure on natural resources due to population growth;

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

3. Pressure on the environment through the expansion of the food network;
4. Biodiversity reduction;
5. Low level of access of the population to organic products, especially in developing countries, and as a consequence of the problem of ensuring healthy food;
6. Population growth rates exceed economic growth rates, which leads to increased consumer demand for agricultural products;
7. Increasing pressure on the food network due to more systematic droughts, climate change;
8. Growth of migration flows. These trends lead to chronic food shortages, malnutrition.

These trends increase the need for countries to develop food security policies, strengthen the resilience of food systems to meet growing demand. Sustainable agriculture is becoming a priority in different countries, as it takes into account migration, technological, environmental and economic aspects of food security. Sustainable agriculture involves the use of innovative organic farming methods, especially in developed EU countries, where food security policy is mainly aimed at promoting healthy lifestyles and certified organic foods ("promote healthy and sustainable diets" (Grosso et al., 2020).

The present research correlates with the results of Pawlak & Kołodziejczak (2020), namely: "the greatest problems with maintaining food security are observed in the developing countries with a high share of agriculture in their Gross Domestic Product (GDP), adverse conditions hindering agricultural production and deficient infrastructure". The strategy towards improving food security should include stimulating investment in the agar sector, increasing the purchasing power of farms in order to reduce inequality and equal access to food. New technologies in the agricultural sector can partially solve the problem of stimulating investment. Investment in research and technological development is a priority goal of food security sustainability policy in the context of increasing production in the agricultural sector. For instance, agroforestry-enhancing systems provide higher yields with lower environmental risks (Waldron et al., 2017), thus, aligning with other goals of sustainable development, especially for small agricultural enterprises in developing countries with the highest levels of food security risks. "New plant breeding technologies (NPBTs), including genetically modified and gene-edited crops, offer large potentials for sustainable agricultural development and food security while addressing shortcomings of the Green Revolution" (Qaim, 2020). Herewith, there is an over-regulation of NPBTs within EU due to the population's lack of perception of these technologies' benefits, which restrains the effect of use for food security and sustainability. This requires more in-depth research concerning the risks and benefits of technologies that help address food security issues. Along with this, the development of the biofuel market may have a negative impact on food security through the transmission mechanism and fluctuations in prices for agricultural products, in particular, in the direction of growth. Moreover, the poorest segments of the population are especially vulnerable to rising biofuel prices due to consumption features (Naylor et al., 2007). This means that despite technological growth (including innovation markets and industries) in order to ensure sustainable production in the agricultural sector, innovations are likely to pose new challenges to food security. These challenges relate primarily to food safety, which is especially relevant within EU, and price volatility, which is acutely manifested in the less developed EU countries. High agricultural commodity prices have an impact on the volume of humanitarian food aid for very poor countries (Naylor et al., 2007). Therefore, it increases the scale of the problem of food security of the poorest states. A multipurpose approach to the development of food security policies for EU states (Waldron et al., 2017) should be used in

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

order to develop strategies to protect the population from possible risks. The policy should focus "on the interaction between multi-level actors, including national governments, international organisations such as WTO, the food industry and consumers" (Aiking & De Boer, 2004).

Organic farming is in its infancy, especially in advanced EU countries. The environmental aspect of increasing production also needs to be taken into account (reduction of pesticides, ammonia emissions, nitrates, reduction of soil erosion, conservation of biodiversity); "achieving efficient and productive agricultural land use while conserving biodiversity is a global challenge" (Tscharntke et al., 2012). Traditional intensification of the agricultural sector is one of the threats to food security (one third of products is wasted; one third is inefficiently used for livestock). Therefore, the policy should provide for the redistribution of food products, especially during periods of price volatility. Similar to the study of Candel et al. (2014), we find the conflict of EU food security policy regarding (1) the productionist frame, (2) the environmental frame, (3) the development frame, (4) the free trade frame, (5) the regional frame, and (6) the food sovereignty frame. This conflict also concerns migration policy, bioenergy, integration of food quality and safety standards. Despite the improvement of EU food security policy integration processes, diversification of goals and raising awareness of the need for coordination (Candel & Biesbroek, 2018), there are significant differences. Improving coherence and coordination has also been demonstrated in Maggio et al. (2016), which identified the need to take urbanization into account.

The study of EU food security policy provides an opportunity to identify recommendations for enhancing the positive impact on developing countries and global food markets: 1) alignment with migration policy to ensure equal access to quality food; 2) improving and financing the policy of integration of product standards into the markets of developing countries to ensure the effect of scale and solve the problems of a healthy lifestyle; 3) support for agro-innovation in developing countries through further reduction of subsidies.

CONCLUSION

The conducted research gives evidence of an increase in the effectiveness of food security sustainability policies within EU countries. EU policy is characterized by inconsistency of sustainable development goals in the context of food security, in particular, in such areas as: coherence with migration policy, which increases inequality and problems of access to food for the population; limited internal resources of EU countries (land for the development of organic production) in order to ensure the quality and safety of food (Ireland, Denmark, Germany and Finland); absence of effect of the research's state funding and development of the agricultural sector in case of excessive allocation of funds to the industry; over-regulation of technology development to ensure the growth of production due to the bias of the population about potential risks. This means that a production approach towards supporting food security cannot be effective due to numerous contradictions between environmental and food safety issues. Therefore, it is advisable to transform the food security policy of EU in the context of sustainable development by developing goals for technological sustainability of the agricultural sector.

The theoretical value of the study is to complement the concepts of food security, sustainable development and migration policy through the integration of the concept of "virtuous food production and food systems" in order to preserve the environment. The practical value of the study provides an opportunity to improve the policy of sustainable

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

development of the EU, taking into account the identified effects of the impact of migration, technology, resource constraints, financing of technological development of the agricultural sector.

REFERENCES

Aiking, H., & De Boer, J. (2004). Food sustainability: Diverging interpretations. *British Food Journal, 106*(5), 359-365.

Ariffin, S. K., Dihanan, N. N., & Wahid, N. A. (2019). Investigating the factors affecting consumer purchase intention towards halal organic food. *Journal of Entrepreneurship, Business and Economics, 7*(2), 162-188.

Bazgă, B. (2015). Food security component of sustainable development–prospects and challenges in the next decade. *Procedia Economics and Finance*, *32*, 1075-1082.

Bilan, Y., Lyeonov, S., Stoyanets, N., & Vysochyna, A. (2018). The impact of environmental determinants of sustainable agriculture on country food security. *International Journal of Environmental Technology and Management, 21*(5-6), 289-305.

Bureau, J. C., & Jean, S. (2013). Trade liberalization in the bio-economy: Coping with a new landscape. *Agricultural Economics*, *44*(s1), 173-182.

Bureau, J. C., & Swinnen, J. (2018). EU policies and global food security. *Global food security, 16*, 106-115.

Candel, J. J., & Biesbroek, R. (2018). Policy integration in the EU governance of global food security. *Food security, 10*(1), 195-209.

Candel, J. J., Breeman, G. E., Stiller, S. J., & Termeer, C. J. (2014). Disentangling the consensus frame of food security: The case of the EU Common Agricultural Policy reform debate. *Food policy*, *44*, 47-58.

Eurostat SDG 2 (2020a). *Goal 2 - Zero hunger.* Retrieved from https://ec.europa.eu/eurostat/data/database

Eurostat SDG 2 (2020b). *Sustainable development in the European Union-Monitoring report on progress towards the SDGs in an EU context-2020 edition.* Retrieved from *https://ec.europa.eu/eurostat/data/database*

FAO. (1996). *Food security: concepts and measurement.* Retrieved from http://www.fao.org/3/y4671e/y4671e06.htm

FAO. (2020). Government Expenditure. Retrieved from http://www.fao.org/faostat/en/#data/IG

Fogarasi, J., Wieliczko, B., Wigier, M., & Tóth, K. (2014). Financing of agriculture and investment supports in agriculture. *Structural changes in Polish and Hungarian agriculture since EU accession: lessons learned and implications for the design of future agricultural policies. Budapest: AKI*, 55-76.

Gil, J. D. B., Reidsma, P., Giller, K., Todman, L., Whitmore, A., & van Ittersum, M. (2019). Sustainable development goal 2: Improved targets and indicators for agriculture and food security. *Ambio, 48*(7), 685-698.

Grosso, G., Mateo, A., Rangelov, N., Buzeti, T., & Birt, C. (2020). Nutrition in the context of the Sustainable Development Goals. *European journal of public health, 30* (Suppl 1), i19-i23.

Kazukauskas, A., Newman, C., & Sauer, J. (2014). The impact of decoupled subsidies on productivity in agriculture: a cross-country analysis using microdata. *Agricultural economics*, *45*(3), 327-336.

Lang, T., & Barling, D. (2012). Food security and food sustainability: reformulating the debate. *The Geographical Journal*, *178*(4), 313-326.

Lyulyov, O., Pimonenko, T., Stoyanets, N., & Letunovska, N. (2019). Sustainable development of agricultural sector: Democratic profile impact among developing countries. *Research in World Economy*, *10*, 97-105.

Maggio, A., Van Criekinge, T. and Malingreau, J.-P. (2016). Global food security: assessing trends in view of guiding future EU policies, *Foresight, 18*(5), 551-560.

Naylor, R. L., Liska, A. J., Burke, M. B., Falcon, W. P., Gaskell, J. C., Rozelle, S. D., & Cassman, K. G. (2007). The ripple effect: biofuels, food security, and the environment. *Environment: Science and Policy for Sustainable Development*, *49*(9), 30-43.

Nejati, M., Salamzadeh, Y., & Salamzadeh, A. (2011). Ecological purchase behaviour: insights from a Middle Eastern country. *International Journal of Environment and Sustainable Development, 10*(4), 417-432.

Pawlak, K., & Kołodziejczak, M. (2020). The role of agriculture in ensuring food security in developing countries: Considerations in the context of the problem of sustainable food production. *Sustainability*, *12*(13), 5488.

Prasetyo, A. H. (2016). Contextualizing sustainable competitive advantage: A perspective of social entrepreneurship. *Journal of Entrepreneurship, Business and Economics, 5*(1), 41-66.

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.

Qaim, M. (2020). Role of new plant breeding technologies for food security and sustainable agricultural development. *Applied Economic Perspectives and Policy*, *42*(2), 129-150.

Rizov, M., Pokrivcak, J., & Ciaian, P. (2013). CAP subsidies and productivity of the EU farms. *Journal of Agricultural Economics*, *64*(3), 537-557.

Rowiński, J. (2005). *SAPARD programming and implementation*. Retrieved from https://depot.ceon.pl/bitstream/handle/123456789/4783/14.pdf?sequence=1

Salamzadeh, A. (2020). Five Approaches Toward Presenting Qualitative Findings. *Journal of the International Academy for Case Studies*, *26*(3), 1-2.

Tscharntke, T., Clough, Y., Wanger, T. C., Jackson, L., Motzke, I., Perfecto, I., Vandermeer, J., & Whitbread, A. (2012). Global food security, biodiversity conservation and the future of agricultural intensification. *Biological conservation*, *151*(1), 53-59.

United Nation (2020). *Goal 2: Zero Hunger.* Retrived from https://www.un.org/sustainabledevelopment/hunger/

United Nation Statistics Database (2020). *Database SDG 2*. Retrieved from https://unstats.un.org/sdgs/indicators/database

Waldron, A., Garrity, D., Malhi, Y., Girardin, C., Miller, D. C., & Seddon, N. (2017). Agroforestry can enhance food security while meeting other sustainable development goals. *Tropical Conservation Science*, *10*, 1-6.

Zheng, Y., & Gohin, A. (2017). Assessing the Market Impacts of the Common Agricultural Policy: Does Farmers' Risk Attitude Matter? *Proceedings of International Congress, European Association of Agricultural Economists.*

Citation Information: Petrunenko, I., Grabchuk, I., Vlasenko, T., Petrova, E., & Strikha, L. (2021). Ensuring food security of EU countries in the context of sustainable development. *Journal of management Information and Decision Sciences, 24*(2), 1-12.