

Global Food Security: Condition, Problems and Areas of Provision

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ANNOTATION. The issue of the relationship between trade and food security has not lost its relevance for decades, and the situation in the world caused by the spread of the COVID-19 pandemic has further highlighted in regulatory regime at the multilateral level, including the sustainable development goal (SDG) No. 2 on the elimination of hunger. This article analyses the theoretical and scientific aspects of the country's security and the impact of the coronavirus pandemic on the economy of Uzbekistan, as well as on the development of the country, detailed description and analysis of multilateral rules in the field of trade in agricultural products to meet current requirements for responding to food security, as well as the development of recommendations for adaptation of trade rules for these goods for Uzbekistan.

The article reveals the economic essence of the global food problem in the context of sustainable development. It describes the approaches to determining the countries' food supply levels. The main determinants of international trade integration and its place in international cooperation to ensure food stability have been identified. Much attention has been paid to the institutional mechanisms to solve the global food problem and the exclusive role of the World Trade Organization (WTO), the Food and Agriculture Organization of the United Nations (FAO), and informal coalitions and associations in it.

The Coronavirus pandemic that shook the world affects not only Uzbekistan but also the economies of developed countries. The current situation in this area reduces Uzbekistan's business activity and investment attractiveness, seriously undermining the country's reputation in the international arena. Agriculture is one of the leading sectors of the economy of Uzbekistan, and the share of one in the gross domestic product of Uzbekistan amounted to 28.8%. After gaining independence, Uzbekistan took measures to ensure food security in two areas: expansion of rural areas and the allocation of new ones, and revision of the composition

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of crops. Identified that 53.2% of agricultural products were crop products, and 46.8% were livestock products; 3.7 million people were employed in agriculture, 27.2% of the rural population, and half of the country's population lives in rural areas.

The main goal of the reform of the agrarian sector of each country is to achieve independence in the supply of food, which is of great socio-economic importance. The need for self-sufficiency in food is one of the conditions for maintaining independence, economic security, and social stability in the country, further ensuring the country's food security, filling the market with high-quality, safe, and affordable food products, strengthening the purchasing power of the population, liberalizing foreign economic activity and developing a healthy competitive environment, as well as existing systemic problems in this area.

KEY WORDS: food, totalitarian, consumption, commodity, coronavirus, global, GDP, pandemic, sustainable development goal (SDG), WTO (World Trade Organization).

Introduction

Modern dynamic global processes transform the world economy into an environment of constant interaction of national economies. The primary trend is the activation of integration processes, the dynamization of international trade, and the liberalization of international trade relations. These trends determine the number of opportunities and threats for developing the world economy and Uzbekistan, among which global problems are increasingly facing humanity. A key place among global problems belongs to the food problem, the importance of which is determined by the primary human need for food in the structure of general needs. The solution is complicated by the interconnectedness of the causes of its occurrence and methods of solution. The development trends of the world economy convincingly show that one of the most effective methods of achieving the country's food security and ensuring sustainable development is the integration vector of the economy with an effective trade policy and the development of the agricultural sector in accordance with the innovative type.

The issue of food shortages has been studied since the beginning of the development of economic thought. However, conceptually, the food problem began to be studied and brought to the global level only in the 20th century. The critical reasons for the strengthening of the global food problem are proposed to be considered in the form of the following groups: economic, ecological, and social (Fig. 1). The economic group includes the low standard of living and extreme poverty of the population, low rates of economic growth, the unfairness of global food trade conditions, inefficient public administration; the environmental group includes a change in climatic conditions, extreme weather events, a decrease in the fertility of arable land, depletion of agricultural resources and water pollution; and the social group includes reasons such as technical and technological incapacity for modern agribusiness management, armed conflicts, and wars, hazardous diseases.

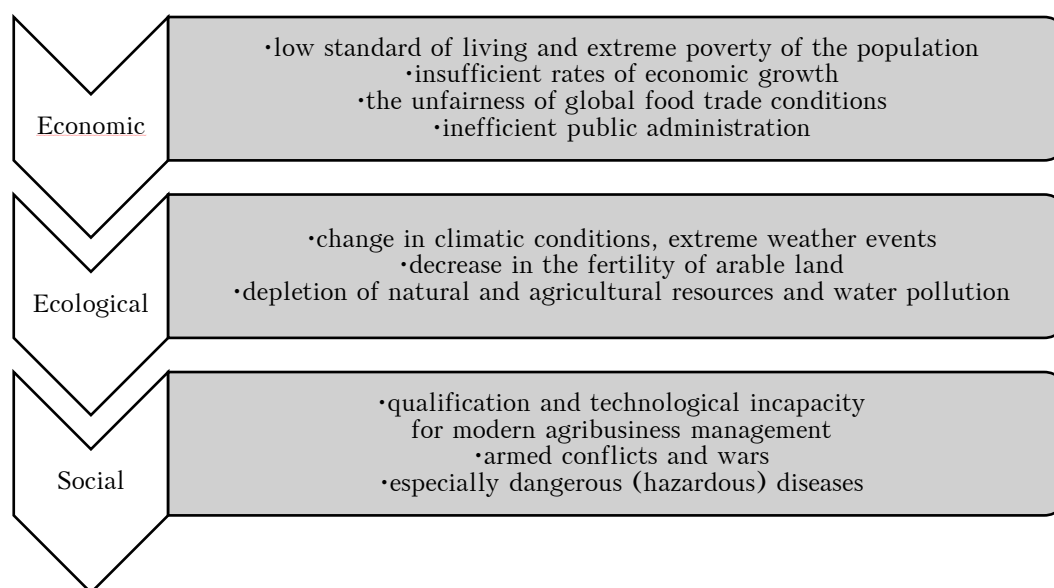


Figure 1. Main causes of the emergence and strengthening of the global food problem

Source: summarized by the authors.

The global food problem is currently one of the most pressing challenges in the context of sustainable development (table 1). The study determined that ensuring global food security is a critical prerequisite for achieving the 2030 Goals, as food is both a producer and a marker of development. Improved nutrition provides a platform for progress in health, education, employment, women's empowerment, and the reduction of poverty and inequality. It can lay the foundation for peaceful, secure, and stable societies.

Table 1

**INTERDEPENDENCE OF THE SUSTAINABLE DEVELOPMENT GOALS
WITH THE FOOD PROBLEM AND DIRECTIONS FOR THEIR SOLUTION**

SDG	Interrelationship with the food problem	Directions for solutions
Poverty alleviation	Economic inaccessibility of food	Inclusive rural development, sustainable investment and training of farmers
Overcoming hunger	Economic and physical availability of food, quality and safety, natural resources and sustainability	Increasing labour productivity in the agricultural sector and incomes of small producers, ensuring supply stability and sustainable development
Strong health	Childhood stunting, obesity among children and adults	Achieving food security and healthy nutrition standards.

Continuation of Table 1

SDG	Interrelationship with the food problem	Directions for solutions
Quality education	The barrier to obtaining education is at a high level	Raising awareness about nutrition, food waste, agricultural problems, and ways to overcome them
Gender equality	Different access to resources for women and men; about 40% of agricultural labour force in developing countries	Increasing farmers' incomes through the involvement of women in agricultural production, the possibility of investing in the health and education of children
Clean water and proper sanitary conditions	Drought exacerbates hunger and malnutrition	Investments in the management of freshwater ecosystems and sanitary and hygienic facilities
Renewable energy	High energy consumption for food production and delivery	Promoting affordable and clean energy, such as ethanol from agricultural waste
Decent work and economic growth	Agriculture provides work for a significant part of the population in rural areas and occupies a key place in world trade	Work in the agricultural sector to ensure decent pay
Innovation and infrastructure	Crucial to the circular economy approach	Solving the problems of food loss and waste
Reducing inequality	Malnutrition in the early years can cause growth retardation; iron deficiency can lead to problems with intellectual development and a weakened immune system	Social assistance to vulnerable segments of the population, raising awareness about nutrition
Sustainable development of cities and communities	Rapid population growth and urbanization cause an increase in demand for water, land and ecologically sound food Rapid urbanization contributes to the growth of unhealthy diets and increased food waste at the consumption stage	Access to innovation at all stages of food production and supply
Responsible consumption	Agriculture accounts for about 70% of global water use and about 30% of greenhouse gas emissions	Changing the way food is consumed and produced
Combating climate change	Floods and other extreme weather situations pose a risk to food production. Drought undermines the productivity of crops and livestock	Reduction of greenhouse gas emissions, modernization of agricultural technologies

Continuation of Table 1

SDG	Interrelationship with the food problem	Directions for solutions
Preservation of marine ecosystems	Overfishing, the reduction of marine species by more than three times, pollution of the world's oceans with plastic packaging	Development of renewable packaging materials alternative to plastic
Preservation of terrestrial ecosystems	Annual loss of fertile soil, agriculture as the main cause of forest cover reduction	Changing farming technologies
Peace and justice	Political or other instability contributes to food shortages	Ensuring food stability
Partnership for sustainable development	International cooperation contributes to the eradication of hunger and food security	Promoting sustainability of global food supply chains, reducing waste, and ensuring access to food for all

Source: summarized by the authors.

The primary importance of solving the food problem is also confirmed by the fact that it is organically connected and can contribute to solving other problems, such as economic, environmental, energy, demographic, and others. However, on the other hand, only stable economic growth is the key to overcoming the problem of hunger and chronic malnutrition worldwide. Therefore, special attention is paid to international trade integration, which has every chance to lead among the most effective ways to solve the global food problem. It was determined that the main determinants of international trade integration are motives (the basis of which may be shared, or mutually beneficial, or mutually acceptable interests), the prerequisites for the creation of an integration group are economic, social, ecological, or geopolitical expediency, the subjects can be companies, countries, or active integration associations, objects are determined by agreement between companies or may be goods, services, rights to intellectual property objects, mechanisms of creation (this is the initiation of integration or joining existing integration associations), the scale of integration interaction (corporate, interstate, regional, continental, transcontinental), probable options for the development of an integration group may be an extensive scenario, which involves an increase in the number of participants, an intensive one, which involves expanding the objects of integration, an optimistic scenario will be the transition to the next stage of integration, and a negative one – disintegration or termination of cooperation.

Food security of the population is one of the main components of any state that determines the quality of life of its citizens; at the same time, it is possible to achieve a decent level of quality of life for all categories of the population only under the conditions of complete physical and economic availability of food of a standardized quality that meets sanitary and hygienic standards and does not harm the environment. Food security should be understood as the ability of the state, through the administrative apparatus of management, to guarantee the provision (physical and economic) of members of society with food products (including drinking water) in quantity and quality that meet the standards established by the health care system or exceed them, while simultaneously observing rational use of food, optimization of the system of its distribution, processing of residues and sustainable use of nature, regardless of socio-economic, political, ecological or epidemiological situations^{5, 6}.

We can also call the "Strategy of Actions in five priority areas of Development of the Republic of Uzbekistan for 2017-2021", approved by the Decree of the President of Uzbekistan, Sh.M. Mirziyoyev, dated February 7, 2017, No. 4947, the secondary Constitution of the period, because of reflecting the basic rules and measures for the development and renewal of the country for the next five years. This "small Constitution," like the Constitution of the Republic of Uzbekistan, set as its main task the adoption of laws, decrees, and decisions that will further improve relations between people, society, and the state. In this sense, it is a document that raises the principle of the rule of law to new qualities.

Based on the study of the experience of developed countries in the implementation of the development strategy in Uzbekistan for 2017-2021, the reforms carried out in the country are aimed at further improving agriculture based on models used in other countries. Agriculture is one of the most critical sectors of the economy of Uzbekistan. This sector is one of the most promising sources for enhancing export potential while meeting the needs of the population for food products and the processing industry for raw materials.

It is considered essential to fulfilling the tasks set in the "Strategy of Actions" in five priority areas of the Republic of Uzbekistan development for 2017-2021 of the President of the Republic of Uzbekistan Sh. Mirziyoyev, as well as based on world experience, to develop the agrarian sector and to

⁵ Burkovska A., Shebanina O., Lunkina T., Burkovska A. (2021). Ensuring food security in the context of the sustainable development of agriculture. *Management Theory and Studies for Rural Business and Infrastructure Development*. No. 3(44). P.337-345. DOI: <https://doi.org/10.15544/mts.2021.%2030>

⁶ Shebanina O., Golubeva O., Burkovska A. and Radzevicius G. (2018). The investment in the meat sector in the context of food security in Ukraine. *Management Theory and Studies for Rural Business and Infrastructure Development*. No. 40(3). P. 393-402. DOI: <https://doi.org/10.15544/mts.2018.37>

create a rural infrastructure, to produce and export finished agricultural products⁷.

Food security causes the creation of the necessary economic and organizational basis for the development of agriculture and water management, the need to create additional conditions for farms in the implementation of structural changes, and the introduction of market mechanisms in the Republic of Uzbekistan. Today, modern research with an in-depth analysis of the state of the cluster system is considered relevant to modernizing agriculture in Uzbekistan, introducing new equipment and advanced technologies, increasing the efficiency of using limited land and water resources, capital, and labour resources as well as reducing the cost of products and fruits and vegetables in the country.

In the context of accelerated globalization processes in the market economy and the world economic system, scientific research on the problems of economic security, including food security, is intensifying. Problems of economic security in the CIS countries, including food security, are studied by A. Arkhipov, N.N. Vashekin, E.N. Veduta, M.I. Dzlhev, A.M. Jonlarov, A.V. Kolosov, E.A. Researched in the scientific works of E. Oleynikov, V.K. Senchagov, M. Spanov, and others. Their works focus on issues of economic security of the country, including, in part, food security. Problems of economic security in Uzbekistan have been studied in the scientific works of H.P. Abulkasimov, A.A. Isajanov, Sh.R. Kobilov, A.H. Sodikov, K.Z. Farmonov and others. In the work of H.P. Abulkasimov, these issues are covered from the point of view of the country, enterprise, individual, internal, and external, ensuring economic security and food security in the field of economic and financial activities. A.A. Isajonov studied the external aspects of economic security and issues of increasing the competitiveness of the national economy. However, Uzbekistan's theoretical and practical food security issues still need to be sufficiently studied.

The study of benefits from the growth of international trade in agricultural products in their works was carried out by A. Andreychenko, L. Halperina, T. Zinchuk, S. Kolyadenko, D. Laborde, V. Martin, Z. Mehrabi, Y. Naumko, T. Nych, N Ramankuty, V. Ricciardi, Y. Chen and others. The issue of the food situation of countries is often a cross-cutting theme in the works of D. Varshley, A. Gautam, J. Glauber, R. Zuryak, J. Meenakshi, M. Poudel, P. Poudel, D. Roy, R. Siche and others. The study of factors influencing the exacerbation of the food problem and potential directions for its solution is covered in the scientific works of O. Berezin, S. Vnuchko, L. Germanenko, O. Kotykova, O. Skidan, O. Shebanina,

⁷ Strategy of Actions in five priority areas of development of the Republic of Uzbekistan for 2017-2021. Decree No. 4947 dated February 7, 2017.

O. Yatsenko, and others. Empirical research on the impact of trade liberalization on food security was carried out in the works of P. Barlov, N. Diko, E. Iloh, B. Colucci, S. Liang, R. Lupstra, J. Nzuma, H. Nyangito, H. Ommeh, M. Pasara, V. Tarasyuk, J. Fusco, S. Heras, and others. The works of I. Burakovsky, A. Kireev, P. Krugman, D. Lukyanenko, T. Melnyk, T. Orekhova, A. Poruchnyk, V. Sidenka, G. Solodkovska, T. Tsygankova, O. Shvydanenko, O. Shnyrkova, and other scientists. The ambiguity of socio-economic problems caused by economic liberalization is highlighted in the works of such domestic researchers as L. Antonyuk, O. Bilorus, A. Galchynskyi, V. Geets, T. Obolenska, A. Poruchnyk, S. Sidenko, Y. Stolyarchuk, A. Filipenko, and others. Significant scientific contributions to regional trade agreements as a tool of liberalization were made by foreign scientists: S. Bayer, S. Barari, J. Bergstrand, R. Bhal, V. Vikard, V. Wong, L. Kaltani, N. Loyaza, Ye. Ornelas, S. Park, In Song Kim, R. Chang, and others. The issue of studying the application of protectionism through regional trade agreements was investigated by: S. Bilal, O. Bulatova, J. Grossman, A. Kruger, A. Panagariya, V. Panchenko, E. Helpman. Despite the significant contribution of the scientists mentioned above, there is an objective need for further research into the issue, considering national characteristics and global factors of influence.

The methods of analysis, synthesis, induction, deduction, statistical grouping, expert assessment, scientific abstraction, and others were widely used in the research process. Food producers were taken as the object of research in Uzbekistan. The main goal of the research is to find effective ways to increase the welfare and income of the population and ensure food security.

Food security of countries in conditions of increased trade integration

For comprehensive and systematic monitoring of the effectiveness of international trade integration in the conditions of achieving food security by the participating countries, a matrix format of the influence of international trade integration on solving the global food problem according to the integration-instrumental vector (which is determined by access to the market of agro-food products, internal support of agricultural producers and stimulation export competitiveness) and the food target vector, which is determined by the economic and physical availability of agro-food products, their quality and safety, and sustainable economic development) (table 2).

Table 2

**THE MATRIX FORMAT OF THE ANALYSIS OF THE IMPACT OF INTERNATIONAL TRADE
INTEGRATION ON THE SOLUTION OF THE GLOBAL FOOD PROBLEM ACCORDING
TO THE INTEGRATION-INSTRUMENTAL AND FOOD-TARGET VECTORS**

		Food target vector			
		Economic availability	Physical availability	Sustainable economic development	Quality and safety
Integration-instrumental vector	Access to the agro-food market	+	+	+	+
	Domestic support of agricultural producers	-	+	+/-	+
	Stimulation of export competitiveness	+	+/-	+/-	+

"+", "-" – the presence or absence of a relationship

Source: developed by the authors based on^{8, 9}.

The food situation of countries is determined by the country's ability not only to provide food for the needs of the country's population through its resources but also by actively using the advantages of international cooperation, in particular, the implementation of certain aspects of the agrarian policy of developed countries into the policy of developing countries and the least developed countries, which will contribute not only to the growth of productivity, the improvement of the country's food security but also to the achievement of a more significant share in the export of goods on the global market and the improvement of the country's economic security in general. The calculated average yield indicators of the main groups of goods of the TOP 10 countries exporting agricultural products made it possible to establish that, in addition to developed countries (such as the EU, the USA, and Canada), high-yield indicators were shown by some of the leading countries in the export of agricultural products, such as Brazil, Indonesia, and Mexico, which is the result of effective management of agriculture with

⁸ Bazaluk, O., Yatsenko, O., Reznikova, N., Bibla, I., Karasova, N., & Nitsenko, V. (2022). International integration processes influence on welfare of country. *Journal of Business Economics and Management*, 23(2), 382–398. <https://doi.org/10.3846/jbem.2022.16228>

⁹ Yatsenko, O., Meyers, W. H., Iatsenko, O., & Biletska, I. Modeling of development processes of bilateral trade and economic integration between countries. *Economic Annals-XXI: Volume 168, Issue 11-12*, Pages: 18-23, June 11, 2018 DOI: <https://doi.org/10.21003/ea.V168-04>

the help of agrarian policy, which includes support of the sphere of agricultural production by the state, attraction of foreign investments and implementation of the results of scientific and technical progress in all stages of agricultural production (Table 3). In the rest of the studied countries (China, Thailand, Argentina, India, and Ukraine), the yield rate exceeds or is as close as possible to the world average level only for those groups of goods in which the country specializes. That is, agriculture in these countries is conducted with incomplete use of the available potential, and one of the essential factors of this is the low level of implementation of innovative developments and progressive assets within its borders.

Table 3

**AVERAGE YIELD INDICATORS OF THE MAIN GROUPS
OF GOODS IN 2000-2020, t/ha**

Country	Cereal crops	Citrus fruits	Fibre crops	Fruits	Oil crops	Legumes	Root crops and tubers	Cane	Nuts	Vegetables
EU	5,08	19,75	1,68	11,19	2,55	2,42	29,29	66,22	0,84	27,28
USA	6,94	30,40	-	23,65	2,81	1,86	42,92	69,07	3,61	31,88
Brazil	3,94	23,63	0,24	16,11	2,93	0,91	14,88	74,51	0,29	22,67
China	5,54	11,86	0,10	14,15	2,43	1,62	18,33	65,27	3,97	21,23
Canada	3,38	-	1,20	10,32	1,93	1,88	25,77	58,59	-	21,55
Thailand	3,06	12,35	0,90	9,55	10,66	0,90	20,41	65,95	1,45	7,02
Indonesia	4,73	32,44	0,42	22,18	12,13	1,05	17,49	55,72	0,29	9,08
Argentina	4,27	21,81	0,01	16,54	2,56	1,26	23,61	63,17	2,15	17,63
India	2,72	10,07	0,18	12,16	1,32	0,65	20,87	69,24	0,72	13,69
Mexico	3,36	13,07	0,24	13,92	3,79	0,84	26,30	73,36	1,61	18,19
Ukraine	3,37	-	0,55	7,42	1,65	1,85	14,36	33,88	6,49	17,48
World	3,57	14,74	0,15	12,15	2,91	0,90	13,53	65,69	1,19	17,86

Source: calculated by the authors based on ¹⁰, ¹¹, ¹².

A key indicator for monitoring progress in ending hunger is the prevalence of malnutrition, according to which most hungry people live in developing

¹⁰ Bazaluk, O., Yatsenko, O., Reznikova, N., Bibla, I., Karasova, N., & Nitsenko, V. (2022). International integration processes influence on welfare of country. Journal of Business Economics and Management, 23(2), 382–398. <https://doi.org/10.3846/jbem.2022.16228>

¹¹ FAO Global Food Crisis Report 2022. – URL: <https://www.fao.org/documents/card/en/c/cb9997en/>.

¹² The State of Food Security and Nutrition in the World 2022. URL: <https://www.fao.org/publications/sofi/2022/en/>

countries. The country's malnutrition prevalence is measured as a percentage of the total population. This indicator is a traditional FAO indicator used to monitor hunger at the global and regional levels. For countries with a prevalence of undernourishment below 2.5%, an undernourishment level of 2.5% is automatically assigned. However, in recent decades, this indicator has been subject to increasing criticism because it only considers caloric content and does not include data on the quality of food consumed (including the consumption of protein, vitamins, and minerals)¹³. In turn, food security monitoring is carried out based on 30 indicators, which are divided into four groups: availability, access, stability, and use¹⁴, ¹⁵. Each indicator acts as one stimulating or deteriorating the food problem.

As of January 1, 2020, the total number of starving people in the world was 8.9% of the world population, that is, about 690 million people who are chronically undernourished or experiencing an acute lack of food (fig. 2).

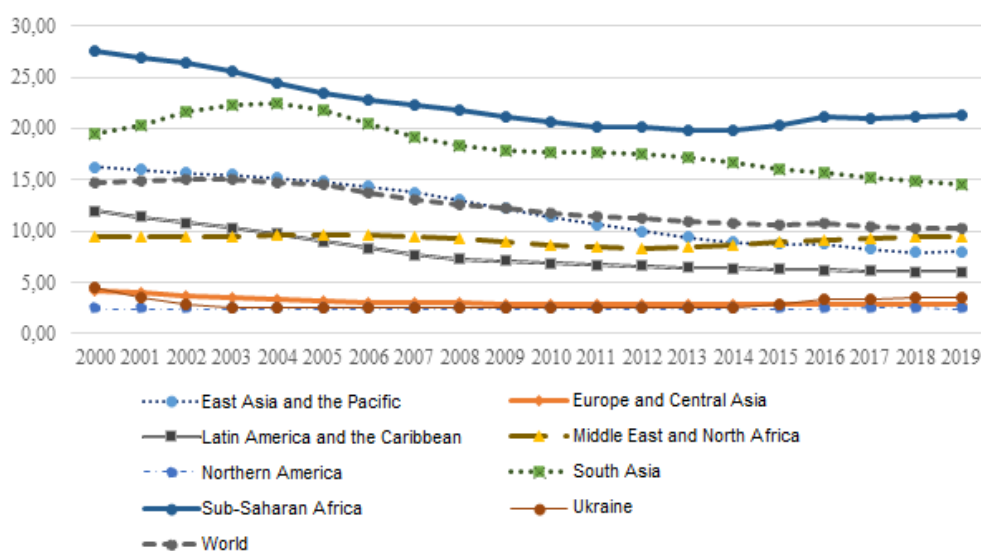


Fig. 2. Prevalence of malnutrition in the world, % of the population

Source: developed by the authors based on ¹⁶, ¹⁷.

¹³ Fanzo J. Ethical issues for human nutrition in the context of global food security and sustainable development. *Global Food Security*. 2015. Vol. 7. P. 15-23. DOI: 10.1016/j.gfs.2015.11.001.

¹⁴ Banakh O.I. Ohliad ta analiz mizhnarodnykh ta vitchyznianskykh metodyk otsiniuvannya prodovolchoi bezpeky. *Ekonomichnyi visnyk Zaporizkoi derzhavnoi inzhenernoi akademii*. 2017. Vyp. 1-2 (07). S. 94-102

¹⁵ Ramanauskas Yu., Biletska I. Modeliuvannya rivnia poshyrenosti nedoidannia v rehionakh ta yikh prodovolcha bezpeka. *Vcheni zapysky*. 2019. № 20. S. 17-29. DOI: 10.33111/vz_kneu.20.19.01.02.012.018

¹⁶ FAO Global Food Crisis Report 2022. – URL: <https://www.fao.org/documents/card/en/c/cb9997en/>.

¹⁷ The State of Food Security and Nutrition in the World 2022. URL: <https://www.fao.org/publications/sofi/2022/en/>

In addition, about 2 billion people need to have the opportunity to eat properly due to the lack of timely, safe, and nutritious food. A multiple regression model was used to assess the impact of the production of agricultural products and the economic state of the country on the prevalence of malnutrition in the regions of East Asia and the Pacific Ocean, Europe and Central Asia, Latin America, and the Caribbean, as well as in the world in general, the results of which established an inverse relationship between the level of malnutrition and indicators of the production index and GDP per capita, i.e., sustainable economic growth and agricultural production have a direct impact on reducing the prevalence of malnutrition¹⁸.

One of the most frequently used methods is the toolkit of the multiple regression model to assess the influence of individual factors on the dynamics of the prevalence of malnutrition. To do this, consider the following view of the model (1):

$$\ln(PoU_{it}) = \beta_0 + \beta_1 \ln(GDP \text{ per capita}_{it}) + \beta_2 \ln(FPI_{it}) + \varepsilon_{it}, \quad (1)$$

here: PoU_{it} is the prevalence of malnutrition in region "i" at time "t";

$GDP \text{ per capita}_{it}$ – GDP per capita in region "i" at time "t";

FPI_{it} – production index in region "i" at time "t";

ε_{it} – all other factors that affect the level of malnutrition in the region, but are not included in the equation;

β_n are constants (model parameters).

The model contains the assumption that β_1 and β_2 will be negative, since they are stimulants of the food problem and when they increase, the prevalence of malnutrition will decrease. The model can be used both for a single country and for an entire region.

With this in mind, we will use indicators of GDP per capita and the index of production to assess their impact on the prevalence of malnutrition in the following regions: East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, South Asia, sub-Saharan Africa, World (North America and Ukraine are excluded from the modelling, as the prevalence of malnutrition in them is less than 2.5% for almost the entire period under study). As a result of the calculations, seven models of the impact of GDP per capita and the production index on the prevalence of malnutrition in each of the regions were obtained:

$$\ln(PoU_{it}) = 24,50 - 0,37 \ln(GDP \text{ per capita}_{it}) - 0,4 \ln(FPI_{it}) \quad (2)$$

$$\ln(PoU_{it}) = 21,29 - 0,36 \ln(GDP \text{ per capita}_{it}) - 0,12 \ln(FPI_{it}) \quad (3)$$

$$\ln(PoU_{it}) = 21,93 - 0,23 \ln(GDP \text{ per capita}_{it}) - 0,48 \ln(FPI_{it}) \quad (4)$$

¹⁸ Bibla I.I. Ekonomichna diahnozyka prodovolchoho stanu krain v umovakh hlobalnoi nestabilnosti. *Vcheni zapysky*. 2021. № 22(1). S. 5-13.

$$\ln(PoU_{it}) = 13,99 - 0,13 \ln(GDP \text{ per capita}_{it}) + 0,96 \ln(FPI_{it}) \quad (5)$$

$$\ln(PoU_{it}) = 22,27 + 0,31 \ln(GDP \text{ per capita}_{it}) - 1,03 \ln(FPI_{it}) \quad (6)$$

$$\ln(PoU_{it}) = 16,6 - 0,31 \ln(GDP \text{ per capita}_{it}) + 0,99 \ln(FPI_{it}) \quad (7)$$

$$\ln(PoU_{it}) = 23,04 - 0,08 \ln(GDP \text{ per capita}_{it}) - 0,37 \ln(FPI_{it}) \quad (8)$$

The Fisher test was used to check the significance level of the relationship between the dependent and explanatory variables, with a tabular value of 3.0. In each of the regression models (table 4), F actual > F tabular with a reliability of 95%, so it can be stated that the model is statistically significant and the hypothesis of a significant relationship between the dependent and explanatory variables in the models is confirmed.

Table 4

MAIN OUTPUT DATA OF THE MODELS

Indicator	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Coefficient of determination R ²	0,947	0,963	0,96	0,89	0,51	0,941	0,866
Correlation coefficient R	0,973	0,981	0,979	0,943	0,717	0,969	0,931
F actual	143,96	207,99	191,99	64,4	8,47	126,46	51,64

Source: calculated by the authors.

The weighted coefficients of determination range from 0.51 to 0.963 and show that the variation in the prevalence of undernutrition is determined by the variation in GDP per capita and the output index by 94.7% for East Asia and the Pacific region, 98.1% for the Europe region and Central Asia, 97.9% for Latin America and the Caribbean, 94.3% for the Middle East and North Africa, 71.7% for South Asia, 96.9% for Sub-Saharan Africa, and 93.1% for the world. The correlation coefficient for all models except model (5) is close to 1, that is, there is a strong relationship between all explanatory variables and dependent variables.

The results of the regression analysis for models (2), (3), (4), and (8) confirmed the hypothesis that an increase in GDP per capita and food production index in the region has a positive effect on the prevalence of malnutrition in the region, that is, it leads to decrease of this indicator. Models (5), (6), and (7) for the countries of Africa and South Asia did not confirm the hypothesis of the model, which can be explained by the rapid growth of the population in each of the regions^{19, 20}. According to specialized UN organizations, by 2050 p. the world

¹⁹ Crops. FAOSTAT: web site. URL: <http://www.fao.org/faostat/en/#data/QC>

²⁰ The state of food security and nutrition in the world. FAO, IFAD, UNICEF, WFP and WHO. 2019. 212 p.

population will grow by 3.6 billion and reach 9.7 billion people. A significant increase is expected in developing countries, including countries in Africa and Asia²¹, ²². For African countries, this results in food production growing out of proportion to population growth, and the prevalence of malnutrition in the region is increasing, even despite increased food production. A similar disparity exists for the countries of South Asia, but with GDP per capita, the growth rate of which is lower than the population growth in the region. In addition, the model for South Asia is the only one with a low coefficient of determination, which does not identify the factors of GDP per capita and the output index as determinants of the prevalence of undernutrition in the region.

The full-scale military invasion of Russia on the territory of Ukraine had a significant impact on geopolitical instability, which significantly affected the ability of the latter to fully produce and export many product groups, countries, and individual customs territories, in order to form critical reserves of national food security, managed to introduce numerous non-tariff measures to regulate agricultural trade products, including a complete ban on the export of such products. After all, many countries have experienced severe economic consequences from the full-scale Russian military invasion of Ukraine. The two countries are significant exporters of agricultural products and fossil fuels, so supply disruptions and associated price spikes are already being felt worldwide. Since the countries of the Black Sea region are essential exporters of fertilizers, shortages, and price increases could lead to reduced yields in many world regions. This, in turn, can lead to food prices reaching new highs²³, ²⁴.

The war in Ukraine is a tragedy for every Ukrainian. At the same time, its consequences, particularly economic ones, have a global manifestation²⁵, ²⁶. The situation is complicated because the war has dealt a blow to the economic system, which has not had time to recover from the recession caused by the COVID-19 pandemic. The people of Ukraine themselves feel the main burden of the destruction. However, the losses associated with the reduction of trade and production are likely to be felt by people worldwide due to the increase in food and energy prices and the decrease in the availability of goods

²¹ Osaulenko O., Yatsenko O., Reznikova N., Rusak D., Nitsenko V. (2020). The productive capacity of countries through the prism of sustainable development goals: challenges to international economic security and to competitiveness. Financial and credit activity: problems of theory and practice. Vol 2, No 33. P. 492-499. Режим доступу до публікації: <http://fkd.org.ua/article/view/207214>

²² Yatsenko O., Tsygankova T., Zavadskaya Y., Horbachova I., Khoroshun O. (2020). Global agro-food market: consumer trends and challenges Financial and credit activity: problems of theory and practice. Vol 4, No 35. 440-448. DOI: <https://doi.org/10.18371/fcaptp.v4i35.222518>

²³ FAO Global Food Crisis Report 2022. – URL: <https://www.fao.org/documents/card/en/c/cb9997en/>

²⁴ The State of Food Security and Nutrition in the World 2022. URL: <https://www.fao.org/publications/sofi/2022/en/>

²⁵ EU Ambassadors Annual Conference 2022: Opening speech by High Representative Josep Borrell. 10.10.2022 Brussels. URL: https://www.eeas.europa.eu/eeas/eu-ambassadors-annual-conference-2022-opening-speech-high-representative-josep-borrell_en

²⁶ Roach Stephen S. Deglobalization's China Wild Card. Project Syndicate. Jul 25, 2022. URL: <https://www.project-syndicate.org/commentary/china-hit-hard-by-slowing-world-trade-by-stephen-s-roach-2022-07>

exported by Ukraine, which has already provoked a significant humanitarian crisis. At the same time, countries with a low income per capita are the most vulnerable because in their borders, as a rule, the population spends a more significant part of their income on food products compared to developed countries. From a macroeconomic perspective, higher food and energy prices will reduce real incomes and global import demand. At the same time, trade costs will continue to rise soon due to sanctions, export restrictions, logistical disruptions, and high energy costs²⁷. As a result, on the economic plane, the war will have a more significant impact on world trade in 2022 than on global GDP. The reduction of gross domestic product, except for Ukraine and Russia, is likely to be observed mainly in European countries, given the geographical proximity of the region and its dependence on Russian energy resources. This, in turn, may affect the stability of his political system.

Although the share of Ukraine in the total volume of world trade and production is relatively small, its integration into international agricultural markets is quite strong. The domestic agricultural sector is a powerful exporter of agricultural products, including primary food products. During 2018-2020, Ukrainian exports of sunflower, corn, and wheat seeds accounted for 38%, 10.6%, and 7.2% of the world market, respectively (Ukraine ranked first, fourth, and fifth among exporters, respectively). The risks of destabilization are exceptionally high in the world wheat market for two primary reasons. First, Russia and Ukraine's total share of wheat exports is about a quarter of the global volume. Secondly, on February 15, Russia introduced a new quota for exporting grain crops to countries not part of the Eurasian Economic Union (EEU). Thus, interruptions in the production and export of Ukrainian wheat have exacerbated a difficult situation within the specified sector. Gambia, Lebanon, the Republic of Moldova, Djibouti, Libya, and Tunisia are currently the most vulnerable to the abovementioned crisis. The volume of total wheat imports from Ukraine reached more than 40%. Due to their high import dependence on domestic production, they may need help to quickly switch to alternative sources of exports, which is likely to lead to short-term supply shortages. Disruptions in the supply of these goods caused a sharp rise in prices. In particular, wheat prices have increased by more than 40% since the beginning of the war (at the same time, futures prices have increased by more than 60%). The prices of food products such as rice and corn are also characterized by a similar trend due to the disruption in production and the fact that they substitute goods in relation to wheat. At the same time, the growing interference in trade policy by the state improves the situation. Export restrictions further reduce global supply,

²⁷ Yatsenko Olha, Tsygankova Tetiana, Tananaiko Tetiana, Zavadaska Yuliia, Irynychyna Inna, Horbachova Iryna (2022). Economization of diplomacy and modernization of global trade policy within geopolitically unstable environment. Modern foundations of economics, management and tourism: Collective Monograph (ISBN - 979-8-88757-558-2). – USA. – Publisher: Primedia eLaunch LLC. P. 130.

while import liberalization measures and subsidies increase demand. Higher food prices hurt net importers the most – mainly low- and middle-income countries in sub-Saharan Africa (Botswana, Zimbabwe) and the Middle East (Algeria, Tunisia) – deepening global poverty^{28, 29}.

Regression models, in combination with expert and author's forecasts, make it possible to predict the prevalence of malnutrition for the following years (fig. 3). According to the forecast, a gradual decrease in the prevalence of malnutrition among the population is expected in absolutely all regions and the world.

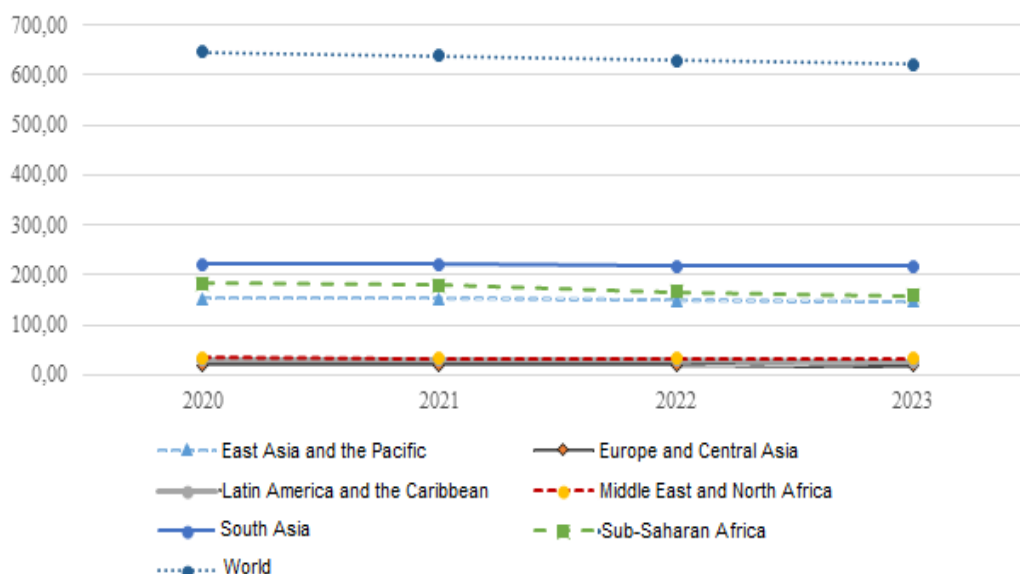


Fig. 3. Forecast values of the prevalence of malnutrition until 2023, in million people

Source: calculated by the authors based on^{30, 31}.

It is predicted that by 2023, the prevalence of undernutrition is expected to decrease in all regions of the world. In particular, the highest rate of decrease in the prevalence of undernutrition is expected in Latin America and the Caribbean and the lowest in Europe and Central Asia (Figure 3). In

²⁸ World Bank Group : web site. URL: <https://data.worldbank.org/>

²⁹ The crisis in Ukraine: implications of the war for global trade and development URL: <https://documents1.worldbank.org/curated/en/099750104252216595/pdf/IDU0008eed66007300452c0beb208e8903183c39.pdf>

³⁰ FAO Global Food Crisis Report 2022. – URL: <https://www.fao.org/documents/card/en/c/cb9997en/>

³¹ The State of Food Security and Nutrition in the World 2022. URL: <https://www.fao.org/publications/sofi/2022/en/>

absolute terms, the number of hungry people worldwide is expected to decrease to 622 million, almost 11% less than January 1, 2020.

The question of who benefits more from liberalization remains at the centre of debate among many scholars. Moreover, if for developed countries, trade liberalization has clear advantages, then for developing countries, trade liberalization carries, in addition to opportunities for development, also specific threats, which, in the case of incorrect trade policy, can negatively affect the food security of the country (table 5). The study identifies four possible scenarios of the impact of trade liberalization on agricultural goods for developing countries. It is established that, with a combination of internal strengths and external opportunities, food security will proliferate. In order to implement such a scenario, a developing country should have a clear plan regarding the use of all opportunities from integration and help its agrarian sector enter new sales markets to increase its profits and economic growth.

Table 5

**SWOT ANALYSIS OF AGRICULTURAL TRADE LIBERALIZATION
FOR THE DEVELOPING COUNTRIES**

EXTERNAL FACTORS

INTERNAL FACTORS	Opportunities (O)	Threats (T)
	1. Expansion of sales markets for national goods. 2. Attracting foreign investments.	1. Increasing competition in the domestic market. 2. Limited access of domestic goods to the market of partner countries.
	Strengths (S)	Expectation (S+O):
	1. Comparative advantages in the production of individual goods. 2. Availability of a relatively cheap labour force. 3. Availability of scientific and technological potential.	Expectation (S+T): A slight decrease in food security or its unchanged state, an increase in demand for imported products in the domestic market, a slight commodity and geographical diversification of domestic exports.
Weaknesses (W)	Expectation (W+O):	Expectation (W+T):
	1. Low competitiveness of goods. 2. Low indicators in social, political and economic ratings	Deterioration of the country's food security, intensifying competition in the domestic market between foreign and national producers, lowering the country's economic level.

Source: developed by the authors.

The role of countries' trade policy in solving the global food problem is challenging to overestimate because it plays a vital role in the country's international trade³². The world currently produces enough food to feed all the people facing hunger. However, due to various reasons, such as the stability of the food supply, access to food, and availability, more than 800 million people are still hungry. That is why international trade is considered one of the most effective ways to solve the global food problem because it can contribute to the solution of each of the named causes.

Modern integration processes over the past several decades have shown that trade liberalization has a directly proportional effect on improving food security. In particular, a significant amount of empirical research confirms that a well-considered trade policy aimed at trade liberalization benefits all participating countries and can improve the food security of countries and the economic status of the country. As for developing countries, they should be more careful in integration issues and have a clear plan for the development of their agrarian sphere and access to new sales markets, but it is through international trade that these countries have the opportunity to accelerate the solution of the food problem in the country and contribute to its economic growth.

Analysis of current condition of food security in Uzbekistan

Every country can only imagine its economy with agriculture. Thus, agriculture is one of the leading sectors of the economy of Uzbekistan, and in 2018 the share of agriculture in the gross domestic product of Uzbekistan amounted to 28.8%³³. In 2018, 53.2% of agricultural products were crop products, and 46.8% were livestock products. In 2017, 3.7 million people were employed in agriculture, 27.2% of the rural population. Almost half of the country's population lives in rural areas. As of January 1, 2019, 33.25 million people live in Uzbekistan, 51% of whom live in rural areas³⁴.

The main goal of the reform of the agrarian sector of each country is to achieve independence in the supply of food, which is of great socio-economic importance. The need for self-sufficiency in food is one of the conditions for maintaining independence, economic security, and social stability in the country.

³² Tsygankova T. M., Obolenska T. Y., Yatsenko O. M., Lyskova L. M. (2020) Priority formats of trade integration of countries. Financial and credit activity: problems of theory and practice. Vol 3, No 34. 460-469. URL: <https://fkd.ubs.edu.ua/index.php/fkd/article/view/2979>

³³ Compiled by the author based on data from the State Statistics Committee of the Republic of Uzbekistan

³⁴ Address from the President of the Republic of Uzbekistan, Sh.M. Mirziyoyev, to the Oliy Majlis. Report dated December 28, 2018. "Xalq so'zi" No. 271-272 December 29, 2018

After gaining independence, Uzbekistan took measures to ensure food security in two areas:

- expansion of rural areas and the allocation of new ones;
- revision of the composition of crops.

The government's food policy also provides for self-sufficiency in potatoes, fruits, and vegetables. Adequate provision of the population with livestock products and vegetable oil, the creation of the necessary base for processing and storage of agricultural products, as well as the formation of sufficient stocks of basic foodstuffs, ensuring the stability of their retail prices, reducing the volume of imported products are also important areas of food security.

In order to further ensure the country's food security, fill the market with high-quality, safe, and affordable food, increase the purchasing power of the population, liberalize foreign economic activity, and develop a healthy competitive environment, as well as eliminate existing systemic problems in this area from February 1, 2018, specific customs, tax and other benefits provided to individual business entities when importing food products into the Republic of Uzbekistan, as well as other preferences, have been cancelled since then.

Regulation and simplification of export-import operations happen in the country. However, severe systemic problems such as unhealthy competition, monopolization of food imports by some economic entities, artificial shortages, and unreasonable price increases for some goods persist, creating conditions for obtaining additional benefits.

The dominance of some importers in the market was facilitated by providing unique benefits and preferences to them, creating exclusive conditions for their activities, which limits the access of other enterprises to the market.

Results and discussions

The current situation in this area reduces business activity and investment attractiveness of Uzbekistan, seriously undermines the country's reputation in the international arena. In order to eliminate these issues, according to the Decree of the President of the Republic of Uzbekistan "Mamalakatning oziq-ovqat xavfsizligini yanada ta'minlash chora-tadbirlari to'g'risida" dated 16.01.2018. PD-5303, further ensuring the country's food security, filling the market with high-quality, safe and affordable food products, strengthening the purchasing power of the population, liberalizing foreign economic activity and developing a healthy competitive environment, as well as existing systemic problems in this area:

- cancellation of individual customs, tax and other benefits, as well as other preferences provided to individual business entities when importing food products into the Republic of Uzbekistan from February 1, 2018;

- adoption by the government of decisions on the provision of certain customs, tax and other benefits, as well as other preferences to certain economic entities when importing food into the country;

- comprehensive measures to find and attract grocery carriers, create equal conditions for them to enter the market, conclude contracts, assist in the transportation and storage of imported products, as well as to fully meet the population's demand for high-quality, affordable food products; development of other activities;

- organization of modern high-tech, energy-efficient equipment for specialized warehouse buildings, warehouses, freezers, processing and packaging of food products in all regions of the country on the terms of public-private partnership³⁵;

According to the Decree of the President of the Republic of Uzbekistan "About measures to further ensure food security in the country" dated 16.01.2018. PD-5303, new regulations come into force as of February 1, 2018:

- the ban on the sale (purchase) of consumer goods on the republican commodity exchanges was cancelled;

- sugar producers will be exempt from value added tax until January 1, 2020 in terms of volumes produced on the basis of imported raw materials;

- a license for wholesale trade for the sale (purchase) of consumer goods in open electronic trading on commodity exchanges is not required;

- upon obtaining a license for wholesale trade in the amount of not less than 3500 minimum wages, of which a statutory fund in the amount of not less than 1200 minimum wages is required;

- import of socially significant food products at the expense of the Fund for Stabilizing Prices in the Domestic Consumer Market (hereinafter referred to as the Fund) is carried out in exceptional cases and only through commodity exchanges, including open exchanges of foreign exchanges;

- detailed information on the planned purchases of food products, receipts and expenditures of the Fund is published monthly on the Single interactive portal of public services of the Republic of Uzbekistan³⁶.

The Coronavirus pandemic that shook the world affects not only Uzbekistan, but also the economies of developed countries. The Coronavirus has created the threat of a global economic crisis. We believe that the probability of a global economic crisis in the next 12 months is 43%. The number of patients infected with the COVID-19 coronavirus, originally detected in China, has dropped sharply, but outside of China – in other parts of the world, the geography of transmission of the virus was still expanding day by day at the time of writing. Furthermore, there is a sharp decline in active indices on the world financial markets. In other words, the COVID-

³⁵ Decree of the President of the Republic of Uzbekistan dated January 16, 2018 PF-5303 "On measures to further ensure the food security of the country."

³⁶ Ibid.

19 coronavirus "penetrated" not only into the human body, but also into its economic life and world financial markets.

Global trends in ensuring food security

In the conditions of global instability, an increasingly urgent issue facing many countries and the world community, in general, is ensuring the sustainable development of the economy and resistance to external factors. This issue is further exacerbated by the COVID-19 pandemic, which has singled out the most vulnerable areas in each country and brought them to the fore. One of them is the agricultural sector, which occupies a critical link in the sustainable food supply of the population. The full-scale military invasion of Russia on the territory of Ukraine, which can provoke and intensify global food and energy crises, also significantly impacted geopolitical instability.

The main directions of ensuring food security and helping to solve the global food problem, which are currently used, have shown their imperfection in the conditions of other crises. Therefore, it is necessary to modernize the current and search for new ways of solving the global food problem in the context of methods and tools of international trade integration at the global level, which will be able to respond to new crisis phenomena effectively.

Currently, the most effective methods of solving the global food problem in the context of agricultural production at the global level, which should continue to be implemented for the proper development of this area, include the following:

- Helping farmers, especially family farmers, to become more efficient in producing their products. This can be achieved through a systemic approach that will include investment in infrastructure and education, ensuring land and property rights registration, supporting research to conserve scarce resources, and promoting agro-biodiversity. In addition, support programs such as social insurance schemes and direct payments must be prepared for specific population categories.
- Cease of subsidizing and other government aid to agricultural producers that distorts the market. Raising farmers' incomes through high domestic prices and trade barriers that hold back imports has only a short-term effect, ultimately leading to higher consumer prices, increasing pressure on natural resources and biodiversity, and contributing to increased greenhouse gas emissions.
- Consolidation of all necessary rules and reforms at the international level and creation of an effective mechanism of regulation and control over their implementation.

An essential step to ensuring fair competition in agricultural production and trade in agricultural goods was the Agreement of the World Trade

Organization on Agriculture, concluded in 1995. The purpose of the Agreement was to simplify access to the markets of agricultural products and reduce subsidies to producers of agricultural products, the provision of which distorts trade^{37, 38}. The WTO agreement on agriculture contributed to a significant increase in trade in agricultural goods, and it was the first step in solving the global food problem.

The terms stipulated by the Agreement provided significant opportunities to influence the agricultural sector and foreign trade of WTO member countries. However, over time, developed countries benefited more from this Agreement than developing countries. First of all, this was manifested in the domestic support of the agricultural sector, which was supposed to decrease due to the reduction of "yellow box" subsidies, but developed countries increased two other types of subsidies, as a result of which the overall domestic support of agriculture increased. In addition, export subsidies remained high because developed countries cut budget expenditures by 36 percent, and the total amount of exports is covered by subsidies by 21 percent. Therefore, the results of the Doha round of negotiations within the framework of the WTO were supposed to be the second step to eliminate the gaps in the Agreement on Agriculture.

In the framework of these negotiations, the critical issues regarding agriculture related to the reduction of domestic support for production, the reduction of tariffs on food imports, and the reduction of export subsidies. Developed countries were expected to reduce subsidies for their agricultural producers, which significantly distorts trade, and developing countries would be able to maintain their agricultural sector and not harm other countries^{39, 40}. However, the Doha Round dragged on, and the development of an agreement that would satisfy all WTO member countries turned out to be almost impossible. In addition, there have been many changes in the world market: the number of bilateral trade agreements has increased; Brazil, India, and China began to play a significant role in the trade of agricultural products; in some developing countries, massive domestic support for the agricultural sector has begun; in developed countries, the type of internal support has changed, etc.⁴¹. All these nuances affected the negotiations and blocked them at the level of indecisiveness. Many scientists believe it is difficult to resume

³⁷ Negotiations of the Doha Round of the WTO: issues related to agriculture / Institute of Economic Research and Policy Consultations. 2015. URL: http://www.ier.com.ua/files/publications/Books/5.WTO_Doha_Round_Negotiation.pdf

³⁸ WTO Agreement on Agriculture. – URL: https://zakon.rada.gov.ua/laws/show/981_005#Tex

³⁹ Elliott K. Food Security in Developing Countries: Is There a Role for the WTO? Center for Global Development. 2015. URL: <https://www.cgdev.org/publication/food-security-developing-countries-there-role-wto>

⁴⁰ Matthews A. Trade rules, food security and the multilateral trade negotiations. *European Review of Agricultural Economics*. 2014. P. 511–535. DOI: 10.1093/erae/jbu017

⁴¹ Bouët A., Laborde D. Food security and international trade. International Growth Centre. 2017. URL: <https://www.theigc.org/blog/food-security-international-trade/>

the Doha Round and end it with the desired results, so the best decision would be to start a new round considering all modern trends and contributing to solving the global food problem.

The main measures that the WTO should take to start a new round of negotiations and improve food security in countries with different economic levels can be defined as follows:

- promote regular updating and consolidation of critical issues regarding agriculture on a multilateral basis rather than making breakthroughs once a decade⁴²;

- establish ad valorem tariffs (a percentage of the import price) and not use special tariffs (per unit of goods), which provide more excellent protection when prices are low and less protection when prices are high;

- solve the problem of information asymmetry by increasing the level of transparency for all WTO members regarding the policy of domestic support for agriculture and export restrictions of others;

- expand the issues for discussion in such a way as to allow developed countries to accept an ambitious reduction of agricultural tariffs in favor of developing countries, but with an advantage for the former in other issues⁴³;

- develop international trade rules that will promote the agro-biodiversity of farms and stimulate the activities of the most agro-biodiverse farms by reducing export tariffs, thereby supporting small farmers who are in a socially, economically, and ecologically dangerous environment;

- continue the search for an adequate protection mechanism that would allow developing countries to reduce marginal tariff rates without fear of a jump in imports, which could negatively affect domestic production⁴⁴.

Each of these measures, individually and in general, can play a crucial role in ensuring the sustainable development of agriculture at the international level and in increasing food security in each of the world's countries.

Ukraine's important role in solving the global food problem is exceptionally controversial because, on the one hand, the country's competitive advantages in the international market of agricultural products are provided by the latent potential of their production, which significantly exceeds the needs of the domestic market. However, on the other hand, the resource orientation of Ukrainian exports, characterized by inconsistent demand and significant price variability, and the low

⁴² Bouët A., Laborde D. Food security and international trade. International Growth Centre. 2017. URL: <https://www.theigc.org/blog/food-security-international-trade>.

⁴³ Josling T. The WTO, Food Security and the Problem of Collective Action: Conference on Food Price Volatility, Food Security and Trade Policy, 18-19 September 2014. World Bank, Washington, DC, 2014

⁴⁴ Fernandez-Wulff P. (2013). International Trade and Food Security: Can Agrobiodiversity Reconcile Both? United Nations Peace and Progress. No. 1 (1). P. 18-32

competitiveness of agricultural products make further proper development of the agrarian sphere impossible. Therefore, only under the condition of the development of the agricultural sector following the innovative type and the implementation of an effective trade policy can Ukraine take a leading position in the global food supply. Existing favourable conditions and advanced positions on international agricultural markets in terms of individual product groups form the necessary basis for the development of the agricultural sector of Ukraine. Therefore, the priority directions for the development of the agricultural sector of Ukraine can be: use of the latent potential of the production of agricultural products, which exceeds the needs of the domestic market, the introduction of programs for the development of rural areas and infrastructure, the stimulation of direct foreign investments, the use of the latest technologies and innovations, the intellectualization of foreign trade, the modernization and robotization of logistics processes, increasing the competitiveness of products, stimulating the export of finished products and goods with high added value, geographical diversification of exports, increasing the level of intra-industry specialization (production of grain and leguminous crops, corn for grain, sunflower seeds, wheat, milk, pigs for meat, rape, barley, chicken eggs, beef cattle and sugar beets) and international specialization – production of organic agro-food products and goods with high added value (cheeses, chocolate, sugar, etc.).

The current crises caused by the pandemic due to COVID-19 and the full-scale military invasion of the Russian Federation in Ukraine have revealed the problem areas in the field of food security of the countries and sharpened the attention on food supply chains and the consequences associated with the failure of their work, the growth of unemployment, which leads to reduced incomes and poverty of a significant segment of the population, the importance of migrant workers, without whom harvests can be threatened and other problem areas that require immediate measures to eliminate them. Therefore, the main directions of the development of trade integration in the global food supply, which should be followed in order to reduce the consequences of unpredictable crises of various manifestations, are proposed (fig. 4). In particular, the promotion of regional cooperation for equal distribution of food; strengthening of social assistance programs for the most vulnerable strata, which are separated in the study into four groups: chronically hungry people, small farmers, children (with disabilities and from low-income families) and people from life-threatening regions; introduction of innovative technologies for increasing the productivity of agricultural production; constant and practical support of small agricultural producers.

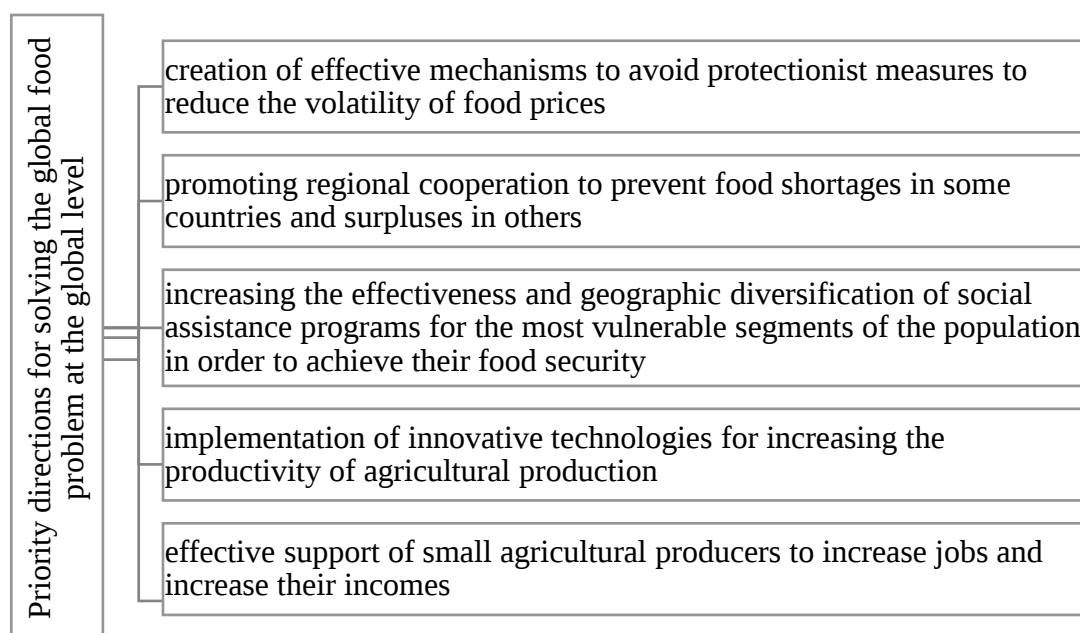


Fig. 4. Priority directions for solving the global food problem in the context of methods and tools of international trade integration at the global level

Source: developed by the authors.

Therefore, global challenges and threats that arise before the world community directly or indirectly affect the agro-food situation of countries and their food security. During the studied period of almost two decades, the volume of export of agricultural goods was affected by various factors; however, the curve of the dynamics of the volume of export of agri-food products shows that the fluctuations were not as significant as for the total volume of export of goods. Thus, it confirms the fact that the field of agriculture is relatively resistant to global manifestations of instability. However, the current crisis caused by the COVID-19 pandemic has exposed the problem areas in the country's food security and has sharpened the focus on food supply chains and the consequences associated with their failure; the growth of unemployment, which leads to a decrease in income and poverty of a significant segment of the population; the importance of migrant workers, without whom harvests can be threatened and other problem areas that need not just additional attention, but immediate measures to eliminate them.

Conclusion

In the context of sustainable economic development, the global food problem plays a key role because, on the one hand, it creates severe challenges on the way to the sustainable economic development of humanity, but on the other hand, only sustainable economic development can be the key to overcoming the problem of hunger and malnutrition in the world. The centrality of the food problem among all global problems of humanity makes its solution critical for achieving the 2030 global Goals because food security is the basis of their interconnectedness. The critical reasons for the strengthening of the global food problem are grouped as follows: economic - low standard of living and extreme poverty of the population, low rates of economic growth, the unfairness of world food trade conditions, inefficient state management; environmental – changes in climatic conditions, extreme weather events, reduction in the fertility of arable land, depletion of agricultural resources and water pollution; social – qualification and technological inability to conduct modern agribusiness, armed conflicts, and wars, hazardous diseases.

Regulation of the market of agricultural products and ensuring food security for the population is carried out at the global, interstate, national, local, social group, and family levels. In particular, international organizations of universal action and specialized international organizations for solving the global food problem are distinguished globally. A key place among international organizations of universal action belongs to the World Trade Organization, which sees a solution to the global food problem precisely through international trade. Informal coalitions and groupings such as the Cairns Group, the G-20, and the G-33 also play a significant role. For complex and systematic monitoring of the effectiveness of international trade integration in the context of ensuring the food security of the participating countries, a matrix format of the influence of international trade integration on solving the global food problem according to the integration-instrumental and food-target vectors is proposed.

The food situation of countries is determined by the country's ability not only to provide food for the needs of the country's population through its resources but also with the active use of the advantages of international cooperation, in particular, the implementation of certain aspects of the agrarian policy of developed countries into the policy of developing countries, which will contribute not only to the increase in productivity, improving the country's food security, but also achieving a more significant share in the export of goods on the global market and improving the country's economic security in general. The calculated average yield indicators of the main groups of goods in different countries made it possible to establish that; in addition to developed countries, high yield indicators were also shown by

some of the leading countries in the export of agricultural goods, such as Brazil, Indonesia and Mexico, which is the result of effective management of agriculture with agrarian policy, which includes the support of the sphere of agricultural production by the state, the attraction of foreign investments and the implementation of the results of scientific and technical progress in all stages of agricultural production. A multiple regression model was used to assess the impact of the production of agricultural products and the economic situation in the country on the prevalence of malnutrition, the results of which established an inverse relationship between the level of malnutrition and indicators of the production index and GDP per capita, i.e., sustainable economic growth and agricultural production has a direct impact on the reduced prevalence of malnutrition. In addition, by 2023, the prevalence of undernutrition is expected to decrease in all regions of the world; in particular, the highest rate of decrease in the prevalence of undernutrition is expected in Latin America and the Caribbean and the lowest in Europe and Central Asia.

Based on the foregoing, the following conclusions should be drawn from the negative impact of the coronavirus on the global economy. In particular, more than half of world experts, or 57%, predict that the growth of world GDP this year will decrease by 0.5 percentage points, and 20% of them will reduce this indicator by 1.0 percentage points.

- The virus is expected to have a substantial impact in countries where the coronavirus is widespread, such as China, Iran, Italy, and South Korea. In contrast, Iran is expected to have its "economic shock" the most severe due to weak health care systems and long-delayed government measures.

- The coronavirus is a threat to the global economic crisis. The probability of a global economic crisis in the next 12 months is 43 percent.

In short, this is further ensuring the country's food security, filling the market with high-quality, safe, and affordable food, increasing the population's purchasing power, liberalizing foreign economic activity and creating a healthy competitive environment, and eliminating existing systemic problems in this area.

However, firstly, the impact of the coronavirus on the global economy can be compared to a "real storm." Today, the damage to tourism and supply chains is so severe that governments must take significant action to prevent damage to the financial system. Second, volatility will continue in financial markets shortly, and market participants are also waiting to see what action the leading central banks will take in this situation. It is also essential to consider the possibility of fiscal stimulus to ensure global economic growth. Third, it is based on the assumption that a financial and global crisis will not occur. Recent positive trends and results achieved in the fight against this epidemic in China support our assumption. In particular, the number of cases of COVID-19 damage in China is decreasing daily (daily additional

damage cases). This indicates the effectiveness of the fight against this epidemic and that the process is under strict control. If the Chinese experience is applied in other countries, financial markets will soon stabilize, and supply chains and global demand will gradually recover. Fourth, it is proposed that the government adopt regulations providing individual customs, tax and other benefits, and other preferences for certain businesses when importing food into the country. Fifth, it is necessary to find and attract food carriers, create equal conditions for them to enter the market, conclude contracts, help in transporting and storing imported products, and fully satisfy the population's need for high-quality, affordable food.

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Received on: March 18, 2022

Accepted on: October 28, 2022

Released on: December 15, 2022