SCIENTIFIC HORIZONS

Journal homepage: https://sciencehorizon.com.ua
Scientific Horizons, 25(9), 117-125

UDC 338.43
DOI: 10.48077/scihor.25(9).2022.117-125

Restrictions on Grain Exports During COVID-19: Features and Solutions

Olga Khodakivska[1*], Tetiana Kolesnyk[2], Oksana Samborska[3], Hanna Shevchuk[2], Natalia Germaniuk[2]

[1]National Scientific Centre "Institute of Agrarian Economics"
03127, 10 Heroiv Oborony Str., Kyiv, Ukraine

[2]Vinnytsia National Agrarian University
21008, 3 Soniachna Str., Vinnytsia, Ukraine

[3]Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University
21000, 32 Ostrozhskogo Str., Vinnytsia, Ukraine

Article's History:
Received: 09/14/2022
Revised: 10/24/2022
Accepted: 11/20/2022

Suggested Citation:
Khodakivska, O., Kolesnyk, T., Samborska, O., Shevchuk, H., & Germaniuk, N. (2022). Restrictions on grain exports during COVID-19: features and solutions. *Scientific Horizons*, 25(9), 117-125.

Abstract. The world export of agricultural and of food products has been a relevant topic at all times, because it regulated the issue of economic and social development of many countries. However, this issue became even more urgent after the start of the COVID-19 pandemic, when the situation in this sector got very complicated. The aim of the study is to look at the features of grain export restrictions during the COVID-19 pandemic and how they can be addressed. The socio-economic method was applied to compare the economy with the market and take into account the multiplicity of economic behaviour. Using the functional method, the theoretical foundations of functional economics were established, focusing on the evolution of terminology to denote certain combinations of restrictions on the export of grain products and services during the COVID-19 pandemic. The method of institutional analysis was used to assess the quality of the institutional basis of the economy and political structures. It was determined that changes in the trade sphere stimulated the development of production in deficit areas. It was defined that the removal of tariff barriers to trade could be useful in overcoming the crisis caused by the pandemic and also an efficient link to reducing the costs of international trade. Another conclusion is that it is worth preserving access to food, rather than restricting exports in countries where people may suffer from hunger. The practical relevance lies in identifying the features of appropriate restrictions on grain exports during a pandemic and highlighting the main ways in which this problem can be addressed

Keywords: sustainable development, pandemic, food security, macroeconomic environment

*Corresponding author

INTRODUCTION

The end of 2019 was marked by the outbreak of the coronavirus pandemic (COVID-19). This disease began to spread rapidly around the world and had a significant impact on various spheres of life (Glauber *et al*., 2020). At the beginning of 2020, a large number of measures were introduced to limit the spread of the coronavirus disease. Those measures were relieved in the summer of the same year, but by the end of 2020, all countries of the world still maintained certain restrictions (Sulser *et al*., 2020). These restrictions have had a negative impact on the economy of many countries, as well as on international trade. Many countries have encouraged imports to promote food security, while some other countries have restricted imports to protect their citizens from the spread of COVID-19 (Glauber *et al*., 2020). These various containment measures affected the production, processing, trade and distribution of cereal foodstuffs in the region, with the greatest impact occurring early in the pandemic. It should be noted that world exports of agricultural and food commodities remained relatively stable and unaffected by mines compared to previous years, while world trade in other commodities fell by 9.2% (Rude *et al*., 2019; Liefert *et al*., 2021; Headey, 2019). Most of the disruption to agriculture and food trade occurred early in the pandemic, when several countries-imposed blockages and other containment measures.

According to A. Mullen (2020), while various countries reacted by imposing export restrictions, leading to increases in prices of staple foods on the world market, this led to the limitation of the sale of grain by many exporters. In this way, it was possible to protect consumers from rising prices. In return, the countries that bought the grain were forced to lower the customs tax on food to stimulate internal trade. Consequently, rather than curbing price rises, these policies only increased prices on the world market. These restrictions, even temporary ones, seem entirely unnecessary. W. Martin & K. Anderson (2020) think that export bans by key exporters have restricted world supplies and have certainly pushed up world prices of staple foods. In April and May 2020, the total value of agricultural and food exports fell by 5-11% compared with the overall averages for the same months of 2018 and 2019 (International Trade Centre, 2020). Exports of grain and food products began to recover to previous indicators in the summer of 2020, however, since then, prices for the mentioned goods started to rise, if compared with the prices of previous years (International Trade Centre, 2020).

T.W. Hertel & M.E. Tsigas (2019) believe that the value of imports of agricultural products and foodstuffs followed a somewhat similar trend, but with greater volatility. According to S. Mitra & T. Josling (2019), the aggregate value of imports started to decline in February 2020 and by May had fallen by 15%, compared to 2018 and 2019. In the summer of 2020, sharp changes in the dynamics of world trade in agricultural products were observed. Researchers explain this phenomenon by the change in the number of products, as a result of the harvest, as well as by the increasing of taxes in many countries (Schewe *et al*., 2017). It should also be noted that throughout 2020, prices for grain and agricultural products fluctuated. Thus, in the winter and spring of 2020, export flows worldwide decreased by a quarter, compared to previous years. However, already in autumn, export flows increased; therefore, it was possible to normalize the situation (Puma *et al*., 2020; Sustainable Development Goals, 2022; Torero Cullen, 2020). The export of agricultural products should be divided into two types: primary (grain) and secondary (cotton, tobacco, fish). Thus, the export of primary goods was stable during 2020; therefore, it was possible to avoid a humanitarian catastrophe related to famine.

The purpose of the study is analysing the characteristics of grain export restrictions during the COVID-19 pandemic and how they can be addressed.

MATERIALS AND METHODS

The methodological basis of the study was formed by the following methods to the study of this topic: social and economic, functional and institutional. The social and economic method, complemented by the conceptualisation of a solidarity and pluralistic economy, likens the economy to the market and takes into consideration the plurality of economic behaviour, which is part of the substantive approach to the economy. It refers to the exchange between an individual and their natural and social environment. This exchange provides one with the means to satisfy their material needs. Indeed, the realisation of the latter requires the elimination of irregularities, such as the involuntary disconnection and separation of the global dimension of grain productivity during the pandemic; the ineffectiveness of the communication coordination and consultation system. To meet this need, the social and economic approach enriches management practices that base increased export performance during a pandemic on a single combination of factors, in particular, products, markets, and technologies, that view human capacity as the foundation and aspect that gives clear competitive advantage, hence as an important lever for improved economic performance.

The functional approach provides a brief overview of the origins and theoretical foundations of functional economics, focusing on the evolution of terminology to refer to particular combinations of constraints on the export of cereal products and services during the COVID-19 pandemic. Drawing inspiration from the variety of categories of solution proposals, a typology can be identified that is intended to characterise the main categories of restriction models that companies may use given the current problem, based on a description

of their mechanisms and a selection of thematic aspects that offer advantages from an economic point of view with respect to grain exports. A functional methodology that optimises the use of constraints and services focuses on the management of existing wealth in the form of cereal products. From this perspective, products in a pandemic appear to be mere inputs, intermediaries in a process aimed at fulfilling a function rather than a central object. Their economic value no longer lies in their exchange value, but in their use value, where one doesn't have to focus only on the cost of production, but on the total value of services that include the stages of operation, maintenance or end-of-life processing.

Institutional analysis is built around three basic principles. Firstly, it develops a programme that integrates various social science approaches, but goes beyond the traditional aporias of these methods, which often tend to focus on the stability of institutions. Second, it analytically develops a theory of endogenous change in institutions and an analysis of temporal dependence, in this case the timing of the extension of restrictive measures in relation to the pandemic, where individual interactions are studied in the context of grain export. Third, it reflects the proper functioning of markets, emphasising that institutional foundations of these markets are strong enough and that the functioning of political structures plays a major role here. Indeed, good institutions also stimulate grain export production by generating savings, investment in human and physical capital, and the development and deployment of useful knowledge, particularly during the COVID-19 period. The quality of the institutional framework of the economy and political structures determines decisively the well-being of a society.

RESULTS AND DISCUSSION

Public health crisis associated with the COVID-19 pandemic threatens global food security in one way or another by slowing down grain logistics and transportation chains. This is enough to make grain-importing countries fear rising prices while their financial resources deteriorate. Although global food security has gradually recovered over the past five years, with more than 820 million people globally undernourished in 2018, the long-term trend has nevertheless shown a clear decline in global hunger over 25 years (Sustainable Development Goals However, 2022), the COVID-19 epidemic has now forced nearly half of humanity to stay in their homes, jeopardising the ability of populations that are already vulnerable or in the process of becoming so. The reversal of this crisis is a powerful indicator of the fragility of food supply chains. After the outbreak of the epidemic, agriculture and food seem to be the decisive sectors in the fight against the pandemic, although they have already been in particular demand since the beginning of the crisis.

All Eurasian zone countries have adopted common measures (introduction of export duty, limit volumes of grain export) to limit exports of raw and processed grain products (Headey, 2019). To limit inflation on processed grain products such as bread, Ukraine has restricted wheat exports to 20.2 million tonnes for the 2019/2020 campaign. Announcements of export restrictions by Black Sea countries have triggered a panic effect on the market and, consequently, significant purchases of wheat for storage, jeopardising food security in sub-Saharan Africa. More generally, the unbalanced structure of agrifood trade on the African continent, i.e., value-added exports compared to basic food imports, makes it unnecessary to divert export flows of products that are not staples for the basic food ration, unlike wheat or rice. All the more so as the value of export earnings from these commodities is likely to fall sharply in the coming years. This loss of income at the macroeconomic level for these countries can also be approached in terms of the micro-economy of households, where the isolation of population in these countries blocks the ability to work and earn wages. As can be seen, the global health crisis raises the urgent issue of food security. To alleviate supply constraints, the challenge is to re-establish national or even regional agricultural policies, where possible, and to strengthen a production system capable of meeting food needs of local populations.

Isolating grain exports during pandemic can severely limit the workforce that must work in the fields or food processing plants, directly affecting food production system. But the problem of self-isolation is much more global, since for the majority of population in developing countries, income from activities is daily and allows them buying food. However, by depriving or restricting labour market with containment measures, the most precarious workers risk, at best, facing a sharp drop-in activity and, hence, a loss of income, which would jeopardise their ability to feed themselves. The state of public finances in most of these cases does not allow for a social safety system to compensate for this labour market failure, especially as much of the activity is concentrated in the informal economy. Populations in urban areas with high population densities thus risk being particularly weakened by these disincentives, which will disrupt formal and informal labour markets. Loss of income caused by this reduction in activity will even worse if it is combined with an increase in the price of imported staple foods (Pugachov *et al.*, 2021; Kaletnik & Lutkovskaya, 2020).

Faced with the spread of the pandemic, countries naturally took measures to restrict exports to make the national food security of their fellow citizens a priority. According to the International Trade Centre (ITC) (International Trade Centre, 2020), 80 countries have adopted export-restrictive measures since the start of the crisis, while 57 countries, on the contrary, have liberalised their imports to boost supply. Of the 130 announced export restriction or liberalisation measures worldwide, about 10 concerns the agrifood sector and

are concentrated in countries of strategic importance in the global food balance (International Trade Centre, 2020). Food autonomy seems largely secured, but the global agrifood balance is severely disrupted by this health crisis and leads some transition and developing countries to depend on external food source in a new period of food insecurity. Since late March 2019, due to fears related to the COVID-19 pandemic, several countries have adopted policy measures to ensure sufficient supply on domestic markets and to avoid rising food prices, including cereals. In Ukraine, a decision to sell 160,000 tons of wheat was made, and at the beginning of spring 2020, the maximum export volume of this grain crop was set at 20.2 million tons (International Trade Centre, 2020). This discovery is all the more paradoxical when one considers global agricultural balances, which show an increasing surplus year on year (Table 1).

***Table 1**. Global estimate of global grain production during the COVID-19 pandemic*

	2018/2019	2019/2020	2020/2021	2021/2022 (based on H1 calculations)
Grain production (million tonnes)	2139	2172	2175	2223
Consumption (million tonnes)	2163	2193	2192	2226
Reserves (million tonnes)	625	604	608	605
Annual difference (million tonnes)	-12	-24	-17	-3
Major exports (million tonnes)	164	156	159	168

***Source:** (International Trade Centre, 2020)*

Restrictions that were introduced due to the spread of COVID-19 strongly affected a number of trade factors in underdeveloped countries. It is important to note that due to the introduction of these restrictions, a number of problems arose. As a result, the production of grain products decreased. In particular, these problems include the reduction of personnel and the difficulties associated with the transportation of grain. The most important factor that could help in overcoming this problem was international cooperation. In the context of a possible humanitarian disaster, governments had to put geopolitical interests aside in order to establish communication and find ways to resolve this situation. Grain has a great influence on the development of the entire trade in agricultural products, because grain itself is the basis for the manufacture of other products. It should also be understood that this branch of the economy is seasonal and depends on many objective factors, such as rainfall, which affect the harvest and the subsequent situation in this area. Also, government restrictions in other areas have a great impact on the development of this particular area; thus, the ban on crossing the border has a significant impact on cooperation in the field of agriculture.

Many instruments of export restrictions depend on trade as an engine of economic growth, production and sales in foreign markets. However, the COVID-19 pandemic has a strong impact on demand in key markets such as Europe and the US, and also on trade logistics with these markets. Many regions play a significant role in grain production for the northern hemisphere markets during the off-season, which can be a valuable source of export earnings. At the agricultural level, the COVID-19 crisis highlights the growing complexity of the food export equation. Between the desire to move some production processes to reduce dependence on global value chains and, on the other hand, to strengthen the resilience of these same chains so as not to weaken the supply of structurally dependent countries, the food prism reveals the difficulty of reconciling the two issues. The most appropriate option would undoubtedly be to promote a solution aimed at achieving a balance, i.e., ensuring both a minimum of food autonomy when agronomic and political conditions that allow it and the management of exchange flows necessary for the food security of the most vulnerable areas. This is the kind of agricultural policy mix strategy that could determine the future course of global food systems. Special attention should be paid to the border crossing restrictions for citizens of another country. Although these measures prevent the spread of the disease, they have a negative impact on poor countries, as they destroy already weak economies. In addition, developing countries are highly dependent on the export of grain, because in such countries the agricultural sector forms the basis of the entire economy (Palamarchuk *et al.*, 2021; Patyka *et al.*, 2021).

In this situation, it is important for the problem of export of agricultural and grain products in particular not to be under control of one single institution. Instead, all branches of management and politics should interact to resolve it. Thus, it is important to establish

cooperation between the governments of different countries in order to control and improve the situation in the field of grain trade. Not only government institutions, but also private ones, such as non-governmental organizations etc. should participate in this process. A close connection should also be established between these institutions. Their activities should be aimed at ensuring the transportation of goods, and sharing their own experience in this field in general. It is especially important that countries with strong economies support weaker partners in order to maintain the balance of world trade. Attention should also be paid to the information aspect, since the situation is developing at a rapid pace, the government needs to receive reliable data on the field of grain trade in a timely manner (Giordani *et al*., 2019). The purpose of the mentioned activity should be to ensure access of farmers to world trade, and to provide benefits therefor, with the aim of improving trade. All this can be done through the use and development of information technologies. Due to the remote format of meetings, politicians and heads of organizations can quickly make decisions without risking health.

The pandemic raises concerns about food security. Traffic restrictions, markets that can no longer be contained, cargo and trucks blocked at borders, complicated customs clearance. The health crisis and associated restrictions are weakening the distribution and production chains for agricultural products. With price volatility caused by shocks to food supply and demand, restrictions affect, in particular, the poorest people. After all, essential goods can, in theory, move freely despite restrictions on movement, but the health crisis has reduced the pace of exports and many countries are far from self-sufficient. Subjects of international trade in grain products, in order to maintain a favourable situation, should agree not to make restrictions hindering trade in agricultural goods. The focus should be on measures that will help prevent a global recession and thereby minimise further increases in food insecurity (Janssens *et al*., 2020). In order to fulfil this goal, the governments of countries must provide assistance of various levels and types, in particular, it can be additional investments, provision of social insurance for workers affected by the disease, and in general control of the epidemic situation at work. To prevent further weakening, questions of increased international aid and debt relief for the poorest countries should be raised in international bodies, but without allowing the mistakes of the past to be repeated.

COVID-19 has had a significant impact on the global food chain. Queues in grocery shops, shortages of staple foods and difficulties in shopping while respecting physical distancing measures have affected large parts of the world's population. Due to the lack of distancing options or adequate protection against the virus in grain-processing plants, many workers have quit their jobs and this has led to the closure of many plants. In addition, there has been an increase in food waste due to the shutdown of the commercial supply chain. Uncertainty over food availability can trigger a wave of export restrictions, causing global market shortages. International or regional trade makes a crucial contribution to global food security (Barrett, 2020). National governments need to support local communities and citizens in increasing local food production, including grains, through appropriate incentives – financial and in-kind – to increase food sustainability, minimise food waste and avoid over procurement to ensure equitable access to food for all. This unprecedented crisis is an opportunity to finally give global governance a real dimension, which is bound to lead to a deep questioning of international institutions.

As in many other export supply chains, food systems are complex and global, and are currently disrupted by a number of factors: disruption to harvesting, as agriculture is heavily dependent on cheap but skilled and flexible labour; production disruption, as production has been completely halted in various locations around the world due to outbreaks of virus among staff and difficulties in maintaining physical distancing measures; transport and trade disruption, as some ports do not operate normally, delivery may be delayed or cancelled, trains and trucks cannot cross certain borders, and some countries have suspended all flights. Although transportation is permitted, export restrictions can affect delivery and, consequently, reduced grain exports are affecting livestock farmers. Indeed, some of them have already experienced difficulties in finding enough food for their herds. Thus, the human dimension of this pandemic extends beyond people directly affected by the virus and seriously threatens the second Sustainable Development Goal, which is the elimination of hunger (Sustainable Development Goals, 2022). In some agricultural regions, droughts and locust invasions further exacerbate the situation. The pandemic confirms the need to stress-test the export supply chain, have an effective business continuity plan and build strong relationships with suppliers rather than relying on third parties (Falkendal *et al*., 2021).

According to D.G. Brewin (2020), as for the current high grain prices, they rose due to global supply-demand relationships and regulatory measures imposed by major exporters, such as additional duties and export restrictions, which are the result of the effects of COVID-19. Nor should one look for a surge in capital interest in investing in agricultural markets, because such activity has been ongoing for years and is likely to continue in the future. R.S. Gray (2020) considers that export restrictions operate against a backdrop of panic buying, which has left supermarkets with empty shelves not because of a lack of goods but because of logistical obstacles created by pandemic containment measures. Export restrictions on wheat and wheat flour increased the prices of essential commodities, including bread. R.F. Ceylan *et al.* (2020) convinced that with the onset of the crisis

triggered by COVID-19, the strain on public policy to strike the necessary balance between commitments and needs intensified and required going beyond traditional measures to guarantee the survival of the health system and the well-being of the supply chain, particularly cereals. These statements coincide with the results of the research, because authors found that the pandemic led to the imposition of mandatory quarantine measures and border closures by virtually all governments worldwide. These measures affected both production and trade flows. Trade distortions led to shortages and unexpected increases in the prices of major cereal exports.

The opinion by C.M. Galanakis (2020) that a slowdown in the movement of agricultural and food workers is blocking many farms is completely relevant. With the closure of borders due to the pandemic, they have all simultaneously become dependent on labour from elsewhere. Regarding the flexibility of customs processes, the multilateral system approaches non-tariff barriers to trade from different angles, where there is no overarching regulation on the issue. In general, J.E. Hobbs (2020) thinks that none of the instruments prohibit or discourage measures aimed at removing non-tariff barriers. On the contrary, they include provisions governing the application of such measures in a non-discriminatory and not overly trade-restrictive manner. According to W.A. Kerr (2020), the ban on exports and re-exports, however, was not absolute; as such transactions were allowed at the request of the party concerned, with prior authorisation, provided that two conditions were specified: that the supply of a particular product for the domestic market was sufficient; the availability of surplus resources had to be confirmed. In this sense, the evaluation carried out in each case must include a general and periodic analysis of the behaviour of the grain on the export market and also a specific study of the supply or production capacity of the inputs (Sohrabi *et al*., 2020; Xiao *et al*., 2020; Laborde *et al*., 2020).

Many regions are struggling to keep borders open and restore trade flows, several trade-related challenges have arisen (Ali *et al*., 2019). Increased air freight costs due to reduced commercial flights are hampering supply chain operations and the timely delivery of grain (Dey & Shekhawat, 2021). Measures limiting human mobility affect various production, trade and marketing processes. Also, delays in the transportation of grain at the borders, due to increased security measures, lead to additional financial costs. This process also takes time; in particular, S. Akter (2020), claims that such circumstances affect the supply of seeds and fertilizers to countries manufacturers, which creates a number of problems in the future. The global cereal harvest is expected to reach 2.175 billion tonnes by the end of the 2022 campaign and projections for the 2022/2023 season are for 2.223 billion tons – the richest season in the world, as far as figures allow (Wolfson & Leung, 2020; Boyacı-Gündüz *et al*., 2021). The ratio of available stocks to global consumption has stabilised between 27% and 30% over the last 5 years, but with increasingly large differences between cereal types (Hobbs, 2021). According to S. Kumar (2022), if the stock-to-consumption ratio of maize drops to 23%, due to a very strong increase in animal consumption, the ratio of wheat and rice, whose consumption is mainly for humans, will reach a record 37% by the next campaign. This is equivalent to an annual coverage of more than 4 months of global consumption of these two grains required for various diets around the world. At the height of the 2008/2009 crisis, this figure was not as high, with an annual coverage of barely 2 months, even as the price of grains and oilseeds skyrocketed, plunging populations in some countries into a dynamic of hunger riots (Kumar *et al*., 2022).

CONCLUSIONS

The pandemic has caused significant distortions in international trade and, in particular, in global grain value chains. Border closures have increased transport costs and, hence, the costs of international trade. In the same sense, mandatory quarantine measures, accompanied by the closure of production centres and a reduction in available labour, have led to shortages and higher grain prices. Similarly, the costs associated with customs processes, with fewer customs personnel and new bio-security procedures, have risen significantly. Possible ways to improve supply chains could be communication between different regions to share best practices; development of a trade promotion strategy by regional organizations; maintaining regular contacts of authorized bodies with industry, directly or through certification bodies; digital technology for exchanging information between countries.

When it comes to protecting health and well-being of citizens, it is important to ensure that all trade restrictive measures on grain exports do not disrupt food supply chain. It is precisely in times like these that international cooperation is a necessity, so that the response to the COVID-19 pandemic does not lead to unintended shortages of essential goods and exacerbates hunger and malnutrition. Also important is the development of digital technologies, by increasing the number and size of investments and creating opportunities for the development of talented young people working in this field. Beyond the human tragedy, this ongoing pandemic has deeply weakened economies, plunging many regions into severe recession, but above all it has disrupted the established global economic order. And, so far, the global economy has not fully recovered from this health crisis. The recovery from COVID-19 has created an imbalance between supply and demand, leading to severe pressure on grain prices, in particular due to bottlenecks in production chains, to which dizzying increases in transport and freight costs, rising energy prices, airport disruptions and shortages of some products have been added.

REFERENCES

[1] Akter, S. (2020). The impact of COVID-19 related 'stay-at-home' restrictions on food prices in Europe: Findings from a preliminary analysis. *Food Security*, 12(4), 719-725. doi: 10.1007/s12571-020-01082-3.

[2] Ali, S.M, Moktadir, M.A., Kabir, G., Chakma, J., Rumi, M.J.U., & Islam, M.T. (2019). Framework for evaluating risks in food supply chain: Implications in food wastage reduction. *Journal of Cleaner Production*, 228, 786-800. doi: 10.1016/j.jclepro.2019.04.322.

[3] Barrett, C.B. (2020). Actions now can curb food systems fallout from COVID-19. *Nature Food*, 1(6), 319-320. doi: 10.1038/s43016-020-0085-y.

[4] Boyacı-Gündüz, C.P., Ibrahim, S.A., Wei, O.C., & Galanakis, C.M. (2021). Transformation of the food sector: Security and resilience during the COVID-19 pandemic. *Foods*, 10(3), article number 497. doi: 10.3390/foods10030497.

[5] Brewin, D.G. (2020). The impact of COVID-19 on the grains and oilseeds sector. *Canadian Journal of Agricultural Economics*, 68(2), 185-188. doi: 10.1111/cjag.12239.

[6] Ceylan, R.F., Ozkan, B., & Mulazimogullari, E. (2020). Historical evidence for economic effects of COVID-19. *European Journal of Health Economics*, 21(6), 817-823. doi: 10.1007/s10198-020-01206-8.

[7] Dey, K., & Shekhawat, U. (2021). Blockchain for sustainable e-agriculture: Literature review, architecture for data management, and implications. *Journal of Cleaner Production*, 316, article number 128254. doi: 10.1016/j.jclepro.2021.128254.

[8] Falkendal, T., Otto, C., Schewe, J., Jägermeyr, J., Konar, M., Kummu, M., Watkins, B., & Puma, M.J. (2021). Grain export restrictions during COVID-19 risk food insecurity in many low- and middle-income countries. *Nature Food*, 2(1), 11-14. doi: 10.1038/s43016-020-00211-7.

[9] Galanakis, C.M. (2020). The food systems in the era of the coronavirus (COVID-19) pandemic crisis. *Foods*, 9(4), article number 523. doi: 10.3390/foods9040523.

[10] Garnett, P., Doherty, B., & Heron, T. (2020). Vulnerability of the United Kingdom's food supply chains exposed by COVID-19. *Nature Food*, 1, 315-318.

[11] Giordani, P.N., & Rocha, M.R. (2019). Food prices and the multiplier effect of trade policy. *Journal of International Economics*, 101, 102-122.

[12] Glauber, J.W., Laborde, D., Martin, W.J., & Vos, R. (2020). COVID-19: Trade restrictions are worst possible response to safeguard food security. In J. Swinnen, J. McDermott (Eds.), *COVID-19 and global food security* (pp. 66-78). Washington: International Food Policy Research Institute (IFPRI).

[13] Gray, R.S. (2020). Agriculture, transportation, and the COVID-19 crisis. *Canadian Journal of Agricultural Economics*, 68(2), 239-243. doi: 10.1111/cjag.12235.

[14] Headey, D. (2019). *Rethinking the global food crisis: The role of trade shocks*. Retrieved from https://www.ifpri.org/publication/rethinking-global-food-crisis-role-trade-shocks.

[15] Hertel, T.W., & Tsigas, M.E. (2019). Structure of GTAP framework, global trade analysis: Modeling and applications. In T.W. Hertel., *Global trade analysis* (pp. 60-73). Cambridge: Press Syndicate of the University of Cambridge.

[16] Hobbs, J.E. (2020). Food supply chains during the COVID-19 pandemic. *Canadian Journal of Agricultural Economics*, 68(2), 171-176. doi: 10.1111/cjag.12237.

[17] Hobbs, J.E. (2021). The COVID-19 pandemic and meat supply chains. *Meat Science*, 181, article number 108459. doi: 10.1016/j.meatsci.2021.108459.

[18] International Trade Centre. (2020). *COVID-19: The great lockdown and its impact on small business*. Retrieved from https://intracen.org/media/file/2467.

[19] Janssens, C., Havlík, P., Krisztin, T., Baker, J., Frank, S., Hasegawa, T., Leclère, D., & Maertens, M. (2020). Global hunger and climate change adaptation through international trade. *Nature Climate Change*, 10(9), 829-835. doi: 10.1038/s41558-020-0847-4.

[20] Kaletnik, G., & Lutkovskaya, S. (2020). Innovative environmental strategy for sustainable development. *European Journal of Sustainable Development*, 9(2), 89-98.

[21] Kerr, W.A. (2020). The COVID-19 pandemic and agriculture: Short- and long-run implications for international trade relations. *Canadian Journal of Agricultural Economics*, 68(2), 225-229. doi: 10.1111/cjag.12230.

[22] Kumar, S., Raut, R.D., Agrawal, N., Cheikhrouhou, N., Sharma, M., & Daim, T. (2022). Integrated blockchain and internet of things in the food supply chain: Adoption barriers. *Technovation*, 118, article number 102589. doi: 10.1016/j.technovation.2022.102589.

[23] Laborde, D., Martin, W., Swinnen, J., & Vos, R. (2020). COVID-19 risks to global food security. *Science*, 369(6503), 500-502. doi: 10.1126/science.abc4765.

[24] Liefert, W.M., Westcott, P., & Wainio, J. (2021). Alternative policies to agricultural export bans that are less market – distorting. *American Journal of Agricultural Economics*, 94(2), 435-441.

[25] Martin, W., & Anderson, K. (2020). Trade distortions and food price surges: Commodity price volatility and inclusive growth in low-income countries. In R. Arezki, C.A. Pattillo, M.G. Quintyn, & M. Zhu (Eds.), *Commodity price volatility and inclusive growth in low-income countries* (pp. 331-348). Washington: IMF Publishing.

[26] Mitra, S., & Josling, T. (2019). *Agricultural export restrictions: Welfare implications and trade disciplines*. Retrieved from https://www.researchgate.net/publication/331478130_Agricultural_Export_Restrictions_Welfare_Implications_and_Trade_Disciplines.
[27] Mullen, A. (2020). Stories of hope and success in the food system. *Nature Food*, 1(5), 250-251. doi: 10.1038/s43016-020-0084-z.
[28] Palamarchuk, V., Krychkovskyi, V., Honcharuk, I., & Telekalo, N. (2021). The modelling of the production process of high-starch corn hybrids of different maturity groups. *European Journal of Sustainable Development*, 10(1), 584-598.
[29] Patyka, N., Khodakivska, O., Pronko, L., Kolesnyk, T., Klymchuk, O., Kamenschuk, B., & Zayed, N.M. (2021). Approaches to evaluation of the agriculture competitiveness level: Empirical evidence in Ukraine. *Academy of Strategic Management Journal*, 20, 6-15.
[30] Patyka, N., Khodakivska, O., Mohylnii, O., & Pugachov, M. (2021). Ukraine's agrarian sector in the conditions of COVID-19 distribution and restrictive quarantine measures: methodological principles of empirical evaluation. *Scientific Horizons*, 24(12), 55-69.
[31] Pugachov, M., Khodakivska, O., Shpykuliuk, O., & Hryshchenko, O. (2021). *Impact of COVID-19 on the food security in the regions of Ukraine*. Retrieved from https://ibima.org/accepted-paper/impact-of-covid-19-on-the-food-security-in-the-regions-of-ukraine/.
[32] Puma, M.J., Bose, S., Chon, S.Y., & Cook, B.I. (2020). Assessing the evolving fragility of the global food system. *Environmental Research Letters*, 10, 1218-1224.
[33] Rude, J., & An, H. (2019). Explaining grain and oilseed price volatility: The role of export restrictions. *Food Policy*, 57, 83-92.
[34] Schewe, J., Otto, C., & Frieler, K. (2017). The role of storage dynamics in annual wheat prices. *Environmental Research Letters*, 12, 162-169.
[35] Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., Iosifidis, C., & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76, 71-76. doi: 10.1016/j.ijsu.2020.02.034.
[36] Sulser, T., & Dunston, S. (2020). *COVID-19-related trade restrictions on rice and wheat could drive up prices and increase hunger.* Retrieved from https://www.ifpri.org/blog/covid-19-related-trade-restrictions-rice-and-wheat-could-drive-prices-and-increase-hunger.
[37] Sustainable Development Goals. (2022). Retrieved from https://www.undp.org/sustainable-development-goals.
[38] Torero Cullen, M. (2020). *Coronavirus, food supply chains under strain: What to do?* Retrieved from https://socialprotection.org/sites/default/files/publications_files/FAO.pdf.
[39] Wolfson, J.A., & Leung, C.W. (2020). Food insecurity and COVID-19: Disparities in early effects for us adults. *Nutrients*, 12(6), article number 1648. doi: 10.3390/nu12061648.
[40] Xiao, Y., & Torok, M.E. (2020). Taking the right measures to control COVID-19. *The Lancet Infectious Diseases*, 20(5), 523-524. doi: 10.1016/S1473-3099(20)30152-3.

Обмеження на експорт зерна під час COVID-19: особливості та шляхи вирішення

Ольга Василівна Ходаківська[1], Тетяна Василівна Колесник[2], Оксана Юріївна Самборська[3], Ганна Вікторівна Шевчук[2], Наталія Володимирівна Германюк[2]

[1]Національний науковий центр «Інститут аграрної економіки»
03127, вул. Героїв Оборони, 10, м. Київ, Україна

[2]Вінницький національний аграрний університет
21008, вул. Сонячна, 3, м. Вінниця, Україна

[3]Вінницький державний педагогічний університет імені Михайла Коцюбинського
21000, вул. Острозького, 32, м. Вінниця, Україна

Анотація. Світовий експорт сільськогосподарської та харчової продукції був актуальною темою в усі часи, оскільки регулював питання економічного та соціального розвитку багатьох країн. Однак ще більшої актуальності це питання набуло після початку пандемії COVID-19, коли ситуація в цьому секторі дуже ускладнилася. Метою дослідження є розгляд особливостей обмежень експорту зерна під час пандемії COVID-19 та шляхів їх подолання. Соціально-економічний метод застосовано для порівняння економіки з ринком та врахування множинності економічної поведінки. За допомогою функціонального методу встановлено теоретичні засади функціональної економіки, зосереджено увагу на еволюції термінології для позначення певних комбінацій обмежень на експорт зернової продукції та послуг під час пандемії COVID-19. Метод інституційного аналізу використано для оцінки якості інституційного базису економіки та політичних структур. Визначено, що зміни в торговельній сфері стимулювали розвиток виробництва в дефіцитних галузях. Встановлено, що усунення тарифних бар'єрів у торгівлі може бути корисним у подоланні кризи, що спричинена пандемією, а також дієвою ланкою зниження витрат міжнародної торгівлі. Інший висновок полягає в тому, що варто зберігати доступ до продовольства, а не обмежувати експорт у країнах, де люди можуть страждати від голоду. Практична значущість роботи полягає у визначенні особливостей доцільних обмежень експорту зерна під час пандемії та виокремленні основних шляхів вирішення цієї проблеми

Ключові слова: сталий розвиток, пандемія, продовольча безпека, макроекономічне середовище