



# Influence of coronavirus crisis on food industry economy

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## Abstract:

Recently, there has been a very rapid accumulation of empirical data of economic indicators of the food crisis associated with the coronavirus pandemic. The purpose of this article was to develop a set of measures aimed at minimizing the negative economic impact of the coronavirus crisis (CVC) both at the national and international levels. All these presupposed solving the following tasks. Having studied the nature of the crisis, we found out that it had the greatest impact on such components of food sector as transport, logistic chains, and human resources. We revealed that, first of all, such areas of the economy as fisheries and agricultural production of fruits and vegetables were affected by the crisis. It is obvious that it will also adversely affect small farmers, seasonal and migrant workers, etc. The work proposes the most effective public measures against the negative impact of CVC on the global economy. In particular, we examined the scenario of (possibly temporary) nationalization of operators of critical infrastructure to produce planned critical goods or services. The developed set of measures included limitation of the workers' rights and freedoms by imposing to them labor duties, or replacing them with military ones, limiting the price of strategic goods, and organizing their consumption and distribution. Possible triggers for the implementation of such a scenario in the agricultural sector are offered, as well as mechanisms of protecting and supporting groups of economic agents affected by CVC are proposed.

**Keywords:** Coronavirus crisis, food crisis, pandemic, food, financing, agricultural products, economy, food security, crisis management

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## INTRODUCTION

It is obvious that the outbreak of COVID-19 (CV) in the Chinese province of Hubei, which took the character of a global pandemic in recent months, will have a negative impact on a global food security.

The following world organizations are involved in food, trade and health issues – the United Nations Food and Agricultural Organization (FAO), the World Trade Organization (WTO) and the World Health Organization (WHO). Their leaders – Che Dongyuy (FAO), T. A. Gebreyesus (WHO) and R. Azevedo (WTO) – made an official report on the risk of the food crisis caused by the pandemic of the new coronavirus [1]. They said that there was currently a danger of “food shortage” in the global market due to disruptions in the supply chain in the trading industry.

“This is a very tough test,” explains M. Torero Cullen, FAO Chief Economist. – For the first time we

witness such a sharp drop in supply and demand. The supply fell due to a reduction in labor, while a drop in demand is determined by a recession. We must help to improve coordination between the authorities of different countries. Our main task is to ensure the “vitality” of the production and distribution chain, applying all the necessary safety standards” [2].

Currently, there is a problem of a large amount of empirical data of economic aspects of the food crisis with a simultaneous lack of scientific analytical data.

The purpose of this article was to develop an effective set of public measures to minimize the negative economic effect of CVC at the national and international levels.

To do this, it was necessary to determine the following aspects:

- a type of crisis;
- the main damaging factors;

- areas of the economy, communities and social groups which are the object of the negative impact of the crisis; and
- search and justification of the most effective public measures to minimize the negative economic impact of the coronavirus crisis (CVC) at the national and international levels.

### STUDY OBJECTS AND METHODS

The object of our study was a system of economic relations taking shape at the level of the aggregate of stakeholders in the national economies of states affected by the CV pandemic.

Our analysis covered the following aspects:

- Functional – production, distribution, exchange, consumption of material goods (food and related services);
- Territorial – developed countries of the “golden billion” (including Russia) and countries of the “third world”;
- Decompositional – all levels of economic interactions: micro-, meso-, and macrolevel;
- Industrial. At the level of the national economy the analysis was made of the supply and demand for food (in various sectors of agriculture and food industry, in the restaurant business, in the transport industry), as well as in the labor market. At the global economy level, the market for basic commodities (rice, wheat, soybean) was investigated;
- Interdisciplinary. In this aspect, the study involved various aspects of the following sections of economic theory: employment theory, pricing theory, agricultural economics, transport economics, the world economy and international economic relations, and public administration theory.

The research materials were analytical works and speeches of the leaders of such world organizations as the FAO, WHO and WTO, expert materials of economists, sociologists, and doctors on the subject of our study, as well as the data from practitioners of the markets studied.

The methodology of the study is a combination of modern methods of retrospective, expert and scenario analyses. The research methodology is based on a systemic analysis, which ensures its integrity and comprehensiveness.

### RESULTS AND DISCUSSION

**Coronavirus crisis nature.** To achieve the main goal of the work, we set the task to determine the type of crisis: what kind of economic crisis is observed in connection with the CV pandemic?

One of the approaches is the collection and analysis of information. In special literature we see the priority of purely “native” ones, i.e. medical, epidemiological, aspects of CVC.

As noted in the FAO Report “Agricultural Food Markets and Trade Policy at the time of

COVID-19”, disease outbreaks can affect food supply and demand. They can lead to a reduction in the workforce (including seasonal and labor migrants), affecting the preparation of land, planting, maintenance of crops and harvesting [3]. They also affect employment in labor-intensive industries, household incomes and food security. During the outbreak of Ebola in West Africa in 2014, the following facts were noticed: disruptions in the supply chain of agricultural products at critical times of the season; a reduced access of workers to the farmland and, as a result, a decrease in their salaries and the area of cultivated land; as well as restrictions in the transportation of goods to processing enterprises and markets. In Liberia, during the same outbreak period, 47% of farmers reported the presence of uncultivated farmland.

However, the analysis of the WHO and WTO information data, local information sources, as well as the data on previous epidemics at the beginning of the 21st century do not provide a clear answer why exactly in the case of the CV pandemic the global economic phenomena and consequences are so different.

Another approach is to prioritize the impact of the crisis on food demand.

At a first glance, this makes sense. The 2008 crisis analysis showed what happened when lower incomes and uncertainty made people spend less. This led to: a reduction in demand, a decrease in sales, and a decline in production. In addition, the most affected entities were forced to apply negative strategies to solve the problems, such as selling productive assets, less varied food, and overfishing to compensate for limited incomes [4].

Food demand is generally inelastic. But in poor countries, it is more related to the size of incomes, and here the loss of income opportunities can affect consumption. Fear of infection can reduce the number of visits to markets; and habits in the field of food purchase and consumption are also changing: a decrease in restaurant traffic, an increase in the supply of e-commerce, and food consumption at home.

However, it remains impossible to consider demand as the basic factor of CVC in isolation from supply, which we will discuss further.

Consumer panic is yet another “candidate” for the role of the main factor of CVC.

At the beginning of 2020, many sources reported that at the beginning of the CV outbreak, there was a significant increase in food demand. However, the CV pandemic cannot be the cause of food shortage, at least wheat, rice, or other products of mass consumption. However, the deficit may be caused by excessive stockpiling for the future. If some economic agents unnecessarily buy too much food or sell too little of their produce for fear that it will not be enough, others lose. In other words, fear of scarcity can be a self-fulfilling prophecy (a term coined by sociologist Robert Merton

in 1948). It is rational to stock up food if you expect others to do so [5].

Coronavirus highlights two of the most important aspects of this extravagance: food waste, i.e., deliberate lack of edible products due to the behavior of companies and individuals, and “food loss” (according to the 2013 FAO report, 14% of the world products is lost or wasted after the harvest even before it goes to retail), as a result of supply chain inefficiencies, mainly due to the lack of infrastructure and poor procedures [6].

At the same time, there are sufficient reserves for the main commodities, the prospect of their harvest in 2020 is favorable. This means that this factor of the crisis is not decisive.

According to FAO Chief Economist B. Abassin, this crisis is not a production one, but, first of all, is that of transport and logistics. In our opinion, this is exactly half of the “guess”: one of the two most important components of the CVC is correctly identified.

As we noted earlier [7], the first economic consequences of CVC were:

– blockade, isolation, autarkization (economic independence) of geographical areas, countries and entire regions;

– decline, up to a complete collapse, of production systems of goods and services that require the physical presence of workers in the team;

– suspension of processes, destruction of supply chains;

– ruin and bankruptcy in a number of industries...”.

To contain the CV pandemic, world leaders have taken measures to drastically reduce the volume of goods transported by land, sea and air, as well as to reduce labor migration at the national and international levels. These factors led to a general disruption in the logistics of food supply chains, creating obstacles to the transport of food and agricultural resources.

Logistics efficiency is critical in the agricultural sector, especially during the crisis. Failures can have a negative impact on the quality and safety of food (for example, with the prohibition of cargo transportation, the delay at the borders of containers with goods, the supply of perishable expensive goods, such as fresh fruit, vegetables, fish and seafood, is especially affected), and it can also reduce their availability (for example, due to the closure of farmers’ markets in cities).

Most agricultural activities are fairly systematic, tied to specific seasons, weather, timing, processes. Delay can affect the entire production process, yield and output: for example, seeds, fertilizers, pesticides, veterinary drugs, machine oils and diesel fuel, etc. are not delivered due to transportation restrictions.

Failures in the supply chain logistics have already taken place. For example, Rosario in Argentina is a major center of grain export and soybean production. Argentina is the world largest exporter of soy flour, livestock feed. Dozens of municipal authorities around

Rosario blocked the entry and exit of grain trucks into their cities to slow the spread of the virus [8]. This is contrary to the decision of the country authorities to unblock the roads, but it meets the anti-epidemic rhetoric. Soy is not imported to crushing plants, which affects its export. Similar problems arise in Brazil, another key exporter of basic commodities. If the large international port of Santos in Brazil or Rosario in Argentina closes, this could mean a disaster for world trade.

The second, equally important, basic factor of CVC, which we noticed, is related to human resources.

Measures affecting the free movement of people, mainly seasonal workers and migrants, greatly affect food production.

Labor-intensive agricultural production, such as fruit and vegetable ones, largely depends on temporary or seasonal workers, especially during planting, weeding, harvesting, processing or transporting crops to markets. With the closure of borders due to CV, farmers from developed countries need workers from other countries: the USA – Hispanics, Spain – North Africans to pick strawberries, Germany – agricultural workers from Eastern Europe in asparagus fields, etc. [1]. Slowing down the rotation of workers when they become ill or cannot come to work due to lockdown blocks many western farms. Agricultural workers in the informal labor sector will be seriously affected by the loss of jobs and income.

In turn, the absence or delay in the supply of products affects citizens working in the informal sector, who earn their living by selling agricultural products [9].

Small farmers, cattlemen and fishermen are also very vulnerable, their business may be hindered by CVC, depriving them of access to markets due to quarantine measures. Agricultural processing enterprises are also labor-intensive. Currently, most sorting and packaging lines do not meet the requirements of social distance. A separate category is children who, as a result of CVC, have lost access to school meals. In Latin America and the Caribbean alone, FAO school meals programs supported 85 million children (10 million of them had it as the main source of nutrition), which were suspended due to the pandemic.

**Third world: a threat to economy.** Developing countries are at risk particularly, since CV can lead to a labor force reduction, and affect the incomes of the population, depriving them of a part of their livelihoods, as well as labor-intensive forms of production (agriculture, fisheries/aquaculture).

According to [10], in 2018, about 820 million people live in conditions of chronic hunger daily, of which about 113 million people in 53 countries and territories in the world were in a state of food crisis. The food crisis involved, first of all, those areas where a significant proportion of the population experiences severe food shortage, and needs an urgent humanitarian assistance

for food safety and nutrition as a result of significant shocks to cope with the consequences [10]. The three main food crisis drivers are conflicts and insecurity, weather disasters and natural hazards, economic turmoil.

Today, 44 countries of the world need an external food assistance. Any additional interruptions in access to food due to CV can lead them to tragic consequences. As a result of the 2007–2008 food crisis, due to the increase in world food prices, a number of undernourished people in the world increased from 848 million to 963 million people (by 14%) over 2 years [11]. The economic downturn correlated with a rising hunger in 65 of the 77 countries surveyed, as FAO and its partners warned in the world report “The State of Food Security and Nutrition” in 2019 [12].

The pandemic can have significant consequences for the delivery of humanitarian assistance (budget cuts due to redirecting resources to combat CV, the movement of equipment, cargo and personnel). The consequences of CVC will affect migrants (the threat of exploitation, poverty, hunger), as well as their families in countries of their origin due to a sharp reduction in a flow of coming financial resources.

From the experience of the food crisis 2007–2008, the inflationary effect of protectionist policies in the form of introducing import tariffs and export bans has increased the number of people who lost food safety around the world.

The overall impact of the pandemic on unemployment, household purchasing power, food prices and their availability in local markets can seriously jeopardize food access in the most vulnerable countries. Of particular concern are temporarily displaced persons (TDPs) and refugees, as well as communities already facing hunger or other crises: for example, the invasion of locusts in the Horn of Africa has led to an increase in the number of Ethiopian people in need of humanitarian assistance (more than 8 million out of 100 million people).

Risks associated with CV are well known in some poor countries. For example, quarantines and panic during the Ebola virus epidemic in Sierra Leone (2014–2016) led to a sharp surge in hunger and malnutrition. The situation was aggravated because restrictions on movement led both to a shortage of labor during harvesting and to the inability to bring their products to the market. In 2008–2009 in parts of Asia, after a series of lean years, rising prices for rice and then for other crops led to “hunger riots”.

In countries where migrant workers from rural areas lost their jobs in big cities because of the lockdown, more people can die from starvation than from CV. State food stocks can reassure consumers. But these reserves may be subject to corruption, or their management may be ineffective, according to a report from Nanyang University of Technology in Singapore [13].

Closing borders in Africa in the fight against the spread of CV raised fears of rising prices and a shortage of staple foods that Africa is forced to import due to population growth. On March 17, Cameroon announced the closure of its land, sea and air borders, while allowing the movement of goods trucks after the sanitary control of drivers. “We cannot close everything. The vast majority of what we consume comes from abroad,” government spokesman J. Ecoga said [14].

In several African capitals, the people staged a massive purchase in supermarkets, stocking pasta, rice, oil, toilet paper, soap and other consumer goods. “In Morocco, the bazaars were stormed” [14]. However, the authorities of many countries reacted quickly, taking measures to calm the population and prevent speculation. The Ministry of Commerce of Côte d’Ivoire reported that the country had a supply of rice for seven months of consumption, tomatoes and sugar for five months, milk for four months and meat for three months, and urged the citizens do not change their consumer habits, playing into the hands of unscrupulous economic operators.

In Rwanda, authorities set a maximum price for basic foodstuffs in order to reduce price growth for rice, oil, and local fruits and vegetables imported from Tanzania. Lemon prices doubled, as many Rwandans tried to treat CV with it. In Morocco, authorities recalled that, on the eve of Ramadan, they had already formed food stocks. The authorities also allowed fruit and vegetable producers to sell crops directly to hypermarkets, without going through wholesale markets. In Algeria, a ban on food exports was introduced as well as price controls, and fines for violators.

The South African Department of Commerce announced price controls. The increase in prices should not exceed the increase in prices for raw materials or resources, the profit of operators should not be higher than in the period before the outbreak of CV. Retailers should limit the number of goods sold to one person. The list contains 22 products, including latex gloves and alcohol solutions. The president called on South Africans to “refrain from excessive and unnecessary purchases”, given “constantly maintained stocks” [14]. In Madagascar, authorities promised to seize stocks of merchants who unfairly raise prices during the crisis. Large distributors have officially committed to comply with tariffs.

By April 2020, the crisis did not lead to inflation, which would primarily harm the poorest people. A quarter of Africans are already undernourished.

**“Golden billion”: change of consumer behavior.** Food consumption throughout the developed world fell victim to social engineering, and temporarily succumbed to a consumer panic during the CVC:

“As the global coronavirus pandemic accelerates, a food panic continues across the country, affecting all outlets, and covering all categories of products (...).



During the period of “social distancing”, filling your closet and refrigerator with your favorite products becomes critically important. This is even more important for consumers who are accustomed to the fact that products do not contain gluten, sodium, lactose, sugar, GMO, and that vegetable meat, vegan (...) certified products are easily available. And these things are becoming very difficult to find” [15]. The author mentions an “unprecedented surge in demand” and, quite symptomatically, says of a “new consumer landscape”.

This local surge occurs simultaneously with the fact that “the largest food brands in the world in recent years have been struggling to maintain their position and compete with innovative special products for [niche] consumers. This battle has been raging for almost ten years and the financial health of such large brands (...) has rapidly deteriorated, as has their liquidity (...). [Today] it will be extremely difficult for these large food producers to create additional burdens on their business by quickly placing orders and stimulating supply chains – especially during the next 4–6 critical weeks across the country. Maybe some of them will face potential bankruptcies...” [15].

In the United States, the situation with coronavirus initially increased the profits of some food manufacturers and retailers. According to Nielsen, in the last week of February, sales of powdered milk products increased by 84%. Sales of such products, as bread and eggs, along with rice, beans and frozen food, also increased.

Companies like Conagra Brands and Campbell Soup Co said they were ramping up a production of the most sought-after food. Some companies, including Coca Cola, by contrast, began to experience delays in February as a result of industrial disruptions from the spread of CV in China.

According to commodity exchanges, at the beginning of April 2020 there were no signs of panic buying up of wheat, corn, soy, pigs or cattle. The only agricultural product, the price of which increased, was rice. The wholesale price of coarse rice rose in March 30 on the Chicago Stock Exchange to 14.1 cents per pound, from 13 cents at the beginning of the year. This price is still much lower than that in April 2008 (24 cents per pound) [5].

The Consumer Brands Association, in a letter to the US Department of State and the US Sales Representative on March 15, expressed concern about a potential shortage of ingredients. According to Nielsen, Califia Farms, a long-shelf vegetable milk producer, increased sales by 323% during the last week of February. The head of the company, G. Shteltenpol, said he was building up supplies 3–4 weeks ahead: “What if our largest competitor suddenly breaks out of the factory? Then he may not be able to send orders at all within 3–4 weeks, so we should even be prepared for the fact

that our brand will occupy a large market share. This involves the adoption of entrepreneurial risks or risk management” [16].

With the workforce in the food industry, the situation in developed countries is not so good. In the UK, the “Landworkers’ Alliance”, representing more than 1000 British farmers and land owners, asked the Chancellor of the Treasury to create a “land army” of workers to fill the shortage of 60 000 foreign seasonal workers, and to create a reserve in case of illness for British workers, and provide a support package in the amount of £9.3 billion for its payment. A similar call to the authorities – to make it easier for people who became unemployed due to lockdowns to search for seasonal work on farms – was made by the “Country Land and Business Association”, representing more than 30 thousand landowners and rural firms in the UK [17].

**Russia: unequal influence on industries.** The spread of CV in China has affected Russian food suppliers. Chinese food import from the Russian Federation in January–November 2019 increased by 23.7%, and amounted to \$2.72 billion, according to customs statistics provided by the Russian Export Center. Of this amount, 45% were deliveries of frozen fish, other large positions were crustaceans, sunflower oil, poultry and chocolate products [18].

By the end of January 2020, according to market participants, pollock prices fell by about 15%, a decrease in demand for crab in China led to a fall in prices from \$15–18 in 2019 to \$7 per kg in 2020 (a general estimate of possible losses in the long run exceeded \$150 million) [18]. The decrease in purchase prices for imported poultry meat due to CVC amounted to 10–15% and exacerbated the general decline in prices in this market.

Disruptions in the operation of transport infrastructure, as well as delays in Russian products supplied to Chinese processing plants were repeatedly noted. The president of the group of companies “Kabosh” D. Matveev noted that there were problems in animal husbandry due to lack of workers in the pandemic: “Even if we skip feeding or cancel one milking, we will receive not only one-time losses, but animal health problems and a significant drop in their productivity over a long period. It is also necessary to recover after a single failure of at least three weeks” [19].

In addition, a spring sowing season is approaching. One cannot cancel or reschedule the sowing time of fodder and grain crops. Due to the shortage of people, less feed will be prepared, which will lead to its higher prices. This means that it will be necessary to reduce the number of livestock or additional funds for feed. In addition, fewer crops will be sown and harvested. The cost of cereal will eventually increase. The result will be an increase in the cost of milk and all its processed products, of bread and all grain products [19].

In Russia in March 2020, after the introduction of a self-isolation regime to suppress the spread of CV,

a consumer panic began. A rush of demand arose for household chemicals, personal hygiene and disinfection products, as well as for long-term storage products: canned food, flour, cereals, sunflower oil, sugar and salt. “SberMarket” product delivery service notified customers of an increase in delivery time “due to demand rise”. The number of orders on March 13 and 14 increased by 104% throughout the country as compared to March 11 [20].

At the same time, there were no shortage of goods and empty warehouses. Production industries worked. The explanation can be a highly competitive environment. “According to our estimates, the top 10 FMCG retailers account for only 30% of the turnover of food and consumer goods. Being in a fierce competition, they cannot allow price speculation, because it will adversely affect sales,” explained I. Fedyakov, general director of Infoline [20].

The impact of the coronavirus pandemic on the alcohol market was specific. According to V. Drobiz, Head of the Russian Center for Research of the Federal and Regional Alcohol Markets, during all previous crises (in 1998, 2008 and 2014) three trends were observed: an increase in the consumption of strong alcohol along with a decrease in the consumption of wine and beer products, a sharp increase in the market counterfeit goods, as well as a sharp decline in the consumption of imported products as a result of, as a rule, the fall in the exchange rate of the national currency.

However, the specifics of self-isolation, requiring a mass consumer to maintain working capacity during the day, made adjustments: a sharp increase in beer consumption compared with a more modest increase in strong drinks. At the same time, there is a well-founded fear that, in the context of a shortage of funds, a consumer has partially switched to illegal surrogate products [21].

**A global aspect of the problem: international cooperation or protectionism.** FAO Director-General Che Dongyu called for coordinated action by the governments of the world in connection with the CVC: “We know that deaths will be high and that enormous efforts to reverse this trend will entail high economic costs. To reduce the risk of even higher losses – food shortages for millions of people, even in rich countries – the world must immediately take action to minimize disruptions in food supply chains. (...) A coordinated and consistent global response is necessary” [22]. “No panic (...). There is enough food in the world to feed everyone. But we still have to ensure that food is available where it is needed” [22].

Che Dongyu noted that “uncertainty about the availability of food can encourage politicians to take restrictive trade measures to ensure food security at the national level.”

The joint communiqué by FAO, WTO and WHO says that “uncertainty about food availability can cause

a flurry of export restrictions, which in turn can lead to a global market crisis” [1]: countries exporting major crops can hold it back for fear of scarcity, while at the other end of the global food chain, other countries will face serious difficulties. The communiqué calls to keep trade relations in order to avoid food problems, especially in the poorest countries. According to FAO experts, “export restrictions” usually cause hunger in other parts of the world.

After the financial crisis of 2007, rice producing countries such as India and Vietnam, worried about rising prices, imposed export restrictions which led to higher world prices and to famine unrest in some developing countries. Other grain exporters have also limited exports to protect their consumers from the initial increase in food prices. Food importing countries, in turn, reduced import tariffs on food, supporting the demand, and kept an upward pressure on world prices. As a result, instead of limiting price increase, these political measures only led to higher prices in the world market. Protectionist measures by national governments during the CVC may provoke food shortages around the world, as the FAO warned.

The experience of cascading export restrictions among the main exporters of food products (India, China, Vietnam and Pakistan for rice; Russia, Ukraine and Argentina for wheat) in 2007–2008 demonstrated that such a political chain reaction could destabilize international markets [23]. As more and more countries followed it, price increased as well as market volatility intensified. Overall quotes for rice grew by 52%, and for wheat and corn by 18% [24]. This caused a particular damage to poor countries dependent on import.

“The worst that can happen is if governments restrict the flow of food,” FAO Chief Economist M. Torero told the Guardian. “All measures against free trade will be counterproductive. Now it is not the time for restrictions or introduction of trade barriers. Now it is the time to protect the flow of food around the world.” “Trade barriers will create extreme volatility,” Torero warned. “[They] will worsen the situation. This is what we observe during the food crisis.”

World export is highly concentrated. Russia, the European Union, the USA, Canada and Ukraine will give 75% of all world wheat export most likely in 2019–2020. The rice market is also concentrated: 75% of export goes to the largest five exporters, and almost a quarter of it, to India. Vietnam’s share in the world market is 16% [25].

Kazakhstan was the first to ban the export of wheat flour, being one of its largest exporters in the world, and imposed restrictions on buckwheat and vegetables, including onion, carrot and potato. Vietnam, the world third largest rice exporter, has temporarily suspended rice export contracts. The US position was uncertain, but it raised market concerns, due to Donald Trump’s desire for a trade war with other commodity-supplying

countries [17]. A number of experts rated the restrictions introduced as “completely unnecessary”, since both countries produce much more than they consume and have enough reserves [5]. The Ministry of Agriculture of Kazakhstan on March 30 changed the course and announced the replacement of the ban by quotas for the export of wheat and flour.

Russia is the world largest exporter of wheat. At the end of March 2020, the ministers of economy and agriculture of the Russian Federation advocated limiting the export of Russian grain to seven million tons in April–June. And on April 1, pending approval by the government of this proposal, Russia decided to sell one million tons of wheat from state reserves in the domestic market in order to limit the increase in domestic prices.

The findings of experts from the International Food Policy Research Institute (IFPRI) are encouraging the data in [25]. At least in relation to staple food, such as rice, wheat, and corn.

The ratio of stocks to consumption is an indicator of the vulnerability of world food markets to shocks. According to IFPRI calculations, this indicator is close to the “normal value” (median level for 20 years) and significantly higher than in 2008, with the exception of China. A sufficient amount of stocks explains the price stability in the markets for basic goods. In China, rice and wheat reserves are enough for domestic consumption for a period of 10–13 months. The amount of rice stocks in India is 34% higher than its consumption. The prospects for the 2020 harvest are good. The US Department of Agriculture (USDA) predicts an increase in global wheat production by 5%, while rice production is projected to remain roughly the same as in 2019. The production of these products is unlikely to be affected by CVC, at least in large producing countries; since it is mechanized, does not require a large amount of labor, and is carried out in areas with dispersed rural populations. Disruptions in international transport and distribution are also unlikely: these dry bulk goods can be loaded and unloaded with minimal interaction between people.

“There is no global supply shortage today,” European Commissioner for Trade Phil Hogan said during a conference telephone call to his colleagues in the G20 countries. Ministers promised to continue trade with each other, despite the pandemic, and “beware of behavior for the purpose of profit and unjustified price increases” [5].

An excellent mechanism for ensuring the transparency of global food markets is the Agricultural Market Information System (AMIS), an interagency platform created by the G20 in 2011 and hosted by the FAO to help coordinate political actions in the face of market uncertainty [26].

Due to the slowdown in supplies, the devaluation of currencies against dollar and the decrease in purchasing power, the vulnerability of countries dependent on

food imports are increasing. Against the background of a prolonged lockdown, sharp fluctuations in food prices can occur. Fighting a pandemic through massive government spending, all countries in the world are interested in restricting inflation. In case of food price jumping they should carefully evaluate their fiscal and other responses, as well as their consequences in the medium and long term. By maintaining supply chains and strong international cooperation, the world can prevent food shortages and protect the most vulnerable population.

**Recommended state policy measures.** In FAO recommendations, the pandemic remains a top priority in food policy, including the use of isolation measures to slow the spread of CV. The second priority of state policy is the identification and meeting the needs of the most vulnerable economic groups of the population, since measures to restrain a pandemic are detrimental to the economy. Finally, the third task is to ensure the supply of food. These tasks should be considered in detail.

*Fighting a pandemic.* FAO recommended avoiding general restrictions on food import. This recommendation seems controversial, as cross-border movement of people and goods can exacerbate epidemiological problems. In the past, countries practiced epidemiological control by restricting trade and travel – for example, import bans from Peru during the 1991 cholera outbreak, from India during the 1994 plague outbreak, and from Guinea during the 2014 Ebola outbreak. However, FAO believes that, although in exceptional cases, these measures may be required to protect human, animal or plant health, they should be limited in time, minimize disruptions in international trade and ensure food availability and access to it [27]. Also, in order to avoid disruptions in the food supply chain, the creation of safe corridors for travel and trade in accordance with WHO recommendations is necessary.

“The party of the lockdown opponents” is numerous, there is just a few examples.

The authors of the FAO, WHO and WTO Communiqué emphasized the need to protect industry workers to “minimize the spread of the virus in the sector” and “maintain food chains.” It was added that “while protecting health and well-being of citizens, it is necessary to ensure that the package of measures does not violate the food supply chain”. “We must make sure that our response to the CV pandemic inadvertently does not create unnecessary obstacles to producing and does not exacerbate hunger and malnutrition” [1].

M. Torero warned: “Do not speculate with fear, because the consequence may be the introduction of embargo on exports. We must continue to ensure the movement of goods, because panic can have serious negative consequences” [2].

“Cargill” (USA), one of the largest food producers in the world, said that “suspending any new protectionist



measures and removing existing barriers to trade will benefit farmers and consumers” [5].

Although social distance is necessary to break the chain of transmission of viruses, it should not be so extreme as to break the chain of food supplies, said T. Tienjens, chairman of the UN Committee on World Food Security, which coordinates food safety for governments, the private sector and NPOs. The authorities of many countries have already made adjustments to their strategy to combat CV. Thus, in the Philippines, farming and fishing were allowed again everywhere, except for the main island of Luzon, and food production and distribution companies can work using 50% of their labor. One of the recommendations of FAO is “giving priority to the health of consumers and workers in the value chains” [9]. This paragraph does not require commentary, since it mainly refers to WHO recommendations of a purely medical and anti-epidemiological nature.

In particular, the authorities should take measures to ensure the safety of agricultural workers. If possible, workers should be tested for CV. Manufacturers of products and warehouses should ensure the absence of visitors and restructure the work taking into account standards of social distance. Physicians should measure the temperature of employees and ensure control over the use of masks, gloves and other protective equipment.

*Identification and meeting the needs of the most vulnerable economic groups.*

We can note among the specific recommendations, in particular, the expansion and improvement of emergency food assistance and social protection programs:

- the mobilization of food banks and local communities with the support of both authorities and private charitable organizations;
- the delivery of food packages to the elderly or people suffering from chronic diseases [8];
- the delivery of school meals to children at home, even after school closures;
- the use of mobile payment systems will prevent disruptions in the delivery of cash benefits due to restrictions on movement, while minimizing contacts between people for transferring cash;
- grants to micro-, small and medium-sized enterprises of the food industry, seasonal workers and hired employees temporarily left without work due to a lockdown in CV; and
- the exemption from taxes on basic food for families with schoolchildren, especially for workers in the most affected sectors of the economy [29].

*Providing food.*

Recommendations for this priority include the following measures to support farmers:

- the access to financing small farmers to continue their work;
- banks removal of fines and penalties for late payments to farmers and extension of payment terms;

- state purchases of agricultural products from small farmers to create strategic emergency reserves;
- accelerating the issuance of visas for migrant workers;
- the introduction of vouchers, subsidies for fuel, electricity, irrigation and fertilizers;
- the introduction of minimum announced prices for agricultural products;
- admission to the movement of seasonal workers and transport operators (for example, truck drivers) across domestic and international borders, while ensuring proper medical examination, testing and protective measures;
- the creation of special flights to help seasonal workers get to the place of work;
- the mobilization of unemployed or part-time workers in the absence of seasonal workers, a redistribution of workers from other areas on a temporary basis, a change in local public work programs [9];
- the promotion of regional trade; and
- securing international funding to support small farmers (the mechanisms for this are within the Global Program on Agriculture and Food Security, created after the food crisis of 2007–2008).

The measures taken by China and Italy to protect their smallholder farmers are particularly interesting [8].

During the lockdown, China used “the Basket of Vegetable” policy to reduce the impact of the virus on the lives of smallholders and to minimize food shortage. Back in the late 1980s this project expanded urban access to fresh food by extending vegetable farms in the suburbs and creating stocks. Under the same scheme, farmers and traders in nine provinces jointly supplied grain, oil, meat, vegetables, milk, eggs and seafood to Hubei Province, the epicenter of the epidemic. Some local governments centralized the purchase, slaughter of livestock and cold storage of county food cooperatives and fully subsidized storage costs. E-commerce platforms made it easier for farmers to trade. For example, the Chinese company “Alibaba”, a giant in the field of e-commerce created a special fund to help farmers in finding markets for agricultural products and had a special “Green Channel” for this.

Chinese authorities allocated \$20 million in subsidies for the purchase of agricultural machinery and equipment. Loans with low interest rates and preferential rents are received by the companies developing innovative agricultural technologies, such as agricultural drones and other unmanned aerial vehicles, to reduce contacts with people while maintaining supply chains.

In Italy, the comprehensive program “Care Italy” includes a series of measures to support the agricultural sector. €100 million is allocated to support agricultural and fishing companies that had to suspend operations, and another €100 million, to finance them. Farmers are helped to receive advance payments from EU subsidies. The program also raises the EU budget for food distribution among the poor by €50 million and includes



**Table 1** Political goals and response during epidemic food crises

	POLICY OBJECTIVE	TYPICAL RESPONSE REACTIONS	SUGGESTED MEASURES
Proposal side	Adequate domestic supply	<ul style="list-style-type: none"> <li>• Export restrictions</li> <li>• Expansion of domestic procurement</li> </ul>	<ul style="list-style-type: none"> <li>• Avoiding proactive export restrictions</li> <li>• Avoiding procurement expansion when inventory levels are already high</li> <li>• Promoting market transparency</li> </ul>
	Food Safety Guarantee	<ul style="list-style-type: none"> <li>• Import bans</li> </ul>	<ul style="list-style-type: none"> <li>• Avoiding general import bans</li> <li>• Promoting transport and trade corridors as recommended by WHO</li> </ul>
	Support for producers, especially smallholders	Subsidies to expand production	<ul style="list-style-type: none"> <li>• Direct transfers</li> <li>• Avoiding excessive subsidies that could exacerbate market volatility</li> </ul>
Demand side	Price containment	<ul style="list-style-type: none"> <li>• Reduced import tariffs</li> <li>• Regulation of domestic prices</li> </ul>	<ul style="list-style-type: none"> <li>• Avoiding excessive accumulation of imports</li> <li>• Encouraging lower import tariffs</li> <li>• Encouraging close price controls in partnership with the private sector</li> </ul>
	Support for poor consumers	<ul style="list-style-type: none"> <li>• Cash transfers</li> <li>• Grocery help, grocery sets</li> </ul>	The choice of one of the options, in accordance with the situation [32]

transfers of €600 to agricultural workers with short-term contracts.

In [28], we considered a scenario that would be associated with the nationalization of the (possibly temporary) operators of the entire critical infrastructure or of its part. In our opinion, this would allow, for example, D. Trump to enact the Defense Production Act, adopted during the Korean War, to solve several problems at once:

- to establish planned production of goods or services critical for the nation;
- to limit the rights and freedom of workers of such enterprises by imputing them to labor duties, or replace them with military workers; and
- to limit the prices of strategic goods produced, to organize their consumption and distribution as efficiently as possible (cards, coupons, restriction of consumption “in one hand”, etc.).

The application of this scenario to the food industry is unlikely; however, forecasts of a sharp increase in the deficit in this area, as the statement of the US Congressman T. Messer predicts that the country is a few weeks from the grave food crisis, can push the countries of “the golden billion” to this path” [30].

Another solution could be the zeroing of interest on consumer loans to farmers and CVC affected by other categories of the population (with the freezing of the loan body payments) and their exchange for tax exemptions of the same denomination, which creditor banks could pay to the budget or trade on the open market [28]. It is worth considering similar securitization options with respect to payments to farmers and food processing enterprises for taxes and contributions to social and health insurance funds. Russian practice of 1995–2000-s gave a number of examples of the application of similar measures regarding federal and regional budgets [31].

FAO recommendations for improving efficiency and reducing trade-related costs include:

- rejecting all measures restricting the mobility of goods and trade;
- reducing food waste and losses;
- a breakdown of bottlenecks in logistics;
- rejecting universal subsidies for food consumers;
- reducing restrictions on the use of stocks;
- reducing import tariffs in cases where the authorities want to minimize, for example, an increase in expenses due to the devaluation of their currencies and other restrictions;
- temporary reducing VAT and other taxes; and
- if necessary, revising the tax policy regarding imported goods to compensate for potential cost increases (as a result of currency devaluation) [8].

Another important measure, of course, is to facilitate the transfer of food trade online.

Political responses during the food crisis may exacerbate the situation and its market consequences, as was the case with the global food price crisis in 2007–2008. FAO analyzed the 2007–2008 food crisis experience, and authorities’ actions during the Ebola epidemic in West Africa (2014), the acute respiratory syndrome (SARS) in East Asia (2003), HIV/AIDS in Africa (1990s, 2000s), plague in South Asia (1994) and cholera in Latin America (1991). The results of this analysis allowed us to draw a number of basic conclusions [32]:

1. Political measures should be aimed at eliminating actual, non-perceived, failures in supply and demand. Increasing market transparency and coordination among all stakeholders are critical;
2. The absence of trade restrictions can be no less important than the direct support of consumers and producers;
3. Compliance with international principles regarding the safety of transport and trade corridors can help preserve the supply chain of agricultural products.

The measures applied should be reasonable and appropriate to the context and the moment. Thus, excessive expansion of government procurements for stocks, especially if stocks are already large, can reduce the availability of foodstuff in international markets and put pressure on prices.

In 2007–2008 different countries decided the problem of excessive private food supplies by individuals differently. For example, in the Philippines, a target group was set up to search for food speculators, and in Ecuador police inspections were introduced throughout the supply chain [33].

When reducing tariffs and taxes on imported food products, their excessive accumulation must be avoided so as not to cause a world price increase. In 2007–2008, many countries reduced or removed duties on imported food products (India, Indonesia, Morocco, Nigeria, and Burkina Faso) and taxes (Brazil, Mongolia, Congo, Madagascar, Kenya, and Ethiopia).

In 2007–2008 many countries controlled prices at some or all stages of value produce (Sri Lanka, Senegal, Malawi, Malaysia, and Pakistan) [33]. Such a policy requires a large volume of products to meet the demand at fixed government prices, and financial potential for the purchase of grain and/or subsidies participants. It is important to introduce control over a small number of goods and for a short time, since low prices will stimulate the black market and impede domestic production. Such policy is applicable only in conditions of extreme price volatility.

The FAO proposed the creation of crisis committees in countries to analyze the impact of the outbreak of CV on food supply, including, in particular, representatives of ministries of agriculture, food industry, transport, economy, trade, etc. Crisis committees would be the most important mechanism for monitoring and developing strategies to minimize the impact of coronavirus on food safety [9]. It is important that crisis committees engage the private sector through a wider multilateral advisory committee, which would include representatives from all parts of the food supply chain.

Then the measures proposed by them would fully meet the needs of the participants.

One of the important areas of work is “collecting the necessary information to coordinate reforms in the field of logistic policy and government intervention” namely [9]:

- conducting operational national and regional food stock assessments and yield forecasts;
- identifying any gaps or surpluses that may arise due to the prohibition or shortage of imports;
- studying the possibility of redistributing food stocks between different regions of the country;
- ensuring the availability of goods and preventing regional price spikes, etc.;
- planning the dynamics of demand and the possibilities of adapting production, processing and distribution to it;
- verification and monitoring of blocked transportation routes and workers who have left due to a lockdown.

## CONCLUSION

Preventive measures are of paramount importance and will cost to the economies and governments less, which is especially relevant, given the growing expectations of a global recession. At the same time, when developing and subsequent practical implementation of a holistic concept of public policy measures to minimize the negative economic effect of CVC at the national and international levels, the imperative efforts should be given to measures neutralizing the negative economic factor of CVC in two key areas: logistics and human resources. It is necessary to ensure a coordinated approach of the participating countries to the development of a policy of counteracting CVC and to monitoring potential consequences.

## CONTRIBUTION

Authors are equally related to the writing of the manuscript and are equally responsible for plagiarism.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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