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FOOD SECURITY MONITORING UNDER MARTIAL LAW CONDITIONS

ABSTRACT

The unprovoked invasion of the Russian Federation into Ukraine caused a temporary domestic food crisis, disrupted the value-added chains, food processing and supply, in particular to the global market, and revealed the lack of practice of emergency food security tools implementation and analysis of current situation.

The purpose of the article is to update scientific and methodological approaches and practical proposals for food safety monitoring improvement for operational evidence-based decision-making in the conditions of Ukraine's martial law.

The methodical approach to the determination of indicators of food security on the state (region) has been improved. The methodology was developed taking into account the Law of Ukraine "On State Support of the Agriculture of Ukraine" No. 1877-IV dated June 24, 2004, Methodology for determining the main indicators of food security and Methodological recommendations for calculating the level of economic security of Ukraine, approved by the order of the Ministry of Economic Development and Trade of Ukraine dated 29.10.2013 No. 1277, the Plan of measures to ensure food security in conditions of martial law, approved by the Decree of the Cabinet of Ministers of Ukraine of April 29, 2022 No. 327-r. The operational monitoring of food security indicators of Ukraine/region (for the period of martial law) is substantiated. Development of a methodical approach and approbation of food security monitoring indicators (retrospective and operational analysis) was carried out with the support of EU Project Institutional and Policy Reform for Smallholder Agriculture.

Keywords: food safety; monitoring of food safety indicators; levels – national/regional, economic, operational, consumer level

JEL Classification: O13, Q18, F14, P42

INTRODUCTION

The unmotivated and unprovoked invasion of the Russian Federation into Ukraine provoked a temporary internal food crisis and shifted the emphasis from a retrospective analysis of food security to operational, focused attention on the availability and economic and physical availability of ready food products, economic stability and continuity of the functioning of key manufacturers of the processing and food sectors, revealed insufficient tools for making quick management decisions and analyzing the situation.

With the adoption of martial law, the approaches to state support has changed, in the first months of the war, the issue of food supply came to the fore, and from July 2022, the economic conditions of production to ensure production volumes. For the first time in history, a food support program was implemented for residents of nine oblasts and the city of Kyiv as suffered from military operations (Decree of the Cabinet of Ministers of Ukraine No. 328-r dated April 29, 2022).

The formation of effective indicators of food security at different levels of the state, region, consumer, and economy gives a complete picture of the state and reasons for changes in food security indicators when they are analyzed. It will contribute to a rapid response to the dynamics of physical and economic availability of food products for all

social and demographic groups of the population, the level and structure of their consumption, food safety, sustainability and degree of independence of the domestic food market.

LITERATURE REVIEW

Diagnostics of food safety are based on certain processes and phenomena, normative values of these indicators and calculation of food safety indicators reflecting the discrepancy between actual and desired values of safety indicators. A significant contribution to the formation of hierarchical levels and indicators of food security in Ukraine was made by: Sabluk P.T. [14], Hoychuk O.I. [4], Dorosh M.M., Dadak O.O [3] and others. FAO methods, household expenditure survey (HESM), dietary nutrition assessment (DIA), expert assessment of threats to food security (FIEMS), etc. are recognized as the most widely used methods for calculating the integral indicator of food security [15]. Generalizing indicators of the Global Food Safety Initiative GFSI is a rating and an integrated index of food safety, which is formed on the basis of such components as economic availability, physical availability and quality and safety of food products [15].

When comparing the FAO and Economist Intelligence Unit approaches to food security assessment, many common features can be found in these methodologies, which address the issue of food availability separately from its availability and production. In addition, the indicators characterizing the consumption of calories and nutrients with food per person per day, as well as their animal or plant origin, are highlighted; the state of development of transport infrastructure, political stability; the level of food losses, etc. There are also certain differences in these indicators.

In general, the study of approaches to monitoring food security indicators established two key methodological approaches to assessment: assessment using statistical and other official data; assessment of the state and opinion of people (consumers) by survey (Table 1).

Table 1. Methodological approaches to the assessment of food safety indicators.		
	Assessment based on statistical data	Assessment based on a survey
Ideology	Emphasis on the subject of provision (on production and economic indicators)	Emphasis on the object of provision (person, consumer)
Availability of information	Periodic	Upon request
Operativeness	According to the output of statistical data, monthly, quarterly, half-yearly, annual), lateness	Operational, on request, 24 hours

The best option is a combination of two approaches.

1. Monitoring of the state of food security is determined by the scales (levels) of assessment: global, national, regional (regional).
2. Interpretation of the survey and evaluation based on statistical data is carried out in any of the scales defined above.

The spheres of food safety assessment (hazards in the international interpretation) include the classical spheres as defined by the UN (Rome Declaration on World Food Security, 1996):

- physical availability of quantitatively sufficient, safe and nutritious food;
- economic accessibility of all social groups of the country's population to the food of the necessary volume and quality;
- economic independence of the national food system (food independence);
- reliability, which involves the ability of the country's food system to level the impact of seasonality and weather and other factors on the supply of food to the population of all regions of the country;
- sustainability of the national food system.

The trends of the last few years have become the maximum attention to the quality and balance of nutrition, research in terms of gender and age groups, taking into account certain specific groups, such as small-numbered peoples, the use of the survey method (typical for UN organizations, countries with developed economies, where more attention is paid not physical availability, but nutritional balance). The use of estimates based on statistical information is typical for the countries of the post-Soviet space.

At the same time, as of now, the monitoring of food security indicators in the UN expert environment is included in the general framework of the study of the dynamics of the transformation of food systems.

The international humanitarian organization Humanitarian Global (<https://humanitarianglobal.com/indicators-of-food-security/>) defines the concept of food security as a situation where everyone at any time has access to quality food to ensure an active healthy life, and accordingly, food danger - lack of access to a sufficient amount of good, healthy and culturally appropriate food [18].

The traditional standard approach is to estimate dietary energy intake using a 24-hour intake survey. However, collecting, processing, and analyzing data in a 24-hour recall is extremely time-consuming. Also, the 24-hour recall method works best where the change in daily intake is relatively small over the medium term.

Most food security measures are based on one or more of the "four pillars" of food security:

- affordability – determined by food prices, food balances, production estimates and food stocks at the household or market level;
- access is the main element that causes a humanitarian emergency;
- utilization the most– determined by indicators of malnutrition, disease outbreaks, morbidity and mortality;
- stability – income and sources, cost and expenditure ratios, especially assets.

The FAO methodology involves the following approaches: Determination by survey and analysis of statistical data of indicators: 1) Study of consumer conditions; 2) In addition, indicators of self-sufficiency and import dependence for certain types of food products are determined; 3) They are determined by the interview method in the FIES (Food Insecurity Experience Scale) system [19].

In practical activity in Ukraine today, documents such as the method of determining the main indicators of food security play a significant role; indicators of achieving the Sustainable Development Goals of Ukraine (2030, the Sustainable Development Goals 2030 are aimed at eliminating all forms of hunger and malnutrition by 2030 and ensuring that consumers receive a sufficient amount of nutritious food throughout the year); indicators for monitoring the transformation of food systems (project); a plan of measures to ensure food security during martial law, and methodological recommendations for determining economic and food security indicators (Ministry of Economy of Ukraine, 2007, 2013) [17].

AIMS AND OBJECTIVES

Given the relevance of the research topic, the purpose of this article is to develop scientific and methodological provisions and practical proposals for improving food safety monitoring indicators for prompt management decision-making in Ukraine's martial law and retrospective monitoring.

To realize the set goal, the following tasks must be solved:

- to improve the methodical approach to the determination of indicators characterizing the state of food security of the state (region) and the formation of the list of producers of food products of the state/region;
- carry out a predictive assessment of food safety indicators for the purpose of prompt management decision-making.

METHODS

The research was carried out using the following methods: statistical and graphic analysis - for a visual presentation of the obtained results, namely forecast indicators of production, workload, trade; scientific abstraction - determination of prospects for ensuring food security; statistical methods were used for the collection, systematization and analytical processing of statistical data, diagnosis of the state and trends in the formation of food security indicators; analysis and synthesis - state food support for territories under martial law, donor support programs; synergistic method - to characterize the impact of national/regional and operational levels on the formation of food security in conditions of sustainable development; the Delphi method for the approbation of food security monitoring indicators (operational analysis) with the support of Institutional and Policy Reform for Smallholder Agriculture (IPRSA).

RESULTS

The concept of food security is defined by the Law of Ukraine "On State Support of Agriculture of Ukraine", Art. 2.13. "Food security is the protection of a person's vital interests, which is expressed in the state's guarantee of a person's unhindered economic access to food products in order to maintain his normal life activities" [5].

The same Law (Article 2) defines the relationship between food security and the effectiveness of state support for the agriculture of Ukraine, which is defined as the creation of favourable conditions for the implementation of agricultural activities, the improvement of the quality and competitiveness of agricultural products in order to minimize the natural, climatic and economic risks of agricultural production and guaranteeing the food security of the state.

Structurally, the system of food security monitoring indicators consists of a mandatory part related to the determination of economic security indicators (calculated by the Ministry of Economy of Ukraine every year) and approved by Resolution No. 1379 of the Cabinet of Ministers of Ukraine dated December 5, 2007. At the same time, there were new realities and approaches that can be partially taken into account in the assessment of Ukraine's food security (Figure 1).

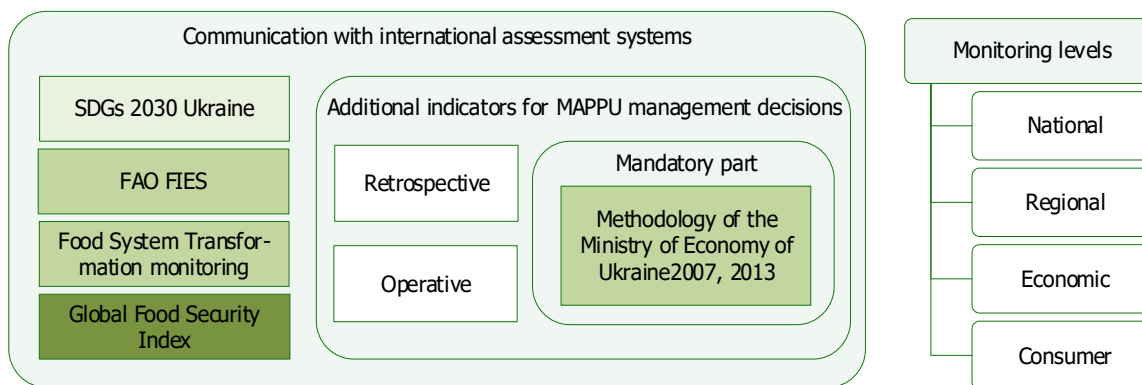


Figure 1. System of food safety monitoring indicators.

Therefore, the system of food security monitoring indicators in Ukraine should take into account the indicators of the mandatory monitoring system as a component of economic security, indicators of monitoring the achievement of the Sustainable Development Goals (Goal 1 Alleviation of poverty, Goal 2 Alleviation of hunger), which are monitored by the Government of Ukraine, optional indicators of the global index of food security, as well as monitoring of transformations of food systems (in the process of discussion), the survey system of the Food and Agricultural Organization of the United Nations regarding the determination of the state of food security. Taking into account the last two indicator systems will (partially) allow the integration of the national food safety monitoring system into international reporting systems. Levels of monitoring: national, regional (according to the principle of decomposition), economic, human.

The draft methodical approach was developed taking into account the Law of Ukraine "On State Support of the Agriculture of Ukraine" No. 1877-IV dated June 24, 2004 (with amendments), taking into account the Methodology for determining the main indicators of food security approved by the Resolution of the Cabinet of Ministers of Ukraine dated December 5, 2007 No. 1379 of security and Methodical recommendations for calculating the level of economic security of Ukraine, approved by the order of the Ministry of Economic Development and Trade of Ukraine dated 29.10.2013 No. 1277, the Plan of measures to ensure food security in conditions of martial law, approved by the Order of the Cabinet of Ministers of Ukraine dated April 29, 2022 No. 327-r [5, 6, 7, 10, 11].

It consists of the following parts:

- economic availability (affordability);
- physical availability (availability);
- nutritional balance (sufficiency);
- resource security.

Indicators characterizing the state of food security of the state (region) are calculated according to the following main groups of food products:

- bread and bread products, including flour, cereals, pasta;
- potatoes; vegetables, melons;
- fruits, berries and grapes;
- sugar;
- oil;
- meat and meat products;

- milk and milk products;
- fish and fish products;
- eggs.

Indicators of annual monitoring of food security (retrospective analysis) of the state/region.

1. Economic availability (affordability).

1.1. Economic availability of products, which is defined as the share of total food costs in the total sum of total household costs according to the formula:

$$E = \frac{B_x}{B_c} 100\% \quad (1)$$

where E is an indicator of economic availability of products; B_x – expenditure of the population on food for the year; B_c – total expenditure of the population for the year.

1.2. The differentiation of the cost of food by social groups, which is monitored in dynamics and is calculated as the ratio between the cost of food of 20 per cent of households with the highest incomes and the cost of food of 20 per cent of households with the lowest incomes according to the formula:

$$D = \frac{D_B}{D_M} \quad (2)$$

where D – an indicator of the differentiation of the cost of food; D_B – an indicator of the cost of consumed products in the 20 per cent of households with the highest incomes; D_M – indicator of the cost of consumed products in the 20 per cent of households with the lowest incomes.

1.3. The share of the population whose average souls are equivalent aggregate costs are lower than the actual (estimated) subsistence minimum, which is defined as the ratio between the number of the population whose expenditures are less than the actual (estimated) subsistence minimum and the total population, %.

1.4. Consumer price index for food products (annual), %.

2. Physical availability (availability).

2.1. Adequacy of grain reserves in state resources, which is defined as the ratio between the amount of food grain in the state food reserve and the amount of domestic consumption of bread and bread products by the population in terms of grain according to the formula:

$$F = \frac{H}{X} 100\% \quad (3)$$

where F – indicator of the provision of grain food resources; H – availability of food grain in the state food reserve X – the average annual domestic consumption of bread and bread products in terms of grain.

2.2. The level of stocks of grain crops at the end of the period, per cent to consumption, which is defined as the availability of grain crops, thousand tons / (total resources of grain and leguminous crops, thousand tons - export of grain and leguminous crops, thousand tons) x 100.

2.3. The capacity of the internal market of individual products, which is monitored dynamically and is determined in natural terms as the product of the consumption of a certain product and the average annual population according to the formula:

$$C_i = R_i P \quad (4)$$

where i – the type of product; C_i – capacity of the domestic market of the i -product; R_i – annual average per capita consumption of the i -product; P – average annual population.

2.4. Food independence by individual product, which is defined as the ratio between the volume of imports of an individual product in natural terms and the capacity of its domestic market according to the formula:

$$Q_i = \frac{I_i}{E_i} 100\%, \quad (5)$$

where Q_i – the share of food imports of the i -product; I_i – import of the i -product; E_i – capacity of the domestic market of the i -product.

The limit (threshold) criterion for the indicated indicator is its 30 per cent level.

2.5. The share of sales of imported food products through the trade network of enterprises, percentages.

2.6. The level of self-sufficiency by individual products, which is defined as the ratio between the volume of production (tons) and internal consumption in natural terms (tons), %.

2.7. The level of self-sufficiency for individual products per person, which is defined as the ratio between the volume of production (thousand tons) to the size of the existing population, million people and to the product consumption fund per person (kg), %.

2.8. Grain production per person per year, tons, defined as the ratio of the total production of grain and leguminous crops, thousand tons to the size of the existing population, thousand people.

2.9. Index of agricultural products, % (annual).

2.10. Food production index, % (annual).

2.11 Dynamics of changes in production volumes in natural terms by individual food products, an average over five years, %.

2.12. Food losses - the share of food losses in the total volume of consumption by the main types of food products, %.

2.13. Demand and supply balances for certain agricultural and food products.

3. Nutritional balance (sufficiency).

3.1 The daily energy value of a person's diet, which is defined as the sum of the products of a unit mass of individual types of products consumed by a person during the day, and their energy value according to the formula

$$P = \sum m_i \mu_i \quad (6)$$

where P – the energy value of a person's daily diet; i type of food product; m_i – mass of the i product consumed by one person; μ_i – energy value per unit mass of the i product;

The limit (threshold) criterion is 2,500 kcal per day, while 55 per cent of the daily ration must be provided by consumption of products of animal origin.

3.2. Providing the human diet with the main types of products, which is defined as the ratio between the actual consumption of a separate product and its rational norm according to the formula:

$$C = \frac{c\phi}{cp} \quad (7)$$

where C – indicator of sufficient consumption of a separate product; $c\phi$ – the actual consumption of a separate product per person per year; cp – the rational rate of consumption of a separate product per person per year.

3.3. Access to drinking water - the share of the population with access to drinking water of adequate quality, %, defined as the ratio of the number of the population with daily regular access to drinking water of adequate quality to the total population, %.

4. Resource security.

- 4.1. The share of degraded land in the total area of agricultural land, %.
- 4.2. The level of dependence of the seed fund on import supplies (by main crops) as a ratio of the volume of imports in natural terms to the volume of consumption (tons), %.
- 4.3. Sufficiency of internal water resources for the needs of agriculture, %.
- 4.4. Share of agricultural land under irrigation systems, %.

Indicators of operational monitoring of food security of the state/region.

Operational monitoring of food security is carried out on the basis of point 1 of the Plan of measures to ensure food security under martial law, approved by the Decree of the Cabinet of Ministers of Ukraine dated April 29, 2022 No. 327-r.

Accordingly, to the list of products for which food safety monitoring is carried out, it is advisable to additionally include the positions defined by the Resolution of the Cabinet of Ministers of Ukraine of March 20, 2022 No. 328 "Some issues of providing the population with food products for long-term storage under martial law" (hereinafter - the Resolution 328): flour, bread and products, cereals, dairy products (long-term storage), oil, meat and canned goods.

1. Indicators of operational monitoring of food security in Ukraine/region.

- 1.1. The level of reserves of food wheat and cereal crops, thousand tons, % of the annual need, by region. It is calculated as the ratio of available stocks of food wheat and cereal crops in natural terms to the annual volume of consumption as raw materials for processing into food products in order to meet the needs of domestic consumption by the population, %.
- 1.2. The level of stocks of finished products of long-term storage at manufacturing enterprises, thousand tons, days of consumption, by region.
- 1.3. The level of stocks of finished products of long-term storage in trade networks, thousand tons, days of consumption;
- 1.4. Population by region, thousands of people.
- 1.5. The share of expenditure on food products, %, by the survey.
- 1.6. Food Insecurity Susceptibility Characterization (FISC), by the survey.
- 1.7. Cost of food products per person per day according to consumption norms, hryvnias.
- 1.8. Price dynamics of basic food products, %, twice a month.

2. Economic level.

In order to analyze and identify threats to food security and its condition, prompt response to the replenishment of physical food stocks, as a monitoring base, it is mandatory to have a record of food and processing industry enterprises that have a significant impact on the formation of food security in the country and at the regional level, commodity nomenclature, their shares in consumption and production, a database has been formed that will allow to determine logistical problems, the level of stocks of finished products, the possibility of changing production volumes.

- 2.1. The stability of the work of critically important enterprises in the section of individual food products as a ratio of the number of months of forced downtime (average weighted by enterprises of the branches) to the duration of the year in months, %.
- 2.2. Survey: change compared to the period until 02/24/2022 (one-time), change for the last month, waiting, required support (one-time) by blocks:
 - 2.2.1. availability of raw materials and resources for operational activities;
 - 2.2.2. change in the cost of raw materials/input resources;
 - 2.2.3. assessment of safety risks for production and transportation (1 - safe; 10 - very dangerous);
 - 2.2.4. evaluation of the logistics component and change in the geography of supplies;
 - 2.2.5. change in production volumes;
 - 2.2.6. market segment;
 - 2.2.7. change in the cost of finished products;
 - 2.2.8. availability and availability of financial resources for operational activities (% of annual or monthly needs;)

- 2.2.9. availability of personnel for operational activities;
- 2.2.10. the level of capacity utilization of the enterprise.

3. Forecast.

3.1. Forecast indicators of the sufficiency of the production of grain and cereal crops for domestic consumption (based on the course of fieldwork, forecasted (average) yields, food consumption rates (of plant and animal origin), population) by region.

4. Population: a survey (for example, through the Diya portal): Share of expenditure on food products in the last month, %; Has the share of expenditure on food products increased compared to the period up to February 24, 2022; Has the level of income changed since the beginning of the war; Is your current income greater than UAH 2,508 per month (subsistence minimum) per family member?

Approbation of food security monitoring indicators was carried out with the support of Institutional and Policy Reform for Smallholder Agriculture (IPRSA). This publication contains part of the tested materials, a clear example of the possibilities of surveying enterprises for the purpose of prompt management decision-making. Critically important enterprises from four industries - bakery, flour mill, and dairy - took part in the survey. Importantly, the results are not representative, but demonstrative. The survey was conducted in late August 2022-early September 2022, after assessing general trends and conducting a retrospective analysis.

In general, the volumes of food production in most product categories are sufficient to meet domestic demand. The dynamics of changes in key indicators are characterized by typical trends and acceptable rates. Price changes are mostly formed by market mechanisms. Some indicators, especially related to the volume of production, require clarification of statistical reporting and may be revised.

The survey of enterprises included the following questions: the status of the enterprise; regional characteristics; the presence of interruptions in work over the past year; assessment of changes in access to raw materials, volumes of production, the geography of supplies of finished products and volumes of production costs (Figure 2).

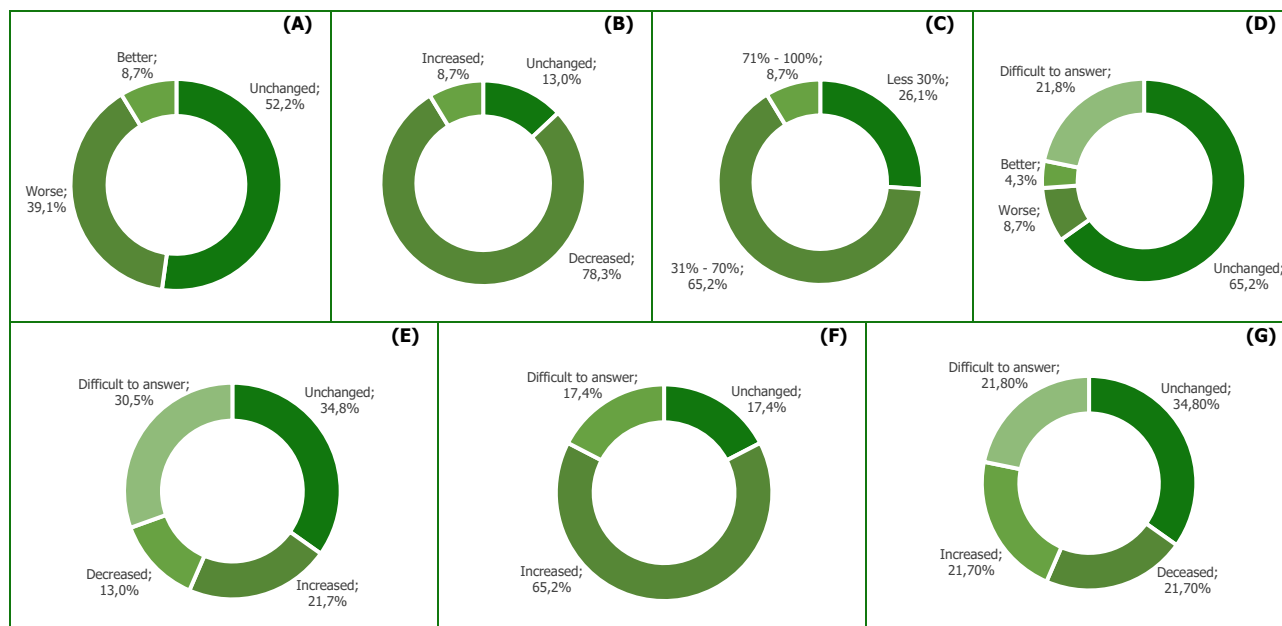


Figure 2. The results of the survey. Notes: (A) – Change in access to raw materials volumes; (B) – Change in production; (C) – Load assessment; (D) – Forecast of access to raw materials; (E) – Forecast of changes in trade volumes; (F) – Forecast of changes in production costs; (G) – Forecast of production volumes.

According to the results of the survey, 8.6% of enterprises in all industries were either partially destroyed or ceased their activities. 9% of enterprises had a break in work for more than a month. Other enterprises operate without changes in the addresses of production facilities and within the framework of market demand for products.

More than 52% of enterprises reported that during the period from March to August 2022, compared to the period until February 24, 2022, they did not experience any significant changes in access to raw materials. There were enough offers, but there were certain problems with delivery due to active hostilities in the regions. Moreover, almost 9% of enterprises

reported that access to raw materials has even improved, amid reduced competition with exporters and limited supplies to foreign markets.

At the same time, about 39% of enterprises, nevertheless, experienced difficulties with the supply of raw materials and reported that their access to raw materials had worsened.

One of the factors that led to insignificant changes in access to raw materials was a change in the volume of production of finished products. Thus, more than 78% of enterprises reported that they reduced the volume of processing. For about 13% of enterprises, the volume of production remained without significant changes, and less than 9% increase the volume of processing.

The change in production volumes also determined the current level of utilization of enterprises. According to the results of the survey, for 65% of enterprises, the level of utilization of production facilities is from 31% to 70%. More than a quarter of enterprises (26%), with current volumes of production of finished products, are loaded by less than 30%. Only less than 9% of enterprises are loaded at 71% - 100%. Such indicators create high risks from the point of view of production efficiency and possible shutdown of enterprises.

When assessing the current activity of enterprises, according to the results of the survey, it was established that in the current conditions, the sufficiency of raw materials for the work of food production enterprises is estimated at an average of 6.59 points on a 10-point scale (1 - shortage of raw materials, 10 - sufficient raw materials).

Also, the level of production support by personnel was assessed on a 10-point scale, which is also a risk factor in current conditions. If, for 1, we accept full satisfaction of production needs in personnel, and for 10 - its critical shortage, then the average score according to the results of the survey is estimated at 3.88, which generally corresponds to a sufficient supply of personnel. In addition, on a 10-point scale, the interviewed representatives of the enterprises assessed the level of difficulties with logistics, both for the supply of raw materials and resources and for the supply of finished products, as well as the level of general production risks. The average score for problems with logistics, according to the results of the survey, was formed at the level of 4.53, with the condition that 1 - significant problems with logistics, and 10 - no problems. Thus, this segment in the overall food supply chain is quite problematic. At the same time, the assessment of general production risks is even worse - the average indicator is 3.53 points, with the condition that 1 corresponds to very high risks, and 10 corresponds to the absence of risks. Thus, in the current conditions, most enterprises are loaded only by 31%-70% of the available capacities, have sufficient access to raw materials and are provided with personnel, but face significant production risks (energy supply, supply of auxiliary resources and raw materials, the possibility of physical damage to production facilities, etc.) and have certain logistical difficulties.

More than 65% of respondents reported that they do not expect significant changes in access to raw materials. For the grain processing and oil industries, this is due to the arrival of a new harvest on the market, which, with limited exports, creates a surplus of raw materials. However, in general, only 4% of surveyed enterprises expect improvement in access to raw materials.

At the same time, the risks and uncertainty of the market situation remain high, which contributed to the formation of the share of respondents of almost 22% who could not reliably assess the future prospects of access to raw materials. In addition, almost 9% reported that access to raw materials would worsen.

Respondents' answers regarding the prospects for food production in the coming month were relatively evenly distributed. For about 35% of enterprises, no significant changes in production volumes are expected. As in the case of estimates of access to raw materials, about 22% of respondents could not estimate changes in production volumes in the near future. However, a much larger part (almost 22%) expect a decrease in production volumes. And, accordingly, less than 21% expect an increase in production volumes.

Another important indicator is the expected changes in the volume of trade of finished products. As in estimates of production volumes, about 35% of respondents do not expect significant changes in trade volumes in the coming month.

At the same time, more than 30% of enterprises had difficulties with estimating future trade rates. At the same time, a much smaller part, only 13%, expect a decrease in trade volumes. Accordingly, about 22% expect an increase in sales of their products in the coming month.

Estimates of changes in production costs are indicative and create certain risks for the efficiency of processing enterprises. The vast majority of respondents, more than 65%, expect an increase in costs in the near future. About 17% of enterprises could not provide a clear assessment, and the same share did not expect significant changes in the volume of production costs in the coming month.

Thus, in the near future, with a sufficient supply of raw materials and stable volumes of production and sale of products, processing enterprises expect an increase in the consumable part, which will cause an increase in prices for finished products and will affect the economic availability of food products for the population.

In parallel with the survey of enterprises, it is important to have information about the population's self-assessment of its food threats.

According to the results of a survey conducted by FAO experts in Ukraine among 5,224 households in 22 regions (excluding Kherson and Luhansk regions), it was established that a significant number of households noted a significant decrease in income as a result of the war. In particular, the results of the analysis show that in the frontline zone and in the central regions, about 58% of households reported a decrease in income, while in the western regions, this figure is about 50%. In addition, between 25% and 50% of households reported a sharp and significant decrease in income. The largest number of such households are in the Donetsk, Zhytomyr, Sumy and Chernivtsi regions. On average, the level of household income in Ukraine decreased by 55%. At the same time, in some areas, the level of decline is much greater. Thus, for households in the Sumy region, this indicator was about 67%, in the Mykolaiv region - 65%, and in the Donetsk and Zaporizhzhia regions - about 63%.

Together with the indicators characterizing the economic availability of food, the indicator of the share of food costs, survival strategies and changes in the level of income in an operational mode allows you to build hypotheses about the development of events and provide assessments of the needs of the population (Figure 3).

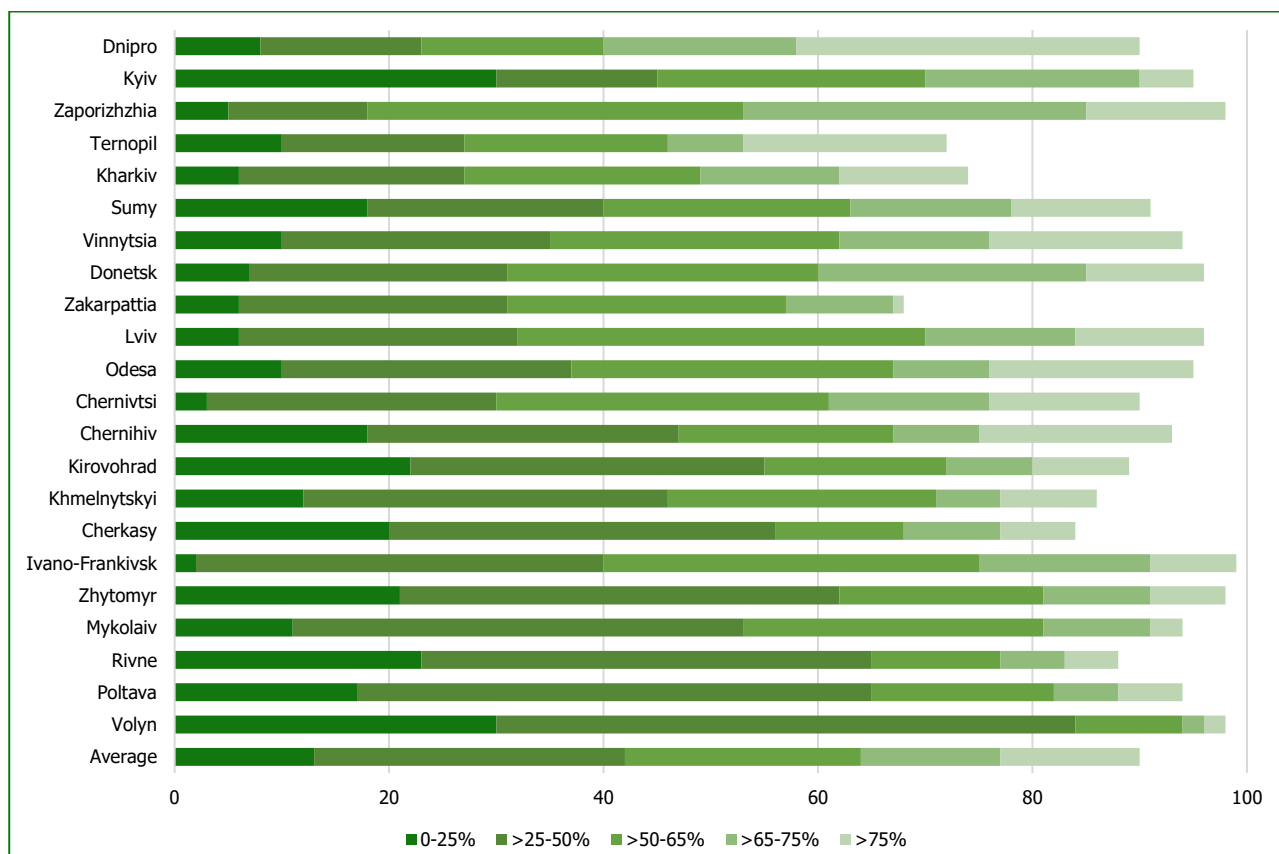


Figure 3. Share of food expenses in total household expenses (rural population). (Source: [19])

The construction of operational monitoring based on assessments of the capabilities of key enterprises, consumer sentiments and the capabilities of the population makes it possible to make decisions about the needs of direct food supply and assess the risks of an unsatisfactory balance at the regional and national level.

The assessment of the state of key enterprises in the cross-section of industries should be supplemented by a general assessment of the expectations of enterprises in the agro-food sector.

DISCUSSION

In accordance with the Law of Ukraine "On State Support for the Agriculture of Ukraine" (Article 2), the relationship between food security and the effectiveness of state support for the agriculture of Ukraine is determined. At the beginning of 2022, with the unmotivated and unprovoked invasion of the Russian Federation on the territory of Ukraine and the introduction of martial law, approaches to state support in the agricultural sector changed to a large extent. First of all, at the beginning of the war, almost all the funds provided for state support of the agricultural industry in the budget of the Ministry of Agrarian Policy and Food of Ukraine in the General Fund for 2022 were directed to the Reserve Fund. Agricultural enterprises have the opportunity to receive state support along with enterprises of other industries in terms of energy efficiency, reconstruction of destroyed assets and other areas of general economic direction.

The conducted research highlighted the debatable issues:

- the periodicity of operational monitoring and the expediency of its implementation in the period after the lifting of the martial law regime;
- regulatory and legal regulation of the concepts of operational and retrospective monitoring of food safety;
- implementation of a sustainable organizational structure of operational and retrospective monitoring. It was the complete approval that identified such participants in the monitoring process (Table 2.)

Table 2. Map of food safety monitoring process participants.

Food safety monitoring participant	Retrospective (report attached, plus dashboard)	Operative (report attached, plus dashboard)	Economic (report attached, plus dashboard)	Human (report attached)
Ministry of Agrarian Policy and Food of Ukraine	Forming a list of indicators	Forming a list of indicators Work with SFS databases for exports (balances) Work with data on the state of crops, the state of industries	Forming a questionnaire Work with enterprise databases Work regarding the critical needs of enterprises	Formation of the interviewer
	General coordination of the BSP, management decision-making based on the BSP, initiation of NPA, review of results and adoption of relevant decisions			
Ukragroprom-productivity		Price monitoring		
Analytical outsourcing	Forming a retrospective report Work with available data Prognostication	Formation of operational reports Working with available data and under the terms of confidentiality with Minagro data Prognostication	Surveys (Internet, telephone, in person, focus group, group at events or remotely) Formation of reports. Working with existing data and under confidentiality conditions with Minagro data Work with international organizations and analytical structures	Data Processing Formation of reports Work with international organizations and analytical structures
Ministry of Digital Transformation				The organization through the Diya portal
Ministry of Economy of Ukraine	Consideration of monitoring results as part of economic security			
Public organizations	Discussion		Work with enterprises - surveys, information transfer	
Enterprises			Participation in the survey	
Consumer				Participation in the survey

CONCLUSIONS

The key emphasis of state support has become issues of food security for the population, ensuring the stability of the production of finished products, unconditional support for small producers, credit support, and infrastructural and logistical support in conditions of export restrictions. Its characteristic feature was the participation of the Ministry of Agrarian Policy,

and, accordingly, of agrarians, in the support programs of the Ministry of Economy of Ukraine, as well as the involvement of donor funds.

Food provision of vulnerable sections of the population (humanitarian aid) is carried out in accordance with Resolution No. 328 dated 20.03.2022 "Some issues of providing the population with long-term storage food products and sanitary and hygienic products in the conditions of martial law" according to such food sets" [11].

In 2022, the Ministry of Agrarian Policy provided support to farms and other producers of agricultural products in the amount of UAH 1,650 million: budget subsidy per unit of cultivated agricultural land (1 hectare) for agricultural activities; a special budget subsidy per hectare of cultivated agricultural land; a special budget subsidy for the maintenance of cattle herd (cows). Only producers of agricultural products who are registered in the State Agrarian Register and meet criteria had opportunity to participate in the program. Under the terms of the program, non-refundable aid can be received by farmers who have from 1 to 120 hectares of agricultural land or keep from 3 to 100 cows.

Donor aid is also aimed at supporting grain storage in conditions of limited export. It is carried out jointly with the Food and Agriculture Organization of the United Nations, which is the implementing agency for the implementation of the support of the governments of Canada, Japan, Minderoo Foundation. Small producers are also provided with seeds, plant protection products, and fertilizers.

Through the support programs of the Ministry of Economy (with the participation of the Ministry of Agrarian Policy), grant support is provided for horticulture, viticulture, berry growing and greenhouse farming [12] and participation in the program to reduce the cost of credit funds "5-7-9" (agriculture occupies 53% of the total amount of loans). Subsidies for horticulture, viticulture, berry growing, greenhouses (Yerobota) also provided.

In order to timely identify the weak links of the entire food security chain and effectively distribute support to the segments that need it most, it is advisable to monitor the state of food security using the proposed methods and covering all the proposed groups of participants.

The results of the study show that the new mechanism for forming indicators and levels of food security plays an important role in curbing adverse consequences regarding food supply and food costs and ensuring food security in Ukraine.

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МОНІТОРИНГ ПРОДОВОЛЬЧОЇ БЕЗПЕКИ В УМОВАХ ВОЄННОГО СТАНУ

Невмотивоване вторгнення російської федерації в Україну спровокувало тимчасову внутрішню продовольчу кризу, порушило системи виробництва, переробки та постачання продовольства, зокрема на міжнародний ринок, і виявило недостатність інструментарію щодо ухвалення оперативних управлінських рішень для аналізу ситуації.

Метою статті є розробка науково-методичних положень та практичних пропозицій щодо вдосконалення індикаторів моніторингу продовольчої безпеки для оперативного ухвалення управлінських рішень в умовах воєнного стану в Україні.

Удосконалено методичний підхід до визначення індикаторів, які характеризують стан продовольчої безпеки держави (регіону), обґрунтовано критерії формування переліку виробників харчової продукції держави / регіону. Методика опрацьована з урахуванням Закону України «Про державну підтримку сільського господарства України» № 1877-IV від 24 червня 2004 року (зі змінами), з урахуванням затвердженої Постановою Кабінету Міністрів України від 5 грудня 2007 р. № 1379 Методики визначення основних індикаторів продовольчої безпеки та Методичних рекомендацій щодо розрахунку рівня економічної безпеки України, затверджених наказом Міністерства економічного розвитку і торгівлі України 29.10.2013 № 1277, Плану заходів забезпечення продовольчої безпеки в умовах воєнного стану, затвердженого Розпорядженням Кабінету Міністрів України від 29 квітня 2022 р. № 327-р. Проаналізована та обґрунтована державна продовольча підтримка територій в умовах воєнного стану, здійснено аналіз програм донорської підтримки. Обґрунтовано оперативний рівень показників продовольчої безпеки України / регіону (на період дії воєнного стану) за товарними підгрупами. Для діагностики національного / регіонального рівня в запропоновані показники й норми для аналізу. Розробку методичного підходу та апробацію показників моніторингу продовольчої безпеки (ретроспективний та оперативний аналіз) здійснено за підтримки Institutional and Policy Reform for Smallholder Agriculture.

Ключові слова: продовольча безпека; моніторинг показників продовольчої безпеки; рівні – національний / регіональний, господарський, оперативний, рівень споживача

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