

PAPER • OPEN ACCESS

## Strategic alternatives for the development of the agricultural sector in conditions of environmental sustainability

To cite this article: O Pavelko *et al* 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1126** 012027

View the [article online](#) for updates and enhancements.

### You may also like

- [Thermal Conductivity of Geopolymer with Polypropylene Fiber](#)  
Felisitas Aprilia Rastri Utami, Andreas Triwiyono, Ni Komang Ayu Agustini et al.
- [Self-Reported Pharmaceutical Storage, Use, and Improper Disposal to The Environment Among Urban Parents in Indonesia](#)  
Anindrya Nastiti, Arlieza Raudhah Riyanto, Ade Supriatin et al.
- [Determination of the most dominant cause factors due to erosion in the farmland of Sibolangit sub-district](#)  
Shanti Desima Simbolon, Zulkifli Nasution, Abdul Rauf et al.



245th ECS Meeting • May 26-30, 2024 • San Francisco, CA

Present your work at the leading electrochemistry & solid-state science conference.

Network with academic, government, and industry influencers!

Submit abstracts by December 1, 2023

[Learn more & submit!](#)



## Strategic alternatives for the development of the agricultural sector in conditions of environmental sustainability

O Pavelko<sup>1</sup>, I Lazaryshyna<sup>2</sup>, O Harnaha<sup>1</sup>, P Nesenenko<sup>3</sup>, M Myronets<sup>4</sup> and S Sokoliuk<sup>5</sup>

<sup>1</sup> National University of Water and Environmental Engineering, Rivne, Ukraine

<sup>2</sup> National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine

<sup>3</sup> Odesa National Economic University, Odesa, Ukraine

<sup>4</sup> Nadsluchanskyi Institute of National University of Water and Environmental Engineering, Berezne, Ukraine

<sup>5</sup> Uman National University of Horticulture, Uman, Ukraine

E-mail: o.v.pavelko@nuwm.edu.ua

**Abstract.** The research of the strategic alternatives for the development of the agricultural sector in conditions of environmental sustainability is considered in the article. Social and environmental problems that need to be properly solved in the field of the agrarian sector are investigated. Dynamics of exports to other countries of the world and the share of agricultural exports in its overall structure for 2007-2019 is reviewed. The Global Food Security Index (GFSI) as a quantitative-qualitative model based on more than 28 indicators for Ukraine is studied in dynamics. The method of forming the value of the GFSI indicator of Ukraine for 2021 is investigated. The supplement certain groups of agrarian sector development principles of the economy with separate principles are proposed. Directions for building a strategy for the agrarian sector development are suggested.

### 1. Introduction

Agricultural systems around the world face a number of economic, environmental and technical challenges that require updated technologies in an effort to meet society's demands for sustainable development. They can be used to support farmers in developing innovative agricultural production systems at the individual farm level. The agricultural sector development in conditions of environmental sustainability definitely deserves a lot of attention.

The agricultural sector plays a leading role in Ukraine's economy, providing 9% of Gross Domestic Product, 18% of business entities employment, 18% of the state's gross added value and 6% of tax revenues [1; 2]. According to the "Concept of the State target program for the development of the agrarian sector of the economy for the period until 2022" the basic component of the agrarian sector is agriculture which forms food, economic, ecological and energy security, ensures the development of technologically related branches of various types of economic activity. The share of the agrarian complex as one of the most important components in the consolidated Ukraine's budget in recent years is 12% and more than a third – in the commodity structure of exports [1].

The stable level of the agricultural sector is due, first of all, to appropriate natural conditions and a favorable geographical location from the point of logistics view in the center of Europe.



A favorable climate allows agricultural activities to be carried out with minimal risks regarding the possibility of natural phenomena. However, in recent years, new challenges have arisen for subjects of the agricultural sector related to climate change. The availability of chernozems in Ukraine with the highest content of humus also contributes to the agricultural sector development as well as the low cost of renting land (Ukraine – 41 EUR/ha, France – 202 EUR/ha, Lithuania – 81 EUR/ha, the Czech Republic – 96 EUR/ Ha). However, the deterioration of the chernozem quality should be emphasized (about 20% degraded due to an ill-conceived policy in terms of soil cultivation and uncontrolled application of fertilizers). It should be noted that in 2020 the moratorium on the sale of Ukraine's land was lifted with the gradual opening of the market. Simultaneously a mechanism to determine the amount of land to be sold to non-residents was provided. Low wages (the average official wage in Ukraine is \$277, Poland – \$1,680, Slovakia – \$1,319, Hungary – \$1,114) also causes interest in engaging in agricultural business. Domestic farmers actively acquire knowledge from colleagues from other countries trying to use advanced world technologies.

## 2. Literature review

Strategic alternatives for the agricultural sector development is the subject of consideration by many scientists. Garcia-Fuentes P. etc. [3] as well as Le Gal P., Dugué P. etc. [4] explore improvements to support strategic decision-making in agricultural sector. For instance, the publication: [4] describes the conduct of research at the farm level and at the level of consulting services. The publication: [5] examines the strategic management problems through the use of multivariate statistical analysis methods. The authors prove that latent strategies are considered to be a phase of strategic management formation in agriculture. However, this applies only to those countries where there is no experience in the application of formalized procedures for the development of agrarian business directions.

The organizational and technological features in agrarian business inherent in different regions determined the studies devoted to the prerequisites for the usage of development strategies in the agrarian sphere. Hazell P. emphasizes that the development of agriculture cannot take place on a sufficiently large scale and quickly enough, if the public sector does not perform the function of a leader. It is also necessary to have appropriate investments, favorable policies and clearly defined and well-thought-out strategies for the implementation of development directions [6].

Baryshevska I., Poltorak A., Shishpanova N. note that a strategy aimed at the development of an agricultural company of any kind should be implemented in stages, starting from the highest level to the lowest level. Simultaneously, the peculiarities of the internal and external environment, its entrepreneurial potential, in particular financial, resource, and intellectual capabilities must be taken into account, as well as management capacity. Scheme of of an innovative strategy modeling for agricultural enterprises is developed by these authors [7]. The study by Alemayehu A., Bewket W. presents an analysis of different factors (economic, socio-demographic etc.) that influence the choice of smallholder farmers' strategies of coping and adaptation to change of the climate and variability [8]. Kalkan A., Bozkurt Ö. proved in their research that the important factors affecting the increment in the price of agriculture are the decrease in the yield level and the increase in the cost of energy and fertilizers [9]. In developing countries, as a rule, the components of building strategic management systems are studied, an attempt to find new initiatives is made and possible centers of their growth are identified (Njegovan Z., Jeločnik M. [10], Brenes E., Montoya D., Ciravegna L. [11]). The study [11] describes Porter's strategies and highlights the mechanism of their implementation by agricultural enterprises. 66 such business entities in Latin America were investigated for the conducting of this research. The circumstances of activity that distinguish firms implementing a differentiation strategy are characterized [12]. Strategic management systems in the agrarian complex are directly related to sustainable development as it is actually a process of various changes [13]. Yarmolenko Ju. considers to be advisable to interpret concept of "sustainable development of the agrarian sphere" as a self-sustaining development enterprises of the industry with stable growth rates, which ensures the satisfaction of the population's product needs in food industry, strengthening the export potential of the region and creation of favorable living conditions for next generations [14].

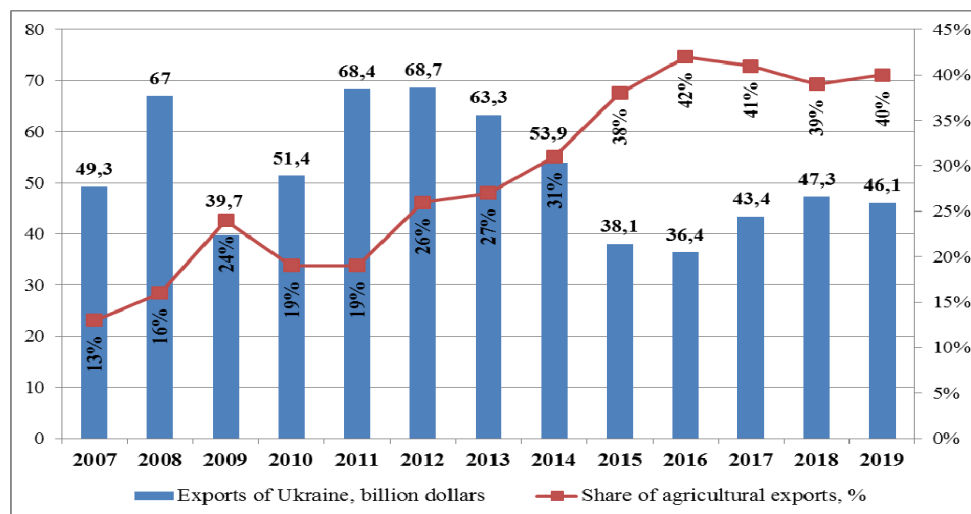
Kuznetsova Yu. and another authors consider the sustainability of agricultural production as a steady increase of production due to the elimination of sharp declines over the years with minimal adverse circumstances effects [15]. French J. believes that the agricultural production can be achieved by minimizing of its fluctuations, increasing the strength of using available resources and improving the quality of finished products. At the same time, it singles out such sustainability criteria as: the ability to cross negative impacts in order to prevent or mitigate the decline in production; the ability to constantly maintain optimal proportionality in the growth of the scale of reproduction of various countries; ensuring a systematic magnification in production volumes [16].

Dynamics of the agro-industrial complex development including agriculture is directly related to the macroeconomic situation. Interindustry proportions and their optimization are the most important factors in the agricultural sector sustainable development [17]. Agricultural production is carried out under the influence of external conditions and internal factors system, the totality of which determines its efficiency, trends and dynamics of development.

### 3. Material and Methods

Ukraine, in the economy of which the specific weight of exports is high, leads the rating of world leaders in a number of commodity positions (sunflower oil – 1st place in the world; rapeseed – 2nd place; corn, barley, rye – 4th place) and is included to the TOP-5 countries of the world which are in the agrotourism category.

The general dynamics of Ukraine's exports to other countries of the world and the share of agricultural exports in the overall structure of exports, in particular, are presented in Fig. 1.



**Fig. 1. Dynamics of exports to other countries of the world and the share of agricultural exports in its overall structure for 2007-2019**

Source: [2].

In general agricultural sector difficulties are justified by such reasons as: agricultural production dependence on imported resources (fuel and energy), high energy consumption, high level of plowing and degradation agricultural lands, the instability of tax legislation, imperfections in the legislative regulation of land relations, risk insurance, land valuation, development of agricultural production organic sector, lack of motivation among agricultural producers to develop labor-intensive industries and the high cost of capital, which restrains their development, absence of a specialized financial and credit infrastructure focused on servicing agricultural production and a long-term strategy for the sector development, dominance of individual big players in the market etc. [1; 18].

Therefore, in the agricultural sector there are problems, in particular social and environmental, that require proper solutions. The dominance of exclusively economic interests among agricultural producers has a negative effect on the environment, worsens the quality of the population life and the level of food security, which in turn accelerates the destruction of the state national security. Ensuring the development of the agrarian sector should be based on a combination of ecological, economic and social components, which are key indicators of the sustainable development concept. Improving the situation in the agrarian sector of the economy will provide conditions for the well-being of the population, strengthen the state's position in the international arena, overcome the ecological crisis and minimize anthropogenic impact on the environment.

The development of the Ukraine's economy agricultural sector should take place on the basis of its production and social infrastructure optimizing, increasing the competitiveness of agricultural production as well as its volume and the level of rural population employment [1]. According to the "Concept of the State target program for the development of the agrarian sector of the economy for the period until 2022" [1] the agrarian sector development can take place according to other options:

1) the first option is characterized by the preservation of the volume of funding for the agrarian sector development that is unstable in terms of volume and time, giving preference to administrative methods of market regulation as opposed to modern market instruments, insufficient emphasis on agrarian policy in relation to certain groups of producers (primarily the small goods sector, the development of which is a prerequisite for a balanced social economic development of rural areas). Under the condition of the implementation of such an option the solution of the main problems of the agricultural production development is not ensured;

2) the second option consists of the implementation of forecast measures and program documents of social and economic development of the agrarian sector for a short-term period. Its shortcoming is the lack of systematicity and consistency in the implementation of measures, which makes it difficult to achieve the targets defined in the program documents aimed at the implementation of the Sustainable Development Strategy "Ukraine – 2020" [1].

Due to the significant volumes of product exports Ukraine has been a guarantor of food security for a long time. Its contribution to the world food market according to the results of 2021 can be compared with providing food for more than 400 million people, which is quite significant.

Ukraine permanently belongs to the five leading world exporters of grains and legumes. In the 2020/2021 marketing year the export of grains, legumes and their processing products amounted to 44.9 million tons, namely: wheat – 16,6 million tons, barley – 4,2 million tons, rye – 18,4 thousand tons, corn – 23,1 million tons, flour – 126,9 thousand tons.

In general there are three main approaches to interpreting the food security essence:

1) ensuring the population's guaranteed access to food in the amount necessary for an active, healthy life. There are different alternatives to achieve food security – import or self-sufficiency and there is no significant difference between them. Among some domestic economists the consumption criterion is also recognized as the only one [19];

2) supporters of this point of view highlight the ability of the country to provide itself with the necessary volume and assortment of food products as another key position in understanding the essence of food security. Achieving food security can be realized if such challenges are addressed: maintaining food supply at a level sufficient for healthy nutrition; ensuring the appropriate level of solvent demand of the population; elimination of dependence on imports and protection of the interests of domestic producers [20];

3) the third approach is based on two criteria: availability on the country's food market of such a quantity of food products as is sufficient to maintain a healthy lifestyle of the population; availability of these products for absolutely all segments of the population [21]. Thus, in outlined approaches attention is focused on the interests of the individual to ensure the needs for physical and economic availability of food products.

Food security should be interpreted as the ability of the state to guarantee the satisfaction of citizens needs with high-quality and safe food products, mostly of its own production, in volumes that

meet rational consumption standards, which makes it possible to ensure the livelihood of both an individual and the nation as a whole, sustainable economic development, the well-being of the population and social-political stability in society. Food security is not a problem unique to the agricultural sector. For Ukraine the issue of food security is especially relevant due to the crisis in many areas of the economy, the reduction of life expectancy, labor migration, etc. In order to determine how successfully this or that country solves internal and external problems of food security, experts traditionally use the value of the Global Food Security Index (GFSI), which takes into account the main problems of economic availability, physical availability, quality of food, natural resources and stability [22]. The GFSI is a quantitative-qualitative model based on more than 28 indicators that is currently calculated for 113 countries worldwide to identify countries that are most and least vulnerable to food insecurity. It was first proposed for use by the organization "Economist Intelligence Unit" with the support of the agricultural company "Corteva Agriscience". Corresponding country ratings are formed annually and published in reports. Within the framework of the GFSI food security is interpreted as a state in which the population of different countries has various types of access to a sufficient amount of food products (physical, social, economic), which is adequate for a suitable diet for leading healthy and active lifestyle.

The dynamics of the GFSI indicator is shown in the Table 1.

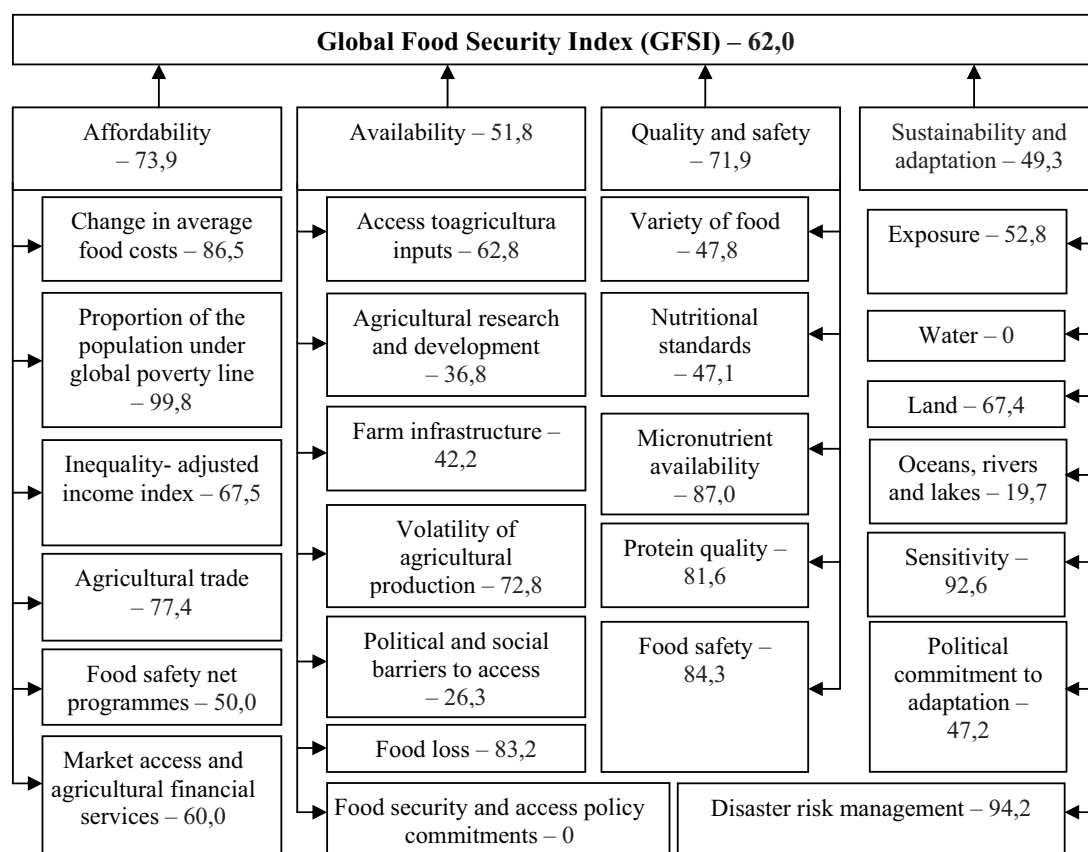
**Table 1. Dynamics of the Ukraine's Global Food Security Index (GFSI) for 2012-2021**

No	Indicators	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1.	Index value	61,3	59,5	51,3	51,6	58,3	53,1	55,7	60,3	58,8	62,0
2.	Place in the rating	44	47	52	59	63	63	63	76	67	58

Source: [22].

Thus, the state of food security in Ukraine has undergone insignificant changes compared to 2012. According to the results of 2021 our country took 58th place among 113 countries of the world according to the GFSI indicator (62 points out of 100). Compared to other European countries Ukraine is at the bottom of the ranking. In general all European countries are characterized by high GFSI values. For example, Ireland, Austria, Great Britain, Finland, Switzerland, and the Netherlands occupy the first six positions in the overall world ranking. The lowest values among all European countries are in Ukraine and Serbia (58th and 60th places, respectively). Compared to 2020 the state of food security in Ukraine has somewhat strengthened: the value of the index has increased by 3,2 points. The method of forming the value of the GFSI indicator for Ukraine for 2021, which is used in calculations by the company "Corteva Agriscience", is presented in fig. 2. Therefore, according to fig. 2 we can state that the formation of the value of the GFSI indicator for Ukraine is influenced by certain indicators, the dynamics of which in 2021 are as follows: affordability – increased by 5,7 units, physical availability – increased by 6,2 units, quality and safety – decreased by 3,5 units, sustainability and adaptation – increased by 0,2 units. All in all, the growth of the GFSI index for Ukraine in 2021 and the improvement of the rating positions is assessed positively. The improvement of the indicator is largely related to the development of agriculture, production and research activity of international agro-industrial companies. Food security and its indicators are of course a priority component of the the agricultural sector sustainable development, which covers interests of future generations.

Investigating this issue Hops N. distinguishes food security indicators separately for a person and a country [23]. At the same time he singles out their social, economic, ecological components and proposes to take into account new ones, in particular rationality of nutrition, safety and compliance with the declared quality of food products; food quality; suitability of conditions for growing safe products, etc. From our point of view, there is no need to identify new indicators of food security, since they are all provided by the method of forming the value of the GFSI indicator, which is used in calculations by the company "Corteva Agriscience" since 2012 for 113 countries of the world, and is made public for the formation of relevant conclusions and comparisons.



**Fig. 2. The method of forming the value of the Global Food Security Index of Ukraine for 2021**

Source: [22].

The problem of food security as one of the factors in the formation of the prerequisites for sustainable development should not be reduced only to growing in the volume of food production, because this increase usually occurs due to the neglect of rational management methods, which harms both nature and people and contradicts the principles of sustainable development. The main obstacle on the way to the transition of agriculture to sustainable development is that its components in many cases compete with each other for scarce resources, in particular, the majority of resources are usually allocated to economic growth with a corresponding decrease for solving social and environmental issues [23]. The use of modern powerful technologies and new means of protection allow to control agricultural production, predict its results, obtain high yields and maintain sustainability.

The food system in the country remains quite vulnerable to economic, climatic and geopolitical factors despite a number of actions aimed at solving the food security problem. Solving the outlined problem will contribute to fulfillment of tasks set before the agro-industrial complex concerning creation of proper living and working conditions for villagers, increase the level of population providing with high-quality staple foods, expand the export orientation, ensure development of agricultural countries throughout the world at the advanced level. An optimal combination of state and market regulators should play a major role in agricultural sector reforming. Development and application of appropriate strategies is considered to be effective for this.

According to: [24] the strategy of economic development of the agro-industrial complex should ensure a planned reproductive process, preservation and protection of the environment, resource potential and people's livelihoods. The strategy for agrarian sector development is a corresponding system of agreed goals and objectives, which are resolved within certain mechanisms. These mechanisms should be based not only on the adopted strategic tasks but should also take into account the proportions, scales and individual characteristics of a specific type of activity. All types of activity without exception where socio-economic, ecological and other processes take place as well as state, branch, regional and local management bodies are the objects of the strategy for the agrarian sector development [25]. The development of such strategy should be based on principles (fundamentals) that illustrate various aspects of functioning of individual regions and take into account the existing processes of management. The "Strategy for the Development of the Agricultural Sector of the Economy for the Period Until 2020" involves the following principles:

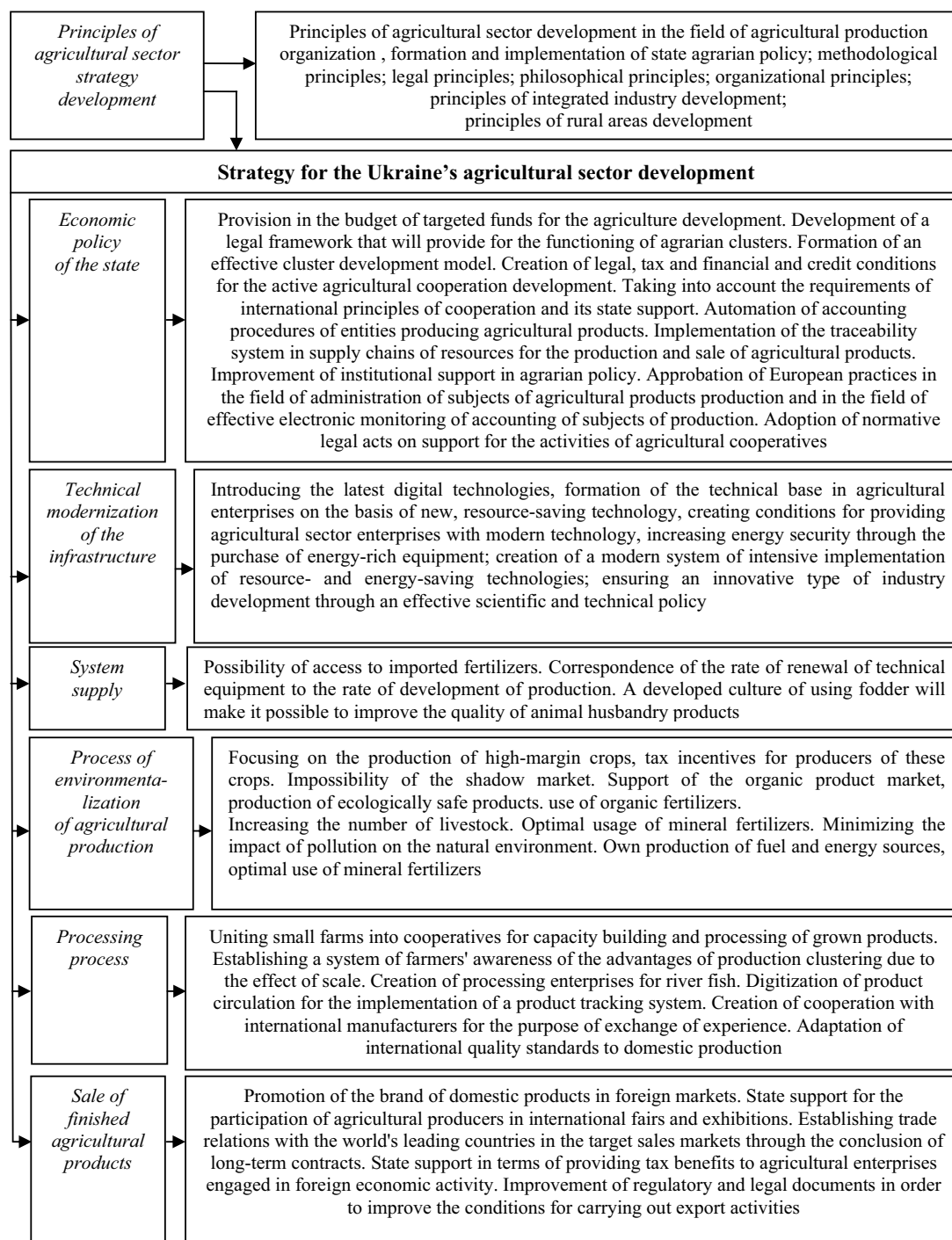
1) principles of agricultural sector development in the field of agricultural production organization (the balance of its development according to economic, social and ecological criteria; creation of conditions to form a responsible user (owner) interested in long-term effective management of the land; development of various forms of management under the condition of prioritizing the formation of farms that have a great socio-economic role for rural communities);

2) principles of agricultural sector development in the sphere of state agrarian policy formation and implementation (the use of strategic management tools for the development of the agrarian sector and operational influence on the market situation; the use of differentiated approaches to create conditions for state support of agricultural producers depending on the criteria of their activity established by law; focus on supporting the development of cooperation using the cluster model; development of self-regulation in the agricultural sector, delegation by the state to sectoral, professional and territorial associations of part of the powers to regulate the agricultural market, including in the part of monitoring the quality and safety of domestic agricultural products; formation agricultural commodity producers have positive long-term expectations; creation of conditions for the introduction of the most productive, resource-intensive and energy-efficient means of production education and technologies; stimulation of agricultural commodity producers to rational agricultural nature management; taking into account the regional conditions of agricultural development) [26].

To our mind the principle of continuity should be attributed to organizational principles, but not methodological principles, as it is defined in the work: [25], because the strategy of the agrarian sector can be a continuous process from an organizational point of view. At the same time the development of the strategy and its implementation take place based on the assumption that the agricultural sector will continue to produce finished products without ceasing its activity.

We propose to supplement the specified groups of principles for the agrarian sector development with the following principles: methodological principles – the principle of representativeness, because when we develop a strategy for the agrarian sector the study of individual indicators from the sample population often makes it possible to reproduce a number of characteristics for the entire studied population; legal principles – the principle of subsidiarity, since the agrarian sector has a branched structure, therefore, only those problematic issues that cannot be solved at a hierarchically lower level should be brought to the higher level of management; philosophical principles – the principle of mentality – the developers of the agricultural sector development strategy have their own mental approach, which is caused by their personal perception and interpretation of the world, their own moral and psychological state, which largely affects the quality of the strategy; organizational principles – the principle of coordination – the organization of interaction at all levels of ensuring the agrarian sector development, coordination and coherence of actions, subordination to a clearly established goal and control by managers of higher levels. The main directions of the agricultural sector strategies development from our point of view are the next (Fig. 3). Nowadays it is extremely important for Ukraine to ensure the effective agricultural sector development.





**Fig. 3. Directions for building a strategy of Ukraine's agricultural sector development**

Source: [2; 25; 26].

It is carried out by various state bodies operating in this field, informal institutions and public organizations to one degree or another. On the whole it requires significant efforts, but the future of Ukraine largely depends on its results.

The developed measures, firstly, should be effective and filled with real ideas, adaptive solutions for improving agrarian policy. The multifacetedness of the agricultural sector as an object of management, the variability of the institutional environment levels should be the basis for the formation of agriculture development strategies. The general concept of the strategy for the Ukraine's agriculture development should be based on the fact that our state is a world leader in the products supply, a leading center for food security ensuring, one of the global centers of ecological and economic system and the basis for social stability ensuring. It can be a single strategy as a complete document or several separate strategies (for the development of the agricultural sector, infrastructure, rural areas, etc.).

Definitely, the Ministry of Agrarian Policy and Food of Ukraine, the Ministry of Infrastructure of Ukraine, the Verkhovna Rada of Ukraine and public organizations should be involved in this process. Consequently, it is necessary for Ukraine to adopt a strategy for the agricultural sector development which can be guided by the positions, depicted in Figure 3.

#### 4. Conclusions

Thus, in order to determine how successfully this or that country solves the internal and external problems of food security experts traditionally use the value of the GFSI. The indicators of it are the main problems of economic availability, physical availability and quality of food, natural resources and sustainability. The GFSI, which is currently calculated for 113 countries, is based on more than 28 indicators. Ukraine took 58th place among 113 countries of the world according to the GFSI indicator (62 points out of 100), the value of the index increased by 3,2 points. Food security and its indicators are a priority component of agricultural sector sustainable development, which involves a balanced consideration of the economic, social, environmental components and covers the interests of future generations.

It is important to form a financial relations strategy in order the agricultural sector and business operating within it could actively develop. It must be implemented as a guarantee of effective transformations of the overall management structure of the industry. Its main tasks should be the following: finding and using adequate mechanisms for directing state financial resources in the right directions; monitoring the financial condition of potential competitors; implementation of effective measures to guarantee the financial stability of the agrarian sector; assessment of its financial potential; development of infection possibilities; search and implementation of long-term financial goals, etc.

Ukraine as primarily an agrarian country is currently in the difficult situation. The main goal of agricultural production is not only providing citizens with high-quality products and guaranteeing the country's food security, but also the desire to increase export volumes in order to enlarge income received from foreign activities. Under such conditions agriculture needs maximum assistance in development as well as adequate financial support at the state and regional levels. The mechanism of it should be declared in the relevant strategies. Their effective implementation will ensure the creation of appropriate conditions for the agricultural sector sustainable development. Achieving of agrarian sphere sustainable development is possible under the conditions of clear commitment of all elements of the economic mechanism.

The desired concept of its development must correspond to the request of modern realities and then it will have practical implementation at the level of individual objects and the industry as a whole. Sustainable management of natural resources in the agricultural sector will make it possible to avoid negative consequences for the environment and will lead to increasing the quality and volume of production in agriculture.

## References

- [1] Concept of the State target program for the development of the agricultural sector of the economy for the period until 2022: order of the Cabinet of Ministers of Ukraine dated December 30, 2015 No. 1437. URL: <https://zakon.rada.gov.ua/laws/show/1437-2015-%D1%80?v=617d3c0773158#Text>
- [2] Vectors of economic development 2030. URL: <https://nes2030.org.ua/#rec246061582>
- [3] Garcia-Fuentes P, Ferreira G, Kennedy P 2013 Economic Performance of U.S. Multinational Agribusinesses: Foreign Direct Investment and Firm Strategy. *Agribusiness*, **29(2)**, 242-255.
- [4] Le Gal P, Dugué P, Faure G, Novak S 2011 How does research address the design of innovative agricultural production systems at the farm level? *Agricultural Systems*, **104(9)**, 714-728. <http://dx.doi.org/10.1016/j.agsy.2011.07.007>
- [5] Bannikova N, Baydakov A, Vaytsekhovskaya S 2015 Identification of Strategic Alternatives in Agribusiness, *Modern Applied Science*, **9**, No. **4**; <https://pdfs.semanticscholar.org/b670/338372f8c23f601e31b76833342c99caf46e.pdf>
- [6] Hazell P 2013 Options for African agriculture in an era of high food and energy prices. *Agricultural Economics* (United Kingdom), **44**, 19-27. <http://dx.doi.org/10.1111/agec.12047>
- [7] Baryshevska I, Poltorak A 2017 Formation of innovative mechanisms for agricultural development. [https://dspace.mnau.edu.ua/jspui/bitstream/123456789/3581/1/Coll\\_mon\\_IER\\_2017\\_print\\_vol\\_3-192-200.pdf](https://dspace.mnau.edu.ua/jspui/bitstream/123456789/3581/1/Coll_mon_IER_2017_print_vol_3-192-200.pdf)
- [8] Alemayehu A, Bewket W 2017 Determinants of smallholder farmers' choice of coping and adaptation strategies to climate change and variability in the central highlands of Ethiopia. *Environmental Development*. **24**, 77-85.
- [9] Kalkan A, Bozkurt Ö 2013 The Choice and Use of Strategic Planning Tools and Techniques in Turkish SMEs According to Attitudes of Executives. *Procedia - Social and Behavioral Sciences*. **99**, 6 November, 1016-1025.
- [10] Njegovan Z, Jeločnik M 2013 Reindustrialization of Serbian agriculture: toward a more balanced and knowledge based rural development. Proceedings of International Scientific Conference, Belgrade. [http://www.iep.bg.ac.rs/images/stories/dokumenti/IAE\\_Thematic\\_Proceedings\\_Topola\\_Serbia\\_2013.pdf](http://www.iep.bg.ac.rs/images/stories/dokumenti/IAE_Thematic_Proceedings_Topola_Serbia_2013.pdf)
- [11] Brenes E, Montoya D, Ciravegna L 2014 Differentiation strategies in emerging markets: The case of Latin American agribusinesses. *Journal of Business Research*, **67(5)**, 847-855. <http://dx.doi.org/10.1016/j.jbusres.2013.07.003>
- [12] Pavelko O, Zaluzhnyi A, Trofimchuk N and Prokopchuk V 2021 Transformation of consumer needs in the context of personality environmental culture formation and innovative development of national economy IOP Conf. Ser. Earth Environ. Sci. 915 012013
- [13] Pavelko O, Antoniuk O, Lazaryshyna I and Los Z 2021 Indicators of effectiveness in the sustainable development field of construction companies: evidence of Ukraine IOP Conf. Ser. Earth Environ. Sci. 915 012026
- [14] Yarmolenko Yu 2015. Sustainable development of the agrarian sector of the economy and its economic support, *Investments: practice and experience*, **22** 110-115.
- [15] Kuznetsova Yu. 2015 Scientific and methodical bases of development of marketing of innovations at agrarian enterprises, *Agricultural and Resource Economics*, **1** 51-62.
- [16] French J, Montiel K, Palmieri V. 2014 Innovation in agriculture: a key process for sustainable development, available at: [http://repositorio.ica.intbitstrea m/11\\_324\\_26\\_07/1/BVE17038694i.pdf](http://repositorio.ica.intbitstrea m/11_324_26_07/1/BVE17038694i.pdf)
- [17] Cherkaska V 2018 Criteria for sustainable development of the agricultural sector. *Investments: practice and experience*, **6** 44-48.
- [18] Ukraine is a global supermarket of ecological products. URL: <https://strategy.uifuture.org/>

- [19] Shchekovych O 2009 Formation of priorities and development of agrarian policy of Ukraine. Kyiv: NSC "Institute of Agrarian Economics», 278.
- [20] Zelenska O 2012 Food security system: essence and hierarchical levels. *Bulletin of ZHTU*, **1 (59)** 108-112.
- [21] Shebanina O 2007 Formation and effective development of the food sub-complex of the agricultural sector: monograph. K.: NNC IAE, 368.
- [22] Global Food Security Index. URL: <https://impact.economist.com/sustainability/project/food-security-index/Country/Details#Ukraine>.
- [23] Khmil N 2014 Food security as a component of sustainable development of agriculture. *Collection of scientific works of the Tavria State Agro-Technological University*, **2(26)** 236-241.
- [24] Nastych V 2013 Food safety as a component of the national security of Ukraine. *Bulletin of the Berdyan University of Management and Business*, **3** 43-48.
- [25] Kostetskyi Y 2017 Strategy of formation and development of the agricultural sector of Ukraine: theory and practice: monograph. Ternopil: TNEU. 356.
- [26] On the approval of the Strategy for the Development of the Agricultural Sector of the Economy for the Period Until 2020: Order of the Cabinet of Ministers of Ukraine dated October 17, 2013 № 806-p. URL: <https://zakon.rada.gov.ua/laws/show/806-2013-%D1%80#Text>.