

Strengthening the Food Security of Uzbekistan through the Development of Agro-Industrial Integration

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Abstract: The article discusses the importance of agro-industrial integration in ensuring food security of the Republic of Uzbekistan and the issues of improving the organizational and economic mechanisms for the development of integration structures in the production and deep processing of agricultural products.

Keywords: agro-industrial integration; food supply; food security; agricultural raw materials; primary and deep processing; value chain; agro-industrial cluster; cluster core; service industries; the science; cooperative; institutional structures.

Introduction

In the world, the importance of deep processing of agricultural products is increasing in order to ensure economic stability and economic growth, as well as to ensure the social development of society. This situation is especially acute in the context of the global crisis caused by the COVID-19 pandemic and other tense situations. According to the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations International Children's Fund (UNICEF), the World Food Program (WFP) and the World Health Organization (WHO), "in 2021 compared to 2015, the number of people suffering from hunger worldwide increased from 8.0 to 9.8%. The number of people affected by hunger due to the COVID-19 pandemic was 103 million during 2019-2020, and increased by 46 million in 2021; almost 3 billion people around the world, in conditions of high dietary costs, poverty and income inequality, cannot consume enough food, and in the future 11.7% of the world's population may face food shortages" [1].

In this context, the importance of food supply and security around the world is growing. The United Nations General Assembly in 2015 has identified food security and sustainable agriculture as one of the 17 global objectives of the 2030 Agenda for Sustainable Development Goals: "Eliminate hunger, ensure food security, improve nutrition and promoting the sustainable development of agriculture" [2]. Therefore, agriculture and food production are becoming the most important issues today. According to the World Bank "agriculture is the largest sector of and the largest employer in Uzbekistan's economy, and has a large role to play in reducing poverty and inequality through job creation" [3].

In strengthening food security and providing the population with food, the development of production and deep industrial processing of agricultural products plays an important role. Despite the fact that during the period of independence, the production of agricultural products per capita in the Republic of Uzbekistan increased significantly, the level of their deep industrial processing remains at a rather low level. In particular, 20 million tons of fruits and vegetables are grown in the republic per year. However, only 15 percent of this volume is processed at the industrial level, of which 7-8 percent is exported. Due to the underdevelopment of infrastructure, the loss of products in the process of collection and storage reaches 30 percent. Further development of the food industry and an increase in exports can be achieved through the rational use of existing opportunities and the expansion of deep processing of products” [4].

Literature review

Throughout the world, priority attention is paid to research on the rational organization of integration ties in cluster production in order to optimize production in the system of deep industrial processing of agricultural products.

The theoretical and methodological foundations for the development of agro-industrial integration and clustering in the field of food supply are reflected in the scientific research of a number of foreign and domestic scientists, such as Porter M.E, Andersson Th., Serger S.Sch., Sörvik J., Hansson E.W., Glotko A.V., Glotko A.V., Korolevich N.G., Bychkov N.A., Zelenovsky A.A., Minakov I.A., Pilipenko I.V., Shchukin M.N., Schukina L.I., Petukhov N.V., Kutsenko E., Artemov S., Yusupov M.S., Soliev A., Kodirov X. and others [5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,16,17].

In the works of these scientists, special attention is paid to such areas of research as the optimal organization of the process of development of agriculture and food production in accordance with the requirements of consumers, improving the rational distribution of the final result among all economic participants in the cluster system, effectively ensuring the economic interest of the participants in the system.

In Uzbekistan, when filling the market with food products, comprehensive measures are being implemented in such areas as the development of the processing industry of agriculture using modern methods, optimization of integration processes through clusters and cooperation relations in the chain of production and consumption of food products, improvement of organizational and economic mechanisms of integration structures. The “Development Strategy of New Uzbekistan for 2022-2026” defines such tasks as the development and allocation of 464.0 thousand hectares of new and unused land to clusters on the basis of an open competition, the implementation of a program for the development of the food industry, increasing the level of food supply to the population and maintaining stable prices for them.

Research Methodology

The theoretical and methodological basis of this study is the scientific work of foreign and domestic scientists who conducted research in the field of development of agro-industrial integration and the cluster approach in the chain of production and deep processing of agricultural products. The study used such methods as abstract analytical observation, normative and positive analysis, comparative and factor analysis.

In preparing the article, materials and statistical data of the Agency for Statistics under the President of the Republic of Uzbekistan, the Ministry of Agriculture, legal acts, developments of research institutions and others were used.

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Analysis and discussion of results

Scientific research confirms that agro-industrial integration is an objective economic process, due to the historical and evolutionary development of productive forces, which is a product of social division and cooperation of labor, concentration of production and specialization (Fig. 1).

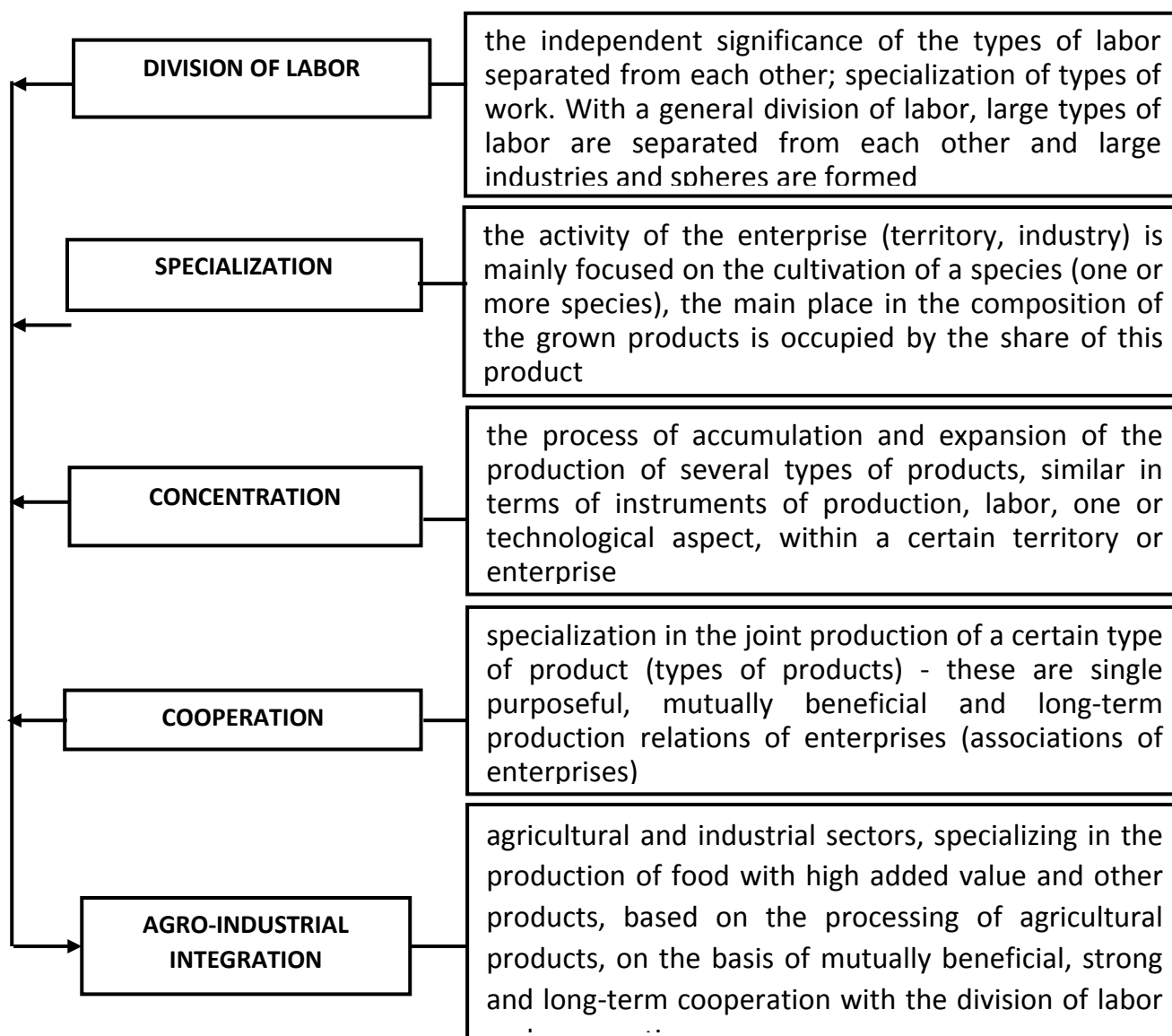


Figure 1. Relationship between the division of labor, cooperation, industrial specialization and concentration with integration

Based on the study, it was found that the deepening of integration processes in the chain of agricultural production and deep processing in an industrial way can have a number of advantages for firms operating in the system and other integrative structures, as well as bring a certain effect (table 1).

At the same time, it is worth paying attention to the fact that this process has certain disadvantages, as well as negative consequences:

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- **as a result of the enlargement of production:** the expansion of the administrative apparatus; strengthening elements of bureaucracy; complication and decrease in the efficiency of managerial decision-making; increase in costs for the organization and management of production; reducing the possibility of effective control at all stages of the technological cycle;

Table 1 Efficiency of integration processes in the chain of production and industrial processing of agricultural products

Тип эффекта	Ожидаемые результаты
Natural geographic effect	<ul style="list-style-type: none"> - the effect of savings on intercompany logistics and transaction costs as a result of the concentration of production in one territory; - increasing the efficiency of production facilities as a result of the sharing of resources, infrastructure and utilities within the territory
Technical and technological effect	<ul style="list-style-type: none"> - average cost reduction as a result of the "scale effect" from the expansion of production volumes; - the effect of the introduction of uniform technical requirements and quality standards in a continuous technological chain of production and systematic control; - savings in operating costs within a single technological chain of production
Labor effect	<ul style="list-style-type: none"> - the effect of the division and specialization of labor; - strengthening cooperation relations between enterprises; - possibility of joint use of highly qualified personnel and exchange of experience
Innovation effect	<ul style="list-style-type: none"> - the possibility of large investments in the modernization and technological equipment of large-scale production; - big opportunities to attract financial resources for scientific research and start-up projects aimed at introducing modern technologies
Economic effect	<ul style="list-style-type: none"> - increasing the possibility of attracting large capital into production from internal and external sources; - formation of guaranteed and reliable supplies of raw materials and a guaranteed market for raw material suppliers; - the possibility of diversifying production; - the possibility of joint protection from market conditions and joint protection from a strong competitive environment; - reduction of losses during transportation and production, introduction of non-production technologies; - savings in administrative and production costs; - the emergence of a synergistic effect within an integral system, etc.

Source: Authors' development based on scientific literature

At the same time, it is worth paying attention to the fact that this process has certain disadvantages, as well as negative consequences:

- **as a result of the enlargement of production:** the expansion of the administrative apparatus; strengthening elements of bureaucracy; complication and decrease in the efficiency of managerial decision-making; increase in costs for the organization and management of production; reducing the possibility of effective control at all stages of the technological cycle;

- as a result of the emergence of monopoly elements: partial restriction of entrepreneurial freedom of selection at the enterprises that supply raw materials in the technological chain and entrepreneurial freedom, as well as industrial and financial independence; the desire of the integrator firm to forcibly transfer its conditions to the suppliers of raw materials; the work of suppliers of raw materials in an unequal environment in relation to the firm-integrator; the possibility for firms-integrators to receive a significant part of the profits, etc. Despite some of the above shortcomings and negative aspects, world experience has confirmed that the benefits and efficiency of integration processes are very high.

According to the authors of this study, “an agrocluster is geographically considered as an integration association of economic entities focused on the production of products with high added value by combining technological processes of production, storage, preliminary and deep processing, sale and production of agricultural products in one (adjacent) territory in single chain.

According to studies, the following factors negatively affect the development of the food industry in the Republic of Uzbekistan, including in the Samarkand region: insufficient number of industrial enterprises specializing in the processing of food products, and their insufficient processing capacity; lack of sources and volume of raw materials for processing; the lack of varieties that meet the standards of the processing industry; deterioration in the quality of raw materials due to the ripening and drying of fruits and vegetables or untimely delivery; lack of stable, strong and long-term complex relations of processing enterprises with suppliers of raw materials, sellers in the domestic and foreign markets, etc.

According to statistics, in 2017-2021, in the Samarkand region, the level of industrial processing of agricultural products relative to the gross harvest decreased from 12.2% to 11.8% (a decrease of 0.4 p.p.), this indicator for the fruits and berries decreased from 25.4% to 16.2% (decrease - 9.2 p.p.), for grapes increased from 7.7% to 13.5% (growth +5.8 p.p.), for vegetables from 2.8% to 5.0% (growth +2.2 p.p.) (Table 2).

Таблица 2 Dynamics of agricultural products processing indicators in Samarkand region in 2016-2021, thousand tons

Product types	2017 y.	2018 y.	2019 y.	2020 y.	2021 y.	2021 y. to 2017 y., in %
Total products:						
Processing volume	527,7	507,4	523,9	512,8	490,1	92,9
Processing level, in %	12,2	13,0	12,9	12,5	11,8	– 0,4 p.p.
Fruits and berries						
- processing volume	105,7	88,9	89,4	65,9	55,9	52,9
- processing level, in %	25,4	26,6	26,7	19,4	16,2	– 9,2 p.p.
Grape						
- processing volume	47,6	56,4	61,2	69,2	75,1	157,8
- processing level, in %	7,7	9,4	10,8	12,4	13,5	+ 5,8 p.p.
Vegetables						
- processing volume	50,4	70,9	72,9	79,9	81,4	161,5
- processing level, in %	2,8	4,9	4,6	4,9	5,0	+ 2,2 p.p.

Source: Compiled based on data from the Main Department of Economic Development and Poverty Reduction of the Samarkand region of the Republic of Uzbekistan

Such circumstances have a serious impact on the economic efficiency of food industry enterprises (table 3).

Table 3 Dynamics of changes in the use of fixed assets and indicators of economic efficiency in the food industry in the Republic of Uzbekistan

Indicators	2017 y.	2018 y.	2019 y.	2020 y.	2021 y.	2021 y. to 2017 y., in %
1. From fixed assets related to core activities:						
- depreciation rate, in %	41,6	39,0	36,6	34,3	28,3	-12,9 p.p.
- renewal rate, in %	20,6	26,7	24,8	24,4	17,1	- 1,3 p.p.
- disposal rate, in %	7,3	7,0	4,1	7,5	1,6	- 3,7 p.p.
2. Return on fixed assets, UZS/UZS	5,97	5,24	3,73	3,74	3,26	54,6
3. Capital intensity, UZS / UZS	0,17	0,19	0,27	0,27	0,31	182,3

Source: Compiled on the basis of data of the State Statistics Committee of the Republic of Uzbekistan

In particular, for 2016-2021, the return on fixed assets in the food industry decreased by 45.4%, respectively, and the capital intensity increased by 82.3%.

Using a SWOT analysis, the advantages and weaknesses, opportunities and existing risks of clusters for the processing of agricultural products were identified and summarized in a single system (Table 4).

Table 4 SWOT analysis of clusters specializing in the production and industrial processing of fruits and vegetables

STRENGTH	WEAKNESS
<ul style="list-style-type: none"> - the effect of deep specialization, division of labor and cooperation; - increase in added value in the chain of production of the final product; - "scale effect" of production; - guaranteed supply of raw materials for processing and a guaranteed sales market for the supplier of raw materials; - reduction of losses in the production chain and the possibility of using waste-free technologies; - introduction of unified technical requirements and quality standards into production; - introduction of innovative technologies through the integration of production, science and education; - joint use of the resource potential of the region and infrastructure 	<ul style="list-style-type: none"> - expansion of the administrative apparatus, increase in expenses, strengthening of elements of the bureaucracy; - reducing the possibilities of effective management of the technological cycle; - compulsory membership in the cluster, impossibility of free choice; - forced connection of farms in one area to one cluster; - the monopoly position of the cluster in the territory and the reduction of the competitive environment; - partial restriction of freedom of choice and entrepreneurship of farms of cluster members; - forced transfer of raw materials by suppliers to clusters on their terms; - the possibility of mastering a significant part of the profits by the cluster
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - availability of reserves and opportunities for the development of clusters in the country that have not yet been launched; - guarantees and benefits provided by the state to 	<ul style="list-style-type: none"> - a sharp increase in the competitive environment in the food markets when joining international trade structures; - low knowledge and skills in the field of food

clusters; - increase in the volume of attracting centralized public and private investments in the food industry; - the increased desire of firms specializing in the production and processing of one type of product, in a strong competitive environment, to cooperate on the basis of mutual integration	quality standards, technical, sanitary and hygienic and other requirements; - unreasonable interference of authorities in the activities of clusters; - insecurity of guarantees of inviolability of property and freedom of enterprise - lack of employment, elements of corruption, etc.
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Source: Authors' development based on scientific literature

When developing short-term and long-term development strategies, it is important to analyze the external and internal environment surrounding of the cluster.

According to the authors, the use of PEST analysis in the analysis of the macro environment, which affects the development of the cluster, can give a good result. PEST-analysis allows you to study the macro-environment that affects the cluster, according to the main 4 approaches and make appropriate decisions: political (Political), economic (Economic), social (Social) and technological (Technology). They are exogenous (external) factors, and have a strong influence on the results of the cluster, but the cluster cannot influence these factors.

It is recommended to determine the feasibility and significance of new projects being formed in order to create a cluster based on the SMART technique (Fig. 2).

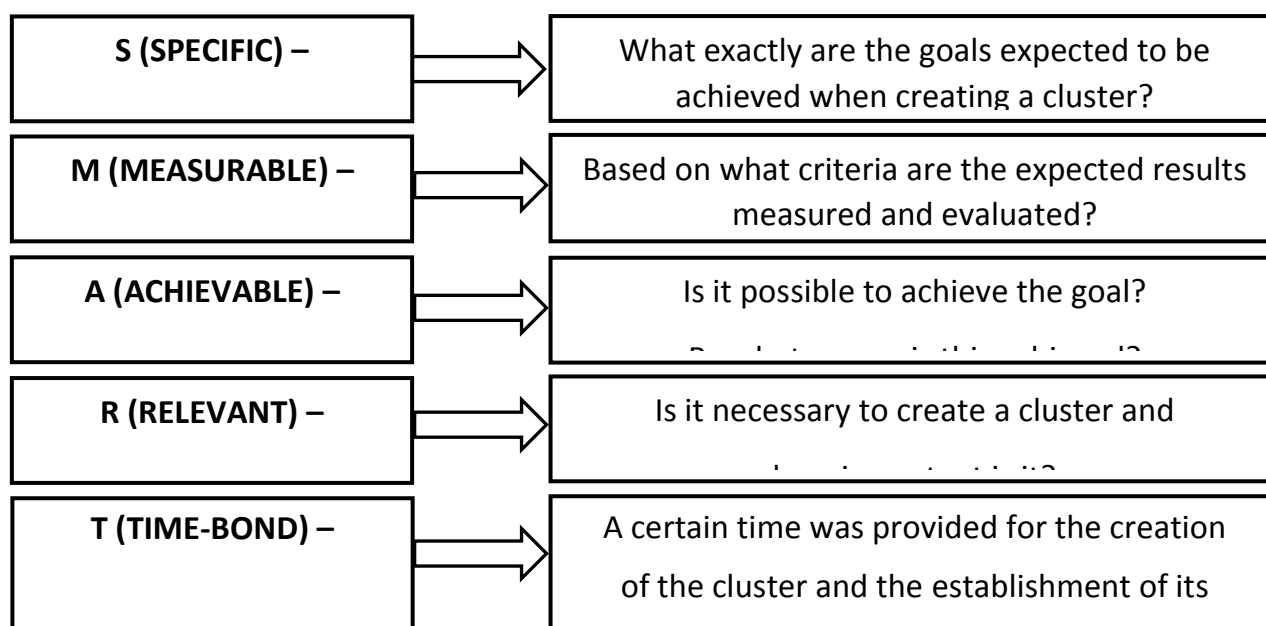


Figure 2. SMART technique for evaluating the feasibility of a cluster project

The importance of SMART-techniques lies in the fact that they determine the feasibility of implementing a cluster project in the socio-economic aspect and significance for solving specific problems.

As world experience shows, the methodology of cluster formation is important for their successful functioning. In particular, when forming clusters, it is important to correctly form their organizational and functional structure.

In addition, in order to organize effective management of the cluster activity, it is recommended:

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1. Adoption of the Law "On the cluster", with the possibility of forming a cluster in it, as a legal entity with a separate authorized capital, clearly define in the law the legal basis for the functioning of the cluster, the procedure for its management and administrative activities, the conditions for regulating interaction between enterprises that are part of the cluster system.
2. If the cluster is formed on a contractual basis, in the form of cooperation between farms and processing enterprises (enterprises) that are legally independent, as well as service providers, the structural and managerial structure of such a cluster can be organized in two ways:
 1. All farms in the cluster system (farmers and dekhkan farms producing raw materials) and enterprises (processing, storage and sales lines) retain their legal independence and are organized under contracts around a firm (for example, a processing enterprise) that is the core of the cluster. In this case, in order to coordinate economic relations between enterprises and service companies that are part of the cluster, a Supervisory Board is formed, consisting of all participants and representatives of institutional structures (farmers, dekhkan farms, the Council of dekhkan, farm entities and owners of household Plots, the Chamber of Commerce and Industry, local authorities, the Cluster Association and others).

It is necessary to assign the following tasks to the supervisory board: to monitor the implementation of mutually beneficial and equal contractual relations of all enterprises and farms in the cluster system; prevent discrimination of the rights of other persons, by using the monopoly position of one of the parties; ensure that the interests of all parties are taken into account when setting prices for raw materials, works and services; prevent mutual non-payments, etc.

In this case, it is advisable to re-introduce the mechanism for allocating preferential loans directly to farms, which is allocated by the state support fund for agriculture under the Ministry of Finance to finance the costs of growing raw cotton, grain and other agricultural products. This leads to the possibility of timely and targeted financing of production costs by farms, on the one hand, while effective control over the targeted use of allocated concessional loans is facilitated, on the other..

2. In the second case, several independent participants in the status of a legal entity form a cluster in the form of a limited liability company (LLC), and contribute their share to the authorized capital of the cluster. In the cluster, a board of directors is created to make decisions based on the contributed share of participants in the authorized capital, and decision-making is carried out on the basis of proportional voting on the contributed shares.

If, the authorized capital of the cluster includes a share of its participants and they have the right to do so, which allows creating the possibility of taking into account the interests of all participants in the cluster system. The firm with the largest share in the authorized capital of the cluster becomes the chairman of the board of directors (Fig. 3).

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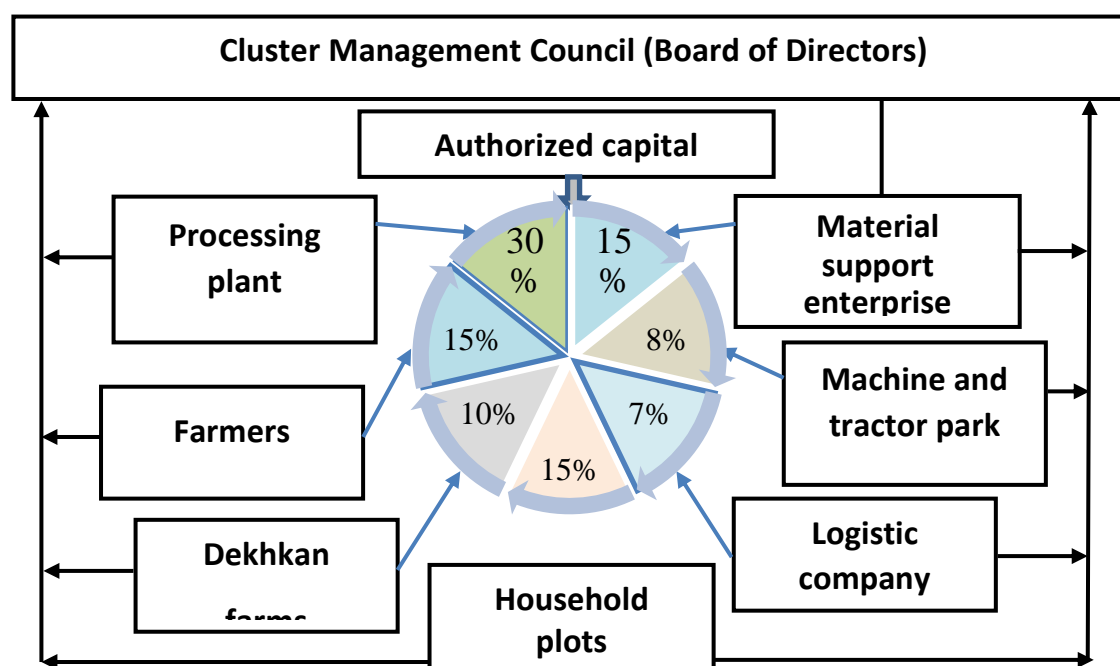


Figure 3. Shared Cluster Management Structure in the authorized capital (in conditional figures)

Source: Authors' development based on scientific literature

This prevents the interests of the processing enterprise (the core of the cluster) from exceeding the interests of other participants, especially the forced acceptance of conditions that are detrimental to the interests of farms, and creates the basis for the correct distribution of profits in the value chain.

Conclusions and suggestion

As part of the research work, the following conclusions were drawn:

1. The global crisis caused by the pandemic requires a completely new approach to food security. In particular, the importance of developing the value chain is growing due to the deepening of integration processes in the system of deep processing of agricultural products.
2. According to research, a number of factors have a strong influence on the formation and development of agro-industrial integration. They can be classified according to economic, socio-political, organizational-legal and technical and technological characteristics, they are divided into external (exogenous) and internal (endogenous) factors, the impact of these factors on production efficiency is assessed from physical-geographical, technical-technological, labor, innovative, informational and economic aspects.
3. According to studies, the development of the food industry is negatively affected by the following factors: an insufficient amount of industrial enterprises specializing in the processing of food products, and their insufficient processing capacity; lack of sources and volume of raw materials for processing; lack of varieties that meet the standards of the processing industry, deterioration in the quality of raw materials due to the ripening and drying of fruits and vegetables or untimely delivery; lack of stable, strong and long-term complex relations of processing enterprises with suppliers of raw materials, sellers in the domestic and foreign markets, etc.

Such circumstances have a serious impact on the economic efficiency of food industry enterprises.

4. Analysis of the external and internal environment surrounding the cluster is important in the development of short-term and long-term development strategies. To do this, we can use the methods of GANTT, PEST, SMART and SWOT analysis to justify the feasibility, importance of cluster formation, its advantages, weaknesses, as well as opportunities and risks.

According to the authors, the use of PEST analysis in the analysis of the macro environment, which affects the development of the cluster, can give a good result. It is recommended to determine the feasibility and significance of new projects being formed in order to create a cluster based on SMART technology.

5. When forming clusters, an important role is played by the correct formation of their organizational and functional structure. There is a growing need for harmonization and ensuring the continuity of technological processes of production between the entities that are part of the cluster.
6. It is advisable to expand the scope of scientific research in such areas as improving the methodology for assessing the main indicators of efficiency and territorial development of the cluster system, organizing continuous production in accordance with the specifics of food products, optimally organizing the full cycle of production of an agro-industrial cluster based on mutual benefit, increasing the level of forecasting accuracy volume of industrial production.

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