

# Priority Directions of Using Cluster in Food Production

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**Abstract:** The scientific-theoretical basis of using clusters in the production of food products is explained in the article, the indicators of regional cluster development are methodologically justified, the results are calculated and the results achieved through cluster development are shown.

**Keywords:** cluster, food industry, agriculture, processing of agricultural products, added value, stages of added value creation, territorial clusters.

## 1. INTRODUCTION

In recent years, the importance of creating a favorable agribusiness environment in the food production and processing chain and the production of high added value products has been increasing. As stated in the "2020-2030 Strategy for the Development of Agriculture of the Republic of Uzbekistan" approved by the Decree of the President of the Republic of Uzbekistan No. PF-5853 of October 23, 2019, "the development of the added value chain is an important factor in ensuring the competitiveness of agriculture. Inadequate development of integrated relations in the chain of delivery of products from the field to the final consumer, that is, collection, transportation, storage, processing, packaging and certification, limits the possibility of increasing the volume of production of products with high added value. [1]

In this regard, in our republic, special attention is being paid to the formation of "clusters" aimed at ensuring deep cooperation of farms with processing industry enterprises. As the President of the Republic of Uzbekistan Sh.M. Mirziyoev noted, "cluster and interests are the future of Uzbekistan's agriculture. Without the introduction of science and innovation, this industry cannot be made competitive".[2]

## 2. LITERATURE REVIEW

The versatility of the "cluster" theory has led to the formation of various scientific approaches to it. The first cornerstone of research in this regard can be seen in A. Smith's work "On the nature and causes of the wealth of nations" published in 1776. According to A. Smith, specialization together with the division of labor is recognized as one of the main factors of increasing labor productivity. [3]

In the further development of the "cluster" theory, Alfred Marshall's work entitled "Principles of Economic Science" (1890), published at the end of the 19th century, should be highlighted. According to him, a cluster is a combination of specialized industry sectors in separate areas. Territorial integration of entities operating in unison is manifested in the following: availability of qualified labor resources; development of supplier and service industries; specialization of different companies in different stages of the production process.

Economist A. Marshall was one of the first to pay attention to the fact that the concentration of enterprises ensures high labor productivity ("Concept of industrial districts", 1890). In his works, he investigated the reasons for the low productivity of small and medium-sized enterprises compared to large vertically-integrated factories that make good use of "economies of scale". A. Marshall said that in some industries, groups of small and medium-sized enterprises are concentrated in one region of the country and specialize in a certain stage of the general production process, they can operate as efficiently as large enterprises. Marshall called them "industrial zones". [4]

Although the development of industrial complexes (clusters) in European civilization coincides with the period of the rise of capitalism, the term "cluster" began to be widely used in the economic literature at the end of the 20th century. The initial foundations of this concept can be found in the works of I. Tunen, who studied the enterprise and its geographical location in the economic space, taking into account the factors affecting the sources of raw materials and sales markets at the beginning of the 20th century.[5]

The cluster approach was also studied by E. Dahmen in order to determine the interactions of large Swedish multinational corporations. According to E. Dahmen, clusters are formed in "blocks of development" and the basis for the development of competitive success is the existence of a connection between the ability of one sector to develop and the development of another sector.[6]

After the 1980s, 3 American, British and Scandinavian scientific schools were formed in the development of "Cluster Theory". M. Porter's "Theory of Industrial Clusters", M. Enright's "Theory of Regional Clusters" proposed by M. Enright and developed by S. Rosenfeld, P. Maskell and M. Lorentsen, M. Storper's "Ideal Regional Cluster Concept" can be included in the American school. [7]

British School A. Marshall's "Theory of Industrial Regions", Dj. Dunning's "Eclectic OLI-paradigm" reflecting new forms of territorial organization of production, DJ. Humphrey and H. Schmitts' "Concept of the value added chain and cluster interrelationship" and K. It is expressed through Freeman's "Technological-economic paradigms".

"Theory of national system of innovation and the economy of education" by the Danish scientists B. O. Lundvall and B. Jonson, "Theory of the regional system of innovation" by the Norwegian researchers B. Ascheim and A. Isaksen, and "Regional growth" by A. Anderson and Dj. Mantsinen were added to the Scandinavian school. belongs to the innovative model. [8]

The term "cluster" was introduced into the scientific process as an economic category in the 80s of the 20th century by Michael Porter. He is the founder of the idea of applying the cluster theory to the development of competitiveness of countries and regions. According to Michael Porter, "a cluster is a group of interrelated companies (manufacturers, suppliers of raw materials, service providers) and organizations related to their activities (scientific research institutions, technology parks, network associations) gathered in one place from a geographical point of view, and is the only network of closely connected networks. are integrated structures that make up the technological chain. At the same time, they operate in mutual cooperation, and to a certain extent they are considered competitors.[9]

The study of the "cluster" theory is rapidly gaining popularity in the world community, and its practical application is becoming the main direction of national and regional economic development. In recent years, the scope of research in this field has expanded and become richer in content. In particular, the Enterprise Directorate General of the European Commission defines the term cluster as follows: "cluster means a group of independent companies and related organizations, which: first, compete and cooperate; secondly, geographically concentrated in one/several areas; thirdly, specialized in a specific field of activity and associated with unique skills and technologies; fourth, it has an institutional structure (there is a governing body) or it does not have one.[10]

According to M. Yusupov, "a cluster means a unified structure of farms, processing industry enterprises, storage, logistics and sales infrastructures operating in a technological system of growing, processing, storage and sale of food products" [11 ]

In 2003, "The Cluster Initiative Greenbook" was published by scientists from the Stockholm School of Economics (O. Solvell, G. Lindqvist) and Harvard Business School (K. Ketels) under the editorship of Michael Porter [12] and in it worldwide 250 programs related to clusters were analyzed, and the "Cluster Initiative Performance Model" was proposed, which allows to evaluate the effectiveness of their activities. In 2004, scientists from Lund University in Sweden prepared "The Cluster Policies Whitebook" [13], which revealed the main elements, importance and characteristics of the concept of cluster-based economic development, as well as theoretical and practical approaches to this issue.

### **3. METHODOLOGY**

In the proposed organizational-functional model of a cluster specializing in food production and industrial processing of raw materials, the chain of added value will consist of 4 stages.

In the first stage, agricultural products (raw materials) are grown on the farms, peasants and homesteads, as well as on the plots of land attached to the cluster itself. Farms producing agricultural products (raw materials) have a contractual relationship with an integrator firm (usually a processing industry enterprise) which is the core of the cluster through horizontal or vertical integration.

The second stage is considered the core of the cluster, and at this stage, the raw materials supplied by the producers of agricultural goods on the basis of contracts undergo initial and deep processing by the industrial enterprise. At this stage, the supplied raw materials are transformed into finished products, and the added value increases.

In the third stage, the goods processed by the industrial enterprise and transformed into finished products go through the processes of standardization and certification, sorting, calibration, packaging, marking and delivery to sales channels, and the amount of added value increases again.

At the fourth stage, the finished product is sold in domestic and foreign markets and delivered to the final consumer. At this stage too, a certain value is added to the product, and all this constitutes a value chain.

It is necessary to develop the criteria of indicators and the methodology of their determination for the analysis and economic evaluation of cluster activity efficiency. It is known that textbooks and scientific literature contain hundreds

of criteria used to evaluate the economic efficiency of enterprises. Naturally, it is impossible to use all of them. In addition, it is permissible to select from among them indicators suitable for evaluating the efficiency of clusters. Considering that clusters are a new structure for the economy of our country, we think it is permissible to form a system of performance indicators based on their specific characteristics.

In our opinion, the following system of criteria and indicators, categorized into 5 groups, allows for a reliable assessment of the effectiveness and economic efficiency of the clusters with a comprehensive approach (Table 1).

Table 1: A system of indicators evaluating the efficiency of cluster activity in the region

Indicator name	Economic content and calculation procedure
Indicators assessing the potential of the region and cluster:	
1. The degree of cluster coverage of the territory;	
2. Production and resource potential of the cluster	
3. Indicators evaluating the economic efficiency of cluster activity	
4. Indicators representing the level and efficiency of the use of fixed assets (capital).	

The method of calculation of the recommended system of indicators for the assessment of the degree of coverage of the region by the cluster, the production and resource potential, economic efficiency and financial stability of the cluster allows to analyze and plan the activities of the clusters.

#### 4. ANALYSIS AND RESULTS

We define each group of the recommended system of criteria and indicators categorized above as X1, X2, X3, X4 and X5. Each of them included a number of indicator systems. Including X1 6, X2 6, X3 11, X4 8, and X5 11 indicators. When regional food production clusters meet all these criteria and indicators, efficiency is 100%. That is

$$K_c = X_1 + X_2 + X_3 + X_4 + X_5 \text{ — } 100\% \text{ or max}$$

Clusters specializing in food production achieve 100% efficiency when meeting all of the above criteria and indicators. Or we can give it another way. Each of these has a certain weight coefficient in the efficiency of the activity of clusters specialized in the production of food products. Based on this, we created weighting coefficients that arise when clusters specializing in food production meet the indicators.

- X<sub>1</sub>) 42-100%  
6- X<sub>1</sub>  
X<sub>1</sub> = 14,3%
- X<sub>2</sub>) 42-100%  
6- X<sub>2</sub>  
X<sub>2</sub> = 14,3%
- X<sub>3</sub>) 42-100%  
11- X<sub>3</sub>  
X<sub>3</sub> = 26,2%
- X<sub>4</sub>) 42-100%  
8- X<sub>4</sub>  
X<sub>4</sub> = 19%
- X<sub>5</sub>) 42-100%  
11- X<sub>5</sub>  
X<sub>5</sub> = 26,2%

The obtained results can be expressed as follows.

$$K_c = 0,143 + 0,143 + 0,262 + 0,19 + 0,262 \text{ — } 100\% \text{ or max}$$

Based on this, we created 4 different efficiency coefficients for fruit and vegetable growing clusters. That is, if the color coefficients are in the range of 1-25%, the efficiency is low, if it is in the range of 26-50%, the efficiency is medium, if it is in the range of 51-75%, the efficiency is good, if it is in the range of 76-100%, we can say that the efficiency is excellent.

#### 5. CONCLUSIONS

In conclusion, it can be said that the above-mentioned opinions, suggestions and recommendations serve to further

improve the cluster system in the development of food production processes in the context of economic diversification.

In general, a number of positive results are achieved by forming clusters in the technological chain of food production processes, including:

- clusters act as a driver in the development of the agro-industrial complex. They enable companies to form a competitive advantage in the market by creating products with high added value;
- clusters have great potential as one of the leading mechanisms in the implementation of the "Industry 4.0" concept. They accelerate technological processes and ensure digital transformation of business. The cluster environment helps to ensure intensive inter-industry relations in the areas of knowledge exchange, personnel qualification improvement, provision of resources;
- the concentration of production within the cluster creates a synergistic effect that stimulates the sustainable development and competitiveness of regions;
- since all processes of product production in the cluster are combined into a single technological chain, long-term strong and stable business relations are formed between companies;
- clusters provide an opportunity to effectively use knowledge, skills and experiences that have been formed over the centuries and have been passed down from generation to generation in the field of cultivation and processing of agricultural products;
- division of labor, regional and inter-farm specialization, and labor cooperation are strongly developed in agroclusters, which makes it possible to increase production efficiency;
- the manufacturer of the final product in the agrocluster is interested in controlling the quality of raw materials and all stages of production, which serves to increase the competitiveness of the product.
- deepening of the integration of science, education and production within agroclusters, implementation of new innovations will accelerate, etc.

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