

Organizational Potential of the Cluster Structure in Grain Farming



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Abstract: *The purpose of the study is to develop theoretical and practical recommendations for assessing the realization of organizational potential of the cluster structure in grain farming. Grain farming can successfully function only if there is an efficient organizational and economic mechanism for the interaction among all parties to the market relations, including the state.*

Keywords: *grain market, organizational potential of the market, cluster, grain farming, organizational and economic mechanism, cluster structure, interdisciplinarity.*

I. INTRODUCTION

The grain market has some organizational potential – the bigger it is, the more efficient the interaction among its parties is, and the lower the transaction costs of finding counterparties in the operating environment are. The presence, maintenance, and promotion of conditions for its expansion imply a steady growth in the demand for grain and its products, as well as their supply to satisfy the effective demand for them at any given time. In structural view, the organizational potential of the grain market consists of two components: 1) organizational; and 2) instrumental. The first structural part provides for the potential possibility of building a system of intra- and interdisciplinarity interaction in the market within the existing legal framework, fully meeting the economic interests of the parties involved. The second part is the availability of hardware capabilities for the money and material flows in accordance with the current legislation.

The availability of the organizational potential of the country's grain market and the completeness of its implementation determine the performance of all its participants, specifying the place of each of them in the system of sale or production-consumption relations.

II. METHODS

A. General description

A set of methods applied in economics was used in the study.

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This improved the reliability of the results obtained and the validity of the conclusions and proposals for improving the organizational and economic mechanism of interactions among the participants of the cluster structure in the regulated market. The applied methods include analysis and synthesis, methods of scientific abstractions, induction, deduction, logical, and computation constructive methods. Their use allowed to systematically assess the organizational potential of various forms of joint cooperation between agricultural organizations and grain processing enterprises, as well as to offer a basis for pricing an intermediate product. Its structural content, which implies the most efficient use of production and economic resources of the participants, provides for the following:

- sufficient organizational potential of producers of grain and its products (inter alia, those assuming compliance with the organizational and resource components);
- possibilities of delivering the commodity weight to consumers without quality loss, as well as the rights to own it;
- measures of organizational maintenance of demand for products.

B. Algorithm

Each of the listed subsystems of the market organizational potential has its own elemental base, affecting the economic, organizational, and managerial, including motivational and legal, aspects of the market development.

The economic category "market organizational potential" is universal, and the method used for its analysis can be applied to any type (or homogeneous group) of goods with the authors' additions.

The authors believe that the comprehensive integral indicator of the market organizational potential use can be found using the following formula (1):

$$PT_o = \sqrt[n]{\prod_{j=1}^n pt_i} \quad (1)$$

where PT_o is the comprehensive integral indicator of the market organizational potential use, %;

pt_i is the partial integral indicator of the organizational potential use by manufacturers, organizational support and organizational support for demand; and

i is the subsystem of the organizational potential of the market. Each of the partial indicators of the market organizational potential use is calculated in a similar way, where the normalized values of indicators are used as the product components and calculated as the ratio of the actual values of the j -th indicator to its reference value determined according to the flow process chart of cultivation (production) and the recommendations of industry unions on the management standards (2).

$$pt_i = \sqrt[n]{\prod_{j=1}^n \frac{z_{ij}^f}{z_{ij}^{norm}}} \quad (2)$$

where z_{ji}^f is the actual value of the j-th indicator relating to the i-th subsystem of the market organizational potential; and

z_{ji}^{norm} is the standard value of the j-th indicator relating to the i-th subsystem of the market organizational potential [1].

The organizational subsystems should be assessed using the following indicators:

- 1) organizational potential of manufacturers:
 - proportion of the active part of fixed assets in the structure of their total value;
 - ratio of validity of fixed assets;
 - average annual load on the production capacities (share of grain area in the structure of agricultural land or arable land); and

- number of machine operators;
- 2) organizational support, which should be assessed using the values of the following indicators:
 - ratio of the average actual and standard values of the transport leg; and
 - compliance with the total capacity of vehicles that may be involved in the transport of products with the volume of commodity weight intended for sale [2];
- 3) organizational support for demand:
 - satisfaction of the maximum value of the medically recommended value of the product consumption (in this case, bread and bakery products in grain terms); and
 - ratio of the average monthly income of residents of the territory to the size of the subsistence minimum.

C. Flow chart

Market organizational potential as a chart is presented in Figure 1.

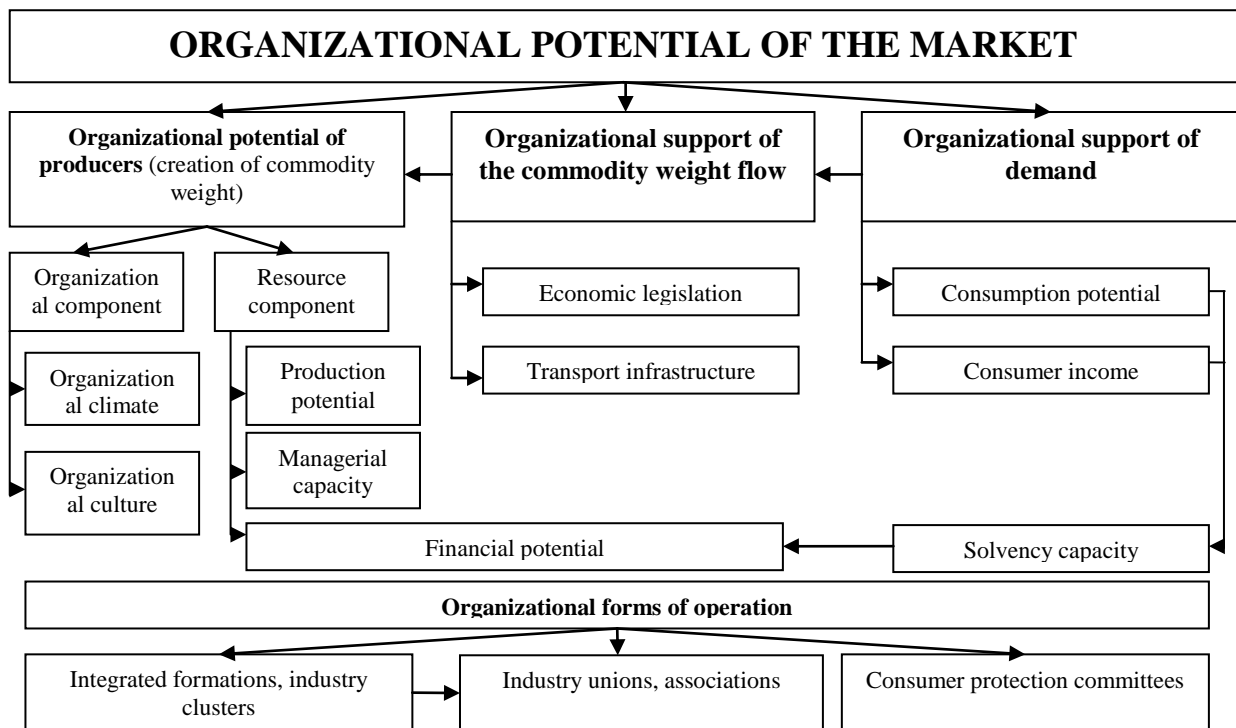


Fig. 1: Chart of the market organizational potential.

III. RESULTS

A detailed analysis of the cluster form of the

grain-producing territory organization was carried out on the territory of the Tambov region (Table 1).

Table 1. Use of the organizational potential of the grain market in the Tambov region for 2014 – 2016, %

Components of the market organizational potential	Potential use, %		
	high	average	low
2014			
Industrial:	74.8	-	-
- potential of producers	78.4	-	-
- management potential	-	73.1	-
- financial potential	83.2	-	-
Organizational support	96.4	-	-
Organizational potential of demand	-	71.3	-

Generalized organizational potential assessment	76.7	-	-
Reserve of the potential growth, %	23.3	-	-
2015			
Industrial:	77.4	-	-
- potential of producers	86.1	-	-
- management potential	-	71.2	-
- financial potential	86.4	-	-
Organizational support	97.5	-	-
Organizational potential of demand	83.3	-	-
Generalized organizational potential assessment	82.0	-	-
Reserve of the potential growth, %	18.0	-	-
2016			
Industrial:	77.7	-	-
- potential of producers	84.7	-	-
- management potential	-	69.3	-
- financial potential	91.3	-	-
Organizational support	97.5	-	-
Organizational potential of demand	85.6	-	-
Generalized organizational potential assessment	82.8	-	-
Reserve of the potential growth, %	17.2	-	-

The "bottleneck" in the implementation of the grain market organizational potential is its managerial component, which had an average level of implementation in 2014 – 2016. This served as the basis for seeking such a form of interaction with the external environment that would allow for close intersectoral contacts on a mutually beneficial basis within the region, on the one hand, indicate a single vector of the balanced development of the grain industry in general, on the other hand, and also open access to the latest developments and achievements in the agricultural and industrial sectors. The use of a cluster form of the grain farming organization will ensure the following:

- availability of information, infrastructure and resources;
- balance of capacities of all grain farming links;
- rationality of creating a production management system, sale of grain, and procurement of resources;
- focus of the internal structure of the grain farming organization on addressing the strategic development objectives;
- rates of implementation of the scientific and technological progress advances in mass production; and
- forms of organization of cooperation within the region's grain farming framework.

Besides, it should optimize ways to achieve the development goals of the subjects in this area by the criterion of minimizing their costs and possible losses from force majeure circumstances that humans cannot control.

Economically feasible long-term development of two areas of the grain farming transformation is based on the following:

- transformation of part of the environment into the internal space, which falls under the full influence of managerial levers, and discovering of unused cash reserves; and
- use of the internal impulse to increase the production potential by obtaining additional effects from the use of innovative solutions, including in the field of technology for growing agricultural raw materials, its storage, processing and transportation.

This determines the application of the sectoral and cluster approaches to business organization in the field of grain

farming (Table 2).

Table 2. Characteristics of the sectoral and cluster approaches to business organization

Comparison parameters	Characteristic of approach	
	cluster	sectoral
Principle of formation	Integration by vertical and horizontal types	
Economic growth potential	Synergistic and multiplier effects	Effect of the production intensification
Activation of innovative potential	High	Low
Points of increasing competitiveness	Reduced transportation and transaction costs	
Location	Concentrated	Distributed
Investment attractiveness	High, determined by the complexity of the investment resources use	High, determined by the capabilities of the investment object
Level of communication	Long-term relationship	
Type of business relationship	contractual	Contractual and property
Sustainability of the regional system	High	Average

From the organizational point of view, unlike the integrated forms of the final product of the grain product subcomplex of the region, clustering extends the interdisciplinarity chain – from the idea of creating innovation to the sale of the final product. These forms of business organization are not antagonists and may well complement each other in achieving the goals. The practice of the cluster structure operation in various areas of the economies abroad has proven high efficiency of these territorial formation.

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The advantages and disadvantages of clusters are presented in Table 3.

Table 3. Advantages and disadvantages of the cluster structures

Advantages of the cluster form of interdisciplinarity organization	Disadvantages of the cluster form of interdisciplinarity organization
Manifestation of positive effects: – scale; – coverage; and – synergy	Growth of the labor demand elasticity
Combination of horizontal and vertical types of interaction based on cooperation	Vulnerability due to the narrow specialization of participants
High speed of introduction of innovative resources, technologies, and products	Effect of isolation
Minimizing the negative trigger effect (losses from the change for the development of an innovative product or technology)	Reducing the strength of competitive pressures from the subjects of the environment
Preservation of legal and economic independence	Self-sufficiency syndrome

Three innovation clusters created in the agro-industrial sector were operating in the Russian Federation as of January 1, 2016, with direct state support from the federal budget (Belgorod and Tyumen regions and the Republic of Mari El) [1].

Grain farming can successfully function only if there is an efficient organizational and economic mechanism for the interaction among all parties to the market relations, including the state. It is a set of tools designed to influence the motivation or deterrence of the behavior of economic entities in the market environment in order to maximize the overall effect of the activities that implement the flow of production and economic processes within the framework of established institutions (norms and rules) and the adopted state economic policy (financial, economic, and social). First of all, the organizational and economic mechanism for the grain market development should encourage all the participants in the grain product value chain to make the fullest use of the existing resource potential and increment it using an innovative approach to the formation of new or modernization of the existing capacities in grain production and the infrastructure of its storage, transportation, and processing. This will facilitate the search for the most rational interdisciplinarity organization (inter alia, taking the spatial distribution of business partners and the formation of the resource zone into account) in order to maximize the economic results of the stakeholders. As an organizer and participant of this process, the state should regulate proportionality in the ratio of their capabilities [3].

Due to this, two complementary and interpenetrating organizational and economic mechanisms should be created: an external one (with state participation) and an intracenter one. The former should be aimed at creating conditions for the full resource provision of agrarian producers, while the latter should be aimed at its most complete use by them.

The polycentric clustering of the specialized business in the region is the most acceptable way to improve the territorial organization of the country's grain farming.

The grain macrocluster of the country will successfully function only when some economic conditions are being formed at the micro level of management:

- equal profitability of sales channels for grain producers;
- possibility of implementing the practice of interchanging the agricultural raw materials for access to innovative (including digital) technologies for grain production and storage, and management of these processes; and
- expanding the potential for increasing the agrobusiness profitability with an increase in the market size for the final product (within the framework of integrated structures) [4].

It is economically feasible to apply the model of using the minimum guaranteed prices for grain, when it is purchased by grain processing enterprises, and respecting the condition of equality of agrobusiness and processing, as well as the final profit-sharing from the sale of the final product obtained in excess of such conditions in proportion to the standard costs of grain production and processing [5-7].

The recipients of an additional effect in applying this approach to the formation of the cluster structure income can be participants in both the agrarian and processing businesses. This allows to do the following:

- 1) implement the principle of economic justice in relation to producers in related industries;
- 2) form a stable raw material base of grain processing factories;
- 3) form the internal insurance schemes to support the possibility of using the expanded reproduction in the related sectors of the food complex that are involved in co-production of the final product;
- 4) use the resource potential of economic entities more fully, including natural and climatic conditions; and
- 5) preserve the economic and legal independence of the interacting parties.

Such economic advantages can only be achieved within the development of contractual relationships among the stakeholders.

The practice of annually concluding sales contracts is applied nowadays when organizing the interbranch relations between grain processing factories and agricultural formations. This causes an increased risk of disrupting the stability of the raw material base of the grain processing enterprises. Besides, the existing price competition between the state and intermediary organizations that purchase grain in the region for subsequent sale to trading organizations that export it during the period of purchasing interventions allows to maintain the price for grain at acceptable levels for agricultural producers (above production costs). Due to this, the factories are interested in increasing the stability of the supply of agricultural raw materials, while the need to provide economic opportunities for full-fledged participation in the competition in the commodity market is manifested in the search for the most profitable types of final products. In the current world market conditions (and the national market as its integral part), they are products of the deep grain processing: dry corn gluten and syrup and mixed fodder for livestock; wheat gluten for the population (improvement of food qualities of flour); and technical bioethanol for the market players.

According to the authors' estimates, the return on the production of these types of grain products ranges from 54.8 % (dry corn gluten) to 138.1 % when producing dry wheat gluten in the Tambov region (in 2016 prices with full load on technological lines). Besides, the markets for these types of grain products are unsaturated, which opens up the prospects for a stable presence of regional processing factories in the foreseeable future and a potential increase in production volumes (if agricultural raw materials are available in sufficient quantity and quality).

*Compiled by the authors using the Consolidated Annual Report of Agricultural Organizations in the Tambov region

The most acute situation in the resulting difference between the average selling prices and the minimum guaranteed prices in 2016 was for sales of the fourth and fifth grades of wheat (by 44.4 % and 36.4 % less than the state established for purchasing interventions) and winter rye (by 21.6 % less). The most "favorable" conditions of sale were only for corn grain, the price for which was only 2.6 % lower than the guaranteed minimum.

The distribution of additional (total) profit from sales between agricultural producers and processing factories can be as follows: 1) in proportion to the total standard costs for the production of goods produced by manufacturers in the areas involved in the production of the final product; 2) as 50:50; 3) as 30:70 (agriculture: processing).

Under the current pricing conditions for intermediate and final grain processing products, agriculture is in a more "advantageous" position when implementing such a scheme for final profit-sharing mechanism in the sale of the final product of the grain processing industry. For example, a profit of 91.2 rubles can be obtained in the production of bioethanol, 146.9 rubles in the production of wheat gluten, 90.6 rubles in the production of corn gluten, and 89.3 rubles in the production of concentrated mixed fodder per 100 rubles spent on grain production for agricultural producers.

The increment in the level of return can range from 51.8 to 109.4 % in the wheat grain production and be 40.6 % in the corn grain production in comparison with the actual data.

The proportions can be changed in accordance with other criteria in order to observe the principle of equity in the distribution – for example, in accordance with the actual cost structure of grain production.

IV. CONCLUSION

In the modern economic conditions, the sectoral cluster structure is the most promising form of organizing joint activities in the intersectoral cooperation. It has higher organizational potential than the existing contractual relationship system. Besides, it allows participants to maintain the economic and legal independence, while the increase in the stability of the commodity zones formation can be ensured through the final profit-sharing mechanism in the sale of the final product in the industry. This helps achieve the implementation of the principles of economic justice pricing and interest in the interaction.

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