

ASSESSMENT OF FINANCIAL PERFORMANCE OF AGRO-INDUSTRIAL CLUSTER

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ABSTRACT

In the context of transforming economy, creating clusters is one of the attractive strategies used by agro-industrial formations. However, there is still no single system of assessment of their economic and financial performance. The purpose of this article is to consider a method for calculating these indicators within the agro-industrial cluster based on the relationships and interdependence of partner enterprises. To calculate the integral efficiency index, a sample of indicators was selected, which more fully reflect the corporate system specific nature. Integrated economic and financial efficiency of agro-industrial cluster is regarded as their interconnectedness and interdependent of business partners system for the general business tasks system implementation with ensuring of the corporate type integrated system maximum effectiveness.

Keywords: Agro-Industrial Cluster, Corporate System Efficiency, Financial Performance Assessment, Production Scope and Concentration, Resource Restoration, Competitive Food Market, Business Partners System.

JEL Classification: Q13, Q18, C38

INTRODUCTION

The agro-industrial cluster working efficiency improving provides the combined managerial, organizational, technological, economic, financial and social practices optimization and research techniques (De Mendonça Costa et al., 2017; Partiwı et al., 2014; Simonetti et al., 2017). The main generalized estimating indicator of the cluster efficiency can serve as an indicator calculated on the basis of an integral measure of economic and financial efficiency (Anokhina, Zinchuk & Petrovskaya, 2015; Mukhtarova & Yesbolganova, 2018; Sloniec et al., 2016). Its definition is based on a systematic and integrated approach and allows determining the main directions of such clusters activities to identify and implement the reserves for increasing the agro-industrial corporate structures efficiency (Golubev, 2017; Egea, Torrente & Aguilar, 2017; Putri et al., 2015).

The performance and efficiency of the cluster system industrial activity is measured by absolute and relative indicators (Fernandes & da Silva, 2017; Doronina et al., 2016; Simboli, Taddeo & Morgante, 2015). Its use allows appreciating realization of economic potential intensity of the subject in general. These indicators depend on many factors and vary greatly in different subjects of the complex. Its effective mechanisms are corrective and directing actions, factors and criteria selection and refinement. As an estimate of the impact of the subject activities acts agro-industrial cluster, which acts as a source of cash income receipts and investment,

strengthen financial stability and solving the problems of economic security of the country (Denisova, 2015; Partiwi et al., 2014; Grigorian & Ramazanov, 2016).

The category of "economic efficiency" is a complex and multidimensional definition from the standpoint of the productive forces unity and production relations in the country's agro industrial complex (Barrera & Cornish, 2015; Golubev, 2017; Herrmann & Grote, 2015). Under the laws of supply and demand influence, it is necessary to assess the level of the return on the all taken measures realization.

The agro-industrial cluster efficiency evaluation includes the analysis and generalization of the results of the comparison with the base. This methodical approach to evaluating the effectiveness is as follows (Potapov, 2013):

$$C_f + \sum m_i \pm \Delta T_{si} + \sum m_i \pm \Delta S_i = \pm \Delta T_{c0} \pm \Delta T_{c0} = C_{pr} K_b + \sum_1^m \pm_1 \Delta K \dots \Delta K_b \pm_0 \dots K_{etc}$$

Where: $E_{f_{etc}}$ -the presented efficiency of the cluster operation;

C_{ave} -presented production outcome;

K_{etc} -presented non-recurring costs;

C_B -the average annual volume cluster production in the base year;

K_b -the average cluster cost in the base year;

$\pm \Delta T_S$ -Difference of this embodiment from baseline by output volume due to exercise i^{th} cluster development activities;

$\Delta T_S = \sum \pm_0 \Delta T_S$ -Difference of this embodiment from baseline by volume of output due to exercise i^{th} development activities as cluster m ;

$\pm \Delta C_i$ -this embodiment difference from baseline on current costs brought about by the i^{th} cluster development activities. Thus a positive value ΔC_i corresponds to a current costs reduction and a negative value of ΔC_i -increase them.

$\Delta C_0 = \sum \pm \Delta C_i$ -is the same, due to the implementation of the event in an amount m ;

$\pm \Delta K_i$ -difference between this embodiment of the base according to a one-time cost due to the implementation of the i^{th} cluster development activities;

$\Delta K = \sum \pm_0 \Delta T_{S_i}$ -is the same, due to the implementation of the event in an amount of m (Tchistov, 2005).

This methodology application does not yet fully reflect the cluster activity results and the integrated system synergy effect. Therefore, to assess the agro-industrial structure efficiency further research to deepen its comprehensive assessment, which takes into account all the cluster system operation components, is required. To evaluate the agro-industrial cluster activities efficiency it is recommended to apply an integrated methodology for determining the corporate system efficiency (Aggarwal, 2015; Oleinik, 2003; Putri et al., 2015).

Therefore, the purpose of this article is to consider a method for calculating the economic and financial performance of the agro-industrial cluster.

DATA, ANALYSIS AND RESULTS

The basis for the cluster formations effectiveness assessing should be efficiency theories and methodologies, dividing and cooperation of labor in society, the industry. In a schematic

view, such a simulation of economic and financial efficiency can be represented in the following form (Figure 1).

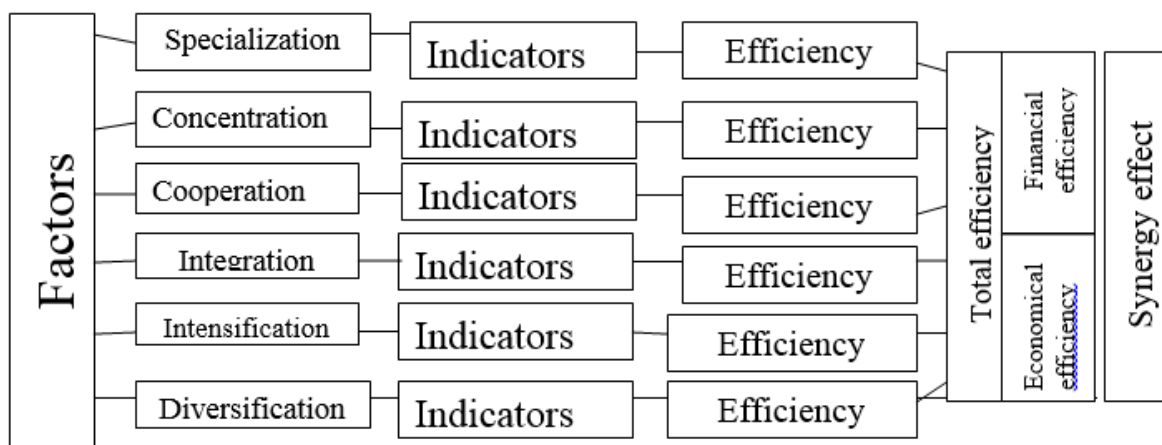


FIGURE 1
MODELING OF THE EFFICIENCY OF AGRICULTURAL CLUSTER

In this model, the specialization is the leading form of labor division in agriculture. Its economic essence is manifested in the very focus of operations and capital, provides the labor division of narrowly focused on individual transactions.

Category production "concentration" is assumed to increase the production scope and concentration, etc. that lead to increase in size of the organization. Major organization with collective forms of production, labor and management organization, can establish the foundation of a mixed economy in the country, so they have the highest economic and financial stability. As concerns, I note that the excessive increase in the size of organization may have epidemiological welfare problems, leading to a decline in industrial and economic activities with a corresponding financial receipts reducing.

The development of business ties in the agro industrial complex causes an increase in the individual capitals size aggregation, which manifests itself in the capital centralization strengthening. The highest form of cooperation development is the production relations, which is considered to be as a suitable state of connectedness of individual system components into a single unit. The integration is determined by sustainable business ties the indicator (that is, at least 3 years, calculated as the average weighted arithmetic value) and their specific gravity in the total number of interaction links in the joint industrial and entrepreneurial activities process.

Multidisciplinary production type holdings and Financial-Industrial Groups (FIGs) resistant to recessions economy period (unfavorable situation with respect to a single product leads to the development of a new type of product, in high demand in a given time) .In its development is carried diversification, that means production re-specialty to another kind of the agro industrial complex enterprise activity, with an increased demand for the market at the moment. In its turn, the production intensification as an efficiency factor comes from an increase in the labor and production intensity and performance in the agro industrial complex enterprises.

Carrying out the cluster impact calculation estimates on the overall efficiency of agro industrial financial system before and after the formation of the cluster can also be determined on the basis of the Net Present Value (NPV) calculation, where RR-payback; NPV-Net Present

Value calculation; A NPV-adapted calculation of net income; PI-Profitability calculation of cluster index; IRR-Internal Rate of Return calculation cluster (Voronin, 2017).

However, according to the author, this economic indicators finance system also partly can be used when disclosing evaluating the agro-industrial cluster performance-this requires a broader set of partial indicators, the use of which fully reveals the essence of cooperative-integrative relations of effective interaction agribusiness entities.

A common method for assessing the production economic systems efficiency such as clusters using the "cost-effectiveness" method is also to ensure the territorial system efficiency with ensuring the fuller use of production, labor, material, financial and natural resources (Table 1).

Table 1 PERFORMANCE CLUSTERING EFFECT (BY METHOD OF "COST-EFFICIENCY")		
Indicators	The calculation formula	The meaning of the incoming values in formula and data
1. The absolute output gain relative increase in output	$\Delta Y_k = Y_k - Y_6$ $\Delta Y_k = \sum_{i=1}^N V_i \cdot (M_{ik} - M_{i6}) \cdot Z_6$ $\frac{\Delta Y_k}{\Delta Y_6} \geq 1$	ΔY_k -increase in output of cluster participants compared to enterprises operating outside the cluster (in the basic structure); Y_k, Y_6 -total output by enterprises within the cluster and in the basic structure; N -number of manufactures; V_i -the physical volume i^{th} production; M_{ik}, M_{i6} -utilization factor i^{th} production capacity within the cluster and the base structure; Z_6 -unit selling price
2. Reducing unit costs	$y_{3k} - y_{36} \leq 0$	Y_{36}, y_{3k} -costs per rouble of output and sales of products within the cluster and in the basic structure; $C_{k,6}$ -production costs within the cluster and in the basic structure
3. Height manufacturer-Nosta labor	$\frac{\Pi T_k}{\Pi T_6} \geq 1$	The productivity of labor working within the cluster and in the basic structure
4. Increase in profitability of production		Profitability of production within the cluster in the basic structure, %

The main orientation of the agro-industrial enterprises organizational system is to improve the industrial, economic and financial performance, competitive advantages increasing, ensuring the stability of production in the market space, to maximize profits, which is especially important in the market relations conditions in the country (world). Their implementation is aimed at the competitive products manufacturing, the extended reproduction ensuring, at trade niche of agricultural products market development and complex financing for its continued operation and cluster development.

For a more comprehensive assessment of the situation and the agro industrial cluster directions determining we attempt to separate the individual factors functional properties, which affect at the efficiency of production and unite into groups on the nature of their influence on the

APK efficiency level. In this regard, it is proposed to supplement economic and financial developments in order to the types of performance indicators classification by the following groups: traditional indicators for the agro-industrial sector management levels (i.e. indicators applicable in all sectors of the country's national economy, for example, the cost of buildings and equipment, labor productivity, profit, efficiency). Indicators of a professional nature-these are the parameters which are characteristic (significant) for the agro-industrial sector of the national economy and define a professional nature of relations (yield, productivity of animals and birds, the particular products cost, the other technological equipment payback period). Auxiliary character indicators contribute to the maximum expression on the production of traditional indicators.

In this paper we consider the following types of effects: technical and technological, economic and financial, investment, social and psychological, natural and climatic and environmental effects. The predominant variety of factors, criteria and the agrarian territorial complex functioning efficiency indicators are grouped by us in the following form (see Figure 1). They are assessed in two versions: before and after the integration relations improvement in the territorial complex. At the same time, it is important to note that all types of efficiency are closely interrelated among themselves on their targeted impact with ensuring the work efficiency.

The performance and efficiency of the economic and financial production activity of agro-industrial cluster is supposed to match its expected result under specific conditions. Focus on the customer is implied its participation in the implementation of cluster solutions for the production of high-quality and competitive products manufacturing.

To calculate the efficiency of the agro-industrial cluster, we propose the following calculation formula for obtaining a synergistic effect:

$$C_{kOe} = [FP_{dd} + FPP_{qkx}] - [RP_{dd} + RPR_{qk} + RP_x] + (and_{other} + e_{kp})$$

Where: C_{kOe} -Synergic effect obtained in the cluster creating process;

FP_{dd} -Actual additional profits from the scale-up of a population of an integrated system;

FP_{DK} -Actual additional profits by improving of the integrated system products subject's quality parameters, including in accordance with applicable standards;

AF_{DC} -Actual additional profits by reducing cost of goods manufactured by all subjects of the integrated system;

RP_{dd} -Calculated (planned) additional profit by scaling up the integrated system of a population;

RP_{DK} -Calculated (planned) additional profit from improving the quality parameters of the integrated system products subjects, including in accordance with applicable standards;

RP_x -Calculated (planned) additional profit from the goods manufactured by all of the integrated system subjects cost reduction;

And others-Additional investment associated with the cluster establishment;

E_{kp} -The size of tax payments in a cluster.

To calculate the integral efficiency index, a sample of indicators is selected, which, according to the researcher, more fully reflect the integrated corporate system specific nature. This sample is conducted according to a group of key performance indicators. To ensure the reliability of the obtained research result, it is recommended to connect the indicators system

from the professional activity group and the indicators system from the auxiliary indicators group to the calculations.

The proposed formula for calculating the integrated indicator of the economic efficiency of the cluster has the form:

$$I_n = \sqrt{4R_1 * k_1 + R_2 * k_2 + R_3 * k_3 + R_4 * k_4}$$

Where: I_n -Integral index of the cluster economic efficiency;

$R_{1,2,3,4}$ -Estimates of the effectiveness of the groups' technical and technological factors", "organizational and economic factors", "socio-economic factors" and "climatic and environmental factors";

$k_{1,2,3,4}$ -Ratio that determine the importance of a group of factors, the total amount of which is equal to one.

In addition to the proposed classification, it is recommended to use the cluster financial performance by the formula:

$$I_n = \sqrt{4F_1 * k_1 + F_2 * k_2 + F_3 * k_3 + F_4 * k_4}$$

Where: I_n -Cluster financial performance integral indicator;

$F_{1,2,3,4}$ -Estimated performance indicators by groups "liquidity ratios", "Turnover ratios", "ratio reflecting coating debt", "ROA coefficient;

$k_{1,2,3,4}$ -Ratio that determine the importance of a group of financial factors, the total amount of which is equal to one.

Analytic evaluation should be carried out both in statics (in comparison with similar clusters) and in dynamics (before and after creating the cluster, for 1-2 years of the newly created cluster).

DISCUSSION

The integrated approach with an economic and financial effect application is considered by us as an efficient process, covering all production process in the cluster aspects thoroughly and comprehensively. The synergy effect obtaining in the result of joint efforts on the participants joint activities on implementation in the programs causes the efficient corporate structures formation (Herrmann & Grote, 2015). The main indicators of the agro-industrial cluster are: the volume of production, quality and sales prices, costs incurred additional revenue from of production realization, economic and financial status of the system. An assessment of the financial status of each cluster entity is characterized by the financial resources availability, their deployment appropriateness and efficiency of use, timeliness of obligations performance, liquidity, solvency, business activity and financial stability. Indicators of its evaluation complement substantially the agro-industrial enterprises (cluster) economic situation of characteristics. Using the balanced system indicators contributes to the growth of aggregate efficiency (Figure 2).

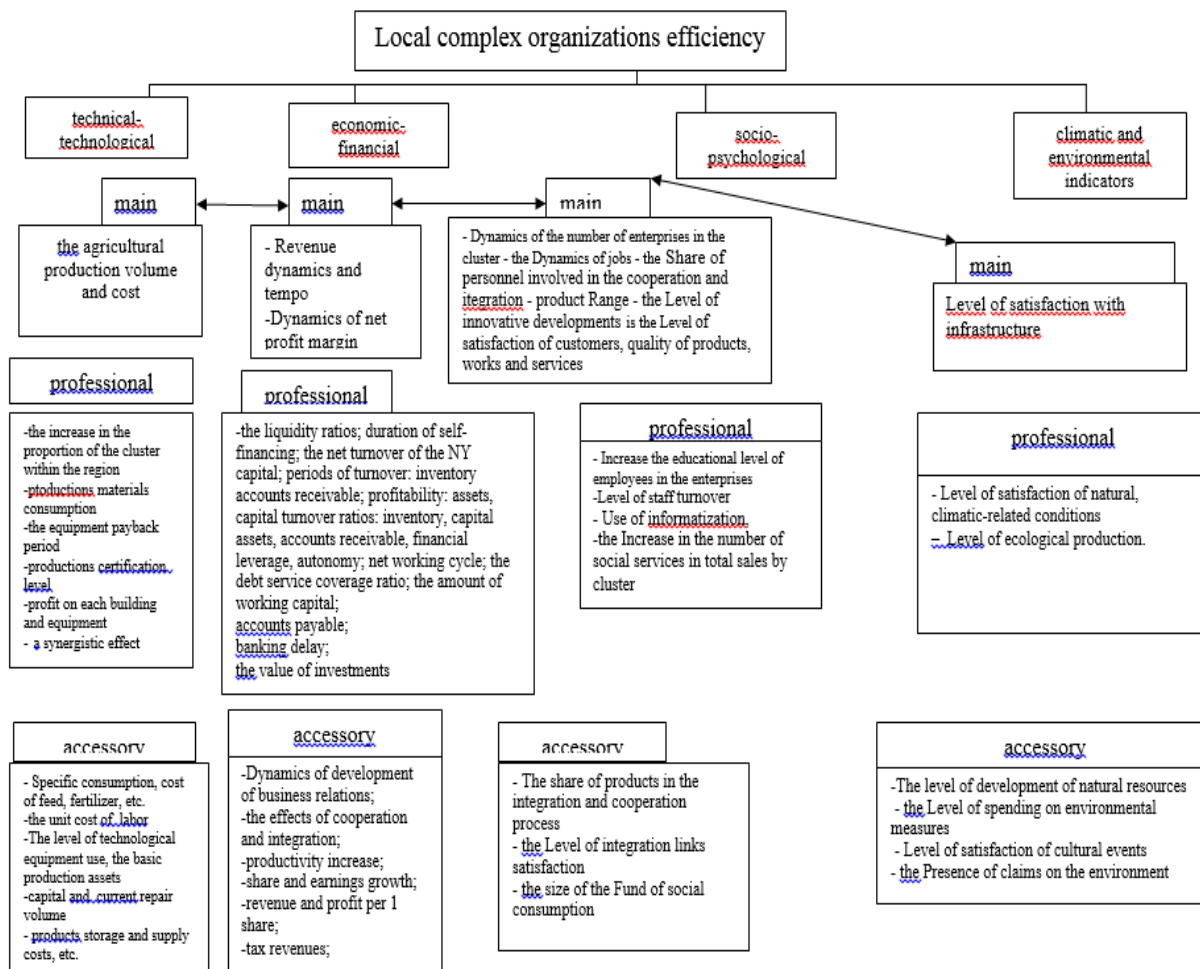


FIGURE 2
THE RECOMMENDED CORE THE AGRO-INDUSTRIAL CLUSTER ENTERPRISES
TOTALITY FUNCTIONING EFFICIENCY INDICATORS

The agro-industrial clusters contribute to economic benefits through the (Naumov, 2006; Wei, 2014):

1. Production cost reduced due to necessary supply organization at stable prices;
2. Reduced refund and resource restoration timeframe.

Any organization and production structure is being gradually improved in the process of evolution. Simple agro-industrial formations transform into more complex ones. Agro-industrial clustering, agricultural product processing/manufacturing, sale and income receipts within the same integrated business entity allow regulating the market situation, keeping a fair distribution principle between various production units and being competitive in the food market.

CONCLUSION

Thus, an integrated economic and financial efficiency of agro-industrial cluster should be regarded as their interconnectedness and interdependent of business partners system for the

general business tasks system implementation with ensuring of the corporate type integrated system maximum effectiveness.

Assessing the economic and financial performance of the agro-industrial cluster will provide an opportunity to analyze its strengths and weaknesses. At the same time, it will be a necessary area for agro-industrial cluster reformation.

ACKNOWLEDGEMENT

The publication was prepared with the support of the “RUDN University Program 5-100”

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