QUANTITATIVE METHODOLOGY FOR ASSESSING THE EFFECTIVENESS OF THE MANAGEMENT SYSTEM IN A STATE AUTHORITY OF THE TERRITORIAL AIC

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ABSTRACT

The article presents the methodology for the quantitative assessment of the effectiveness of the management activities of civil servants of the territorial branch executive bodies of state power (TBEBSP) of the Sverdlovsk region—the departments of the Agro-Industrial Complex and Food (AIC and F) of the Ministry of AIC and F of the Sverdlovsk region. This methodology includes the calculation of synthetic indicators: level, as well as an index of the overall efficiency of management. The calculation of these indicators is based on the use of the following elements: the level and/or index of productivity of labor of civil servants in the management of the AIC and F; the level and/or index of the economy of management of the AIC and F; the level and/or index of arable land use efficiency, as well as the rationality of the organization of activities in growing crops; level and/or labor productivity index of agricultural workers engaged in production. The use of the level makes it possible to compare the efficiency of labor of civil servants both in different years for a specific or group of departments of the AIC and F, and during one period for different departments of the AIC and F; and the use of the index is to assess the change in the efficiency of labor of civil servants of a given administration of the AIC and F or to compare the changes in the efficiency of labor of civil servants of different departments of the AIC and F over several periods.

1. INTRODUCTION

The deepening of the constantly ongoing process of social activity division and the further development of commercial relations increase the importance of effective management, because by using the tools of the latter one can influence the entrepreneurial activity of market entities, including those operating in the framework of the AIC.

Independent entrepreneurship in a market economy inevitably causes an increase in the...
responsibility of the executive bodies of state power at the level of the constituent entities of the Russian Federation and of local governments at the level of municipalities for more effective realization of the available opportunities.

The limited financial resources, inherent in a market economy, as well as the filling of the market with imported food products, form the illusion of overproduction in the agrarian sector of the economy. This state of affairs adversely affects the development of Russian agricultural production, inhibits the development of the production and technological base of the AIC and does not contribute to the production of domestic food products for the population.

At the same time, the existing production factors with reasonable and expedient use of them, based on the competent management of the AIC, can provide the population of the country with all the necessary.

Improving the mechanism of managing the agro-industrial complex serves as an organizational basis that allows to activate the entire set of elements, that make up the policy of agrarian transformations. And one of the components of the AIC control mechanism of a territory is a quantitative assessment of the efficiency of agro-industrial production management at the scale of rural areas.

In the profile literature on the economy and management of agricultural production and agro-industrial complex, dated mainly the fourth quarter of the XX century, when there was an increased interest in this issue, to determine the level of organization of managerial work, as well as to detect and use reserves to increase its efficiency and productivity use a number of indicators, as well as criteria characterizing, mainly, certain aspects of the organization of activities in the field of management.

At the same time, the indicators contained in the above-mentioned literature, as well as the criteria, are focused solely on assessing the effectiveness of management systems at the level of economic subjects (or groups of homogeneous economic subjects), that relate mainly to the second field of the –AIC, and in most cases are not quite suitable for evaluating the effectiveness of management systems in public sector organizations (including government agencies and government agencies).

To assess the effectiveness of the management system at the level of agricultural organizations, it is most often proposed to use three groups of indicators [8, p. 288–298; 11, p. 100–101; 12, p. 306; 14, p. 190]:


Performance indicators and / or managerial performance (the activities of managers) [6, p. 247–248; 8, p. 292–293; 11, p. 101; 12, p. 306; 13, p. 143; 14, p. 190].

Indicators of profitability of the corps of managers, which determines the amount of costs for the maintenance of managers [6, p. 247–248; 8, p. 291, 296–297; 11, p. 101; 12, p. 306; 13, p. 143; 14, p. 190].
The indicators that determine the effectiveness of production management, as well as the profitability of the corps of managers (that is, the indicators included in the second and third groups), are divided into two subgroups. In the first subgroup of indicators, the size of the managerial staff and the costs of their maintenance are compared with the size of production, the second—with the performance and efficiency of economic activity. [6, p. 247]

In addition to the above sets of indicators, measures of efficiency, reliability and optimality of the management system can be used to determine the effectiveness of the management system. [12, p. 305]

Virtually all of the listed aggregates of indicators are equally applicable to the assessment of the effectiveness of management, moreover, in a separately chosen agricultural organization and in general in several homogeneous agricultural organizations, operating in one agricultural territory. The difference is only in the scale of activity and in the well-known «standard» of the starting (baseline) data and the final results of the functioning of farms in generalized terms over the territory. [13, p. 143]

At the same time, it is impossible not to say, that the multiplicity of indicators, combined in the mentioned aggregates, makes it difficult to calculate the final indicator, since the results obtained only sometimes show a general trend in the dynamics of the effectiveness of management activities and the entire management system.

In addition, the quantitative measures of management efficiency presented in the literature often characterize only certain aspects of the organization of activities in the field of management, and synthetic indicators of the overall efficiency of management activities are not suitable for a comprehensive assessment of the work of managers and specialists of the AIC at the territorial level.

Awareness of the need for such a synthetic indicator of evaluating the effectiveness of the management system at the level of the agricultural organization (or territory), which would reflect both the degree of efficiency of the management apparatus and the degree of managerial labor productivity, led to the proposal to use the management efficiency index as a single synthetic indicator, that aggregates both the values of the profitability indexes of the corps of managers, and the indexes in managerial performance. [6, p. 248; 13, p. 144–146]

In modern literature and, above all, in the periodical press (including the international level), covering theoretical and methodological aspects and practical issues of the functioning of public authorities and local governments, priority is given to the publication of research results in the quality assessment of state and municipal [16, p. 52–72], as well as public [10, p. 194–201] services and performance evaluation of civil servants in the provision of such services [9, p. 131–164]; evaluation of the effectiveness of implemented state programs [1, p. 48–69]; evaluation of the effectiveness and efficiency of control and supervisory activities [5 p. 41–64]; performance evaluation of public servants [2, p. 62–73] of the management team [3, p. 81–103] and the use of the system of modern methods of material incentives of the latter [7, p. 16–27], including for the achievement of established performance indicators by them [15, p. 5–15]; as well as an overall assessment of public administration systems with a focus on performance management [4, p. 98–126].
It is the absence of effective tools available to us in the literature, that could be used for a quantitative assessment of the effectiveness of management systems in government bodies at the level of the territorial AIC in terms of the performance of economic entities operating in the territories «subordinate» to the specified authorities, prompted us to try to fill this space.

2. MATERIALS AND METHODS OF RESEARCH

For the quantitative measurement of the efficiency of management activities of civil servants of the territorial branch executive bodies of state power (TBEBSP) of the Sverdlovsk region—the departments of the AIC and F of the Ministry of the AIC and F of the Sverdlovsk region, we have developed, presented, tested and implemented the methods for calculating synthetic indicators: level, as well as an index of the overall efficiency of management. At the same time, the use of the level makes it possible to compare the effectiveness of management activities both in different years for a particular or a combination of several departments of the AIC and F, and within the chosen year for different departments of the AIC and F; and index reconciliation—to assess the change in the efficiency of management activity of any particular management of the AIC and F or a comparative change in the effectiveness of management activity in different departments of the AIC and F over a period of time, exceeding one year and a multiple year.

The calculation of these synthetic indicators we propose to build on the basis of using the following four elements:

1) the level and / or index of productivity (productivity) of labor of civil servants in the department of AIC and F;
2) the level and / or index of thrift department of the AIC and F;
3) the level and / or index of arable land exploitation efficiency, as well as the rationality of the organization of activities in growing crops;
4) the level and / or index of labor productivity of agricultural workers, engaged in production.

At the same time, we suggest calculating the level of productivity (productivity) of work of civil servants in the department of the AIC and F using the following formula (1):

\[ L_1 = \sqrt[5]{L_{1.1} \times L_{1.2} \times L_{1.3} \times L_{1.4} \times L_{1.5} \times C_{1.1}}, \]  

where

- \( L_1 \) the level of productivity (productivity) of labor of civil servants in the department of the AIC and F;
- \( L_{1.1} \) the level of output by agricultural organizations, subordinate to the department of the AIC and F, the gross production in prices of 1994 per one state civil servant of the department of the AIC and F;
- \( L_{1.2} \) the level of output by agricultural organizations, subordinate to the department of the AIC and F, the gross production in prices of 1994 per employee of the department of the AIC and F;
- \( L_{1.3} \) the level of production by agricultural organizations, subordinate to the management of the AIC and F, gross output in prices of the current year per 1 rub. the cost of wages of civil servants of the department of the AIC and F;
- \( L_{1.4} \) the level of production by agricultural organizations, subordinate to the management of the AIC and F, gross output in prices of the current year per 1 rub. the cost of wages of all employees of the department of AIC and F;
$L_{1.5}$—the level of production by agricultural organizations, subordinate to the department of the AIC and F, gross output in prices of the current year per 1 rub. all expenses for the maintenance of the department of the AIC and F;

$C_{1.1}$—payback rate for the production of the current year.

The values of the levels, included in the formula (1), are taken equivalent to the indicators, characterizing the productivity (productivity) of labor of civil servants in the department of the AIC and F. The value of the indicator of recoupment of expenses for the production of the current year is determined by dividing the proceeds from the sale of agricultural products, taking into account the provided subsidies, to the commercial (full) cost of agricultural products sold in current year prices.

*The index of productivity (productivity) of labor of civil servants in the department of AIC and F* we propose to calculate by the formula (2):

$$I_2 = \sqrt{I_{2.1} \ast I_{2.2} \ast I_{2.3} \ast I_{2.4} \ast I_{2.5} + \left( C_{2.1} - C_{2.2} \right)}$$

where

$I_2$—the index of productivity (productivity) of labor of civil servants in the department of AIC and F;

$I_{2.1}$—the index of output by agricultural organizations, subordinate to the department of the AIC and F, the gross output in 1994 prices per one state civil servant of the department of the AIC and F;

$I_{2.2}$—the index of output by agricultural organizations, subordinate to the department of the AIC and F, the gross output in 1994 prices per employee of the department of the AIC and F;

$I_{2.3}$—the index of production by agricultural organizations, subordinate to the department of the AIC and F, the gross production in the prices of the current year per 1 rub. the cost of wages of civil servants of the department of the AIC and F;

$I_{2.4}$—the index of production by agricultural organizations, subordinate to the department of the AIC and F, the gross production in the prices of the current year per 1 rub. the cost of wages of all employees of the department of the AIC and F;

$I_{2.5}$—the index of production by agricultural organizations subordinate to the department of the AIC and F, the gross production in the prices of the current year per 1 rub. all expenses for the maintenance of the department of the AIC and F;

$C_{2.1}$—payback rate for the production of the current year;

$C_{2.2}$—indicator of the cost of production costs for the year, preceding the current.

The values of the indices, included in formula (2), are determined by dividing the value of each relevant indicator, characterizing the productivity (performance) of labor of civil servants in the management of the AIC and F, in the current period (analyzed year) by its value in the preceding period (year, preceding the analyzed).

We suggest calculating the level of the economy of the department of the AIC and F using the following formula (3):

$$L_3 = \sqrt{L_{3.1} \ast L_{3.2} \ast L_{3.3} \ast L_{3.4} \ast L_{3.5} \ast L_{3.6} \ast L_{3.7}},$$

where

$L_3$—level of economy of the department of the AIC and F;

$L_{3.1}$—the level of the ratio of the number of civil servants in the department of the AIC and F to the
total number of employees of agricultural organizations, subordinate to the department of the AIC and F;
$L_{3.2}$—the level of the ratio of the number of all employees of the department of the AIC and F to the total number of employees of agricultural organizations, subordinate to the department of the AIC and F;
$L_{3.3}$—the level of the ratio of the cost of wages of civil servants of the department of the AIC and F to the total wage fund of employees of agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$L_{3.4}$—the level of the ratio of the costs of wages of all employees of the department of the AIC and F to the total wage fund of employees of agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$L_{3.5}$—the level of the ratio of the cost of maintaining the department of the AIC and F to the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$L_{3.6}$—the level of the ratio of the cost of wages of civil servants of the department of the AIC and F to the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$L_{3.7}$—the level of the ratio of the cost of wages of all employees of the department of the AIC and F to the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year).

The values of the levels, included in the formula (3), are taken as equivalent indicators characterizing the economy of the department of the AIC and F.

The index of the economy of department of the AIC and F we propose to calculate by the formula (4):

$$I_4 = \sqrt[7]{I_{4.1} \times I_{4.2} \times I_{4.3} \times I_{4.4} \times I_{4.5} \times I_{4.6} \times I_{4.7}},$$

(4)

where

$I_4$—the index of the economy of the department of the AIC and F;
$I_{4.1}$—the index of the ratio of the number of civil servants in the department of the AIC and F to the total number of employees of agricultural organizations, subordinate to the department of the AIC and F;
$I_{4.2}$—the index of the ratio of the number of all employees in the department of the AIC and F to the total number of employees of agricultural organizations, subordinate to the department of the AIC and F;
$I_{4.3}$—the index of the ratio of the costs of wages of civil servants of the department of the AIC and F to the total wage fund of employees of agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$I_{4.4}$—the index of the ratio of the costs of wages of all employees of the department of the AIC and F to the total wage fund of employees of agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$I_{4.5}$—the index of the ratio of the cost of maintaining the department of the AIC and F to the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$I_{4.6}$—the index of the ratio of the costs of wages of civil servants of the department of the AIC and F to the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year);
$I_{4.7}$—the index of the ratio of the cost of wages of all employees of the department of the AIC and F to
the value of gross output produced by agricultural organizations, subordinate to the department of the AIC and F (the calculation is carried out in prices of the current year).

The values of the indices, included in formula (4), are determined by dividing the value of each corresponding indicator characterizing the economy of the department of the AIC and F, in the current period (analyzed year) by its value in the preceding period (the year, preceding the analyzed).

The level of the efficiency in the use of arable land, as well as the rationality of the organization of activities in the cultivation of grain crops we propose to calculate by the formula (5):

\[ L_5 = \sqrt[3]{L_{5.1} \times L_{5.2} \times L_{5.3}} \]  

where

- \( L_5 \)– the level of efficiency of arable land exploitation, as well as the rationality of the organization of activities in the cultivation of grain crops;
- \( L_{5.1} \)– the level of the grain yield per 100 hectares of arable land, calculated by dividing the average by territory, in which agricultural organizations operate, subordinate to the department of the AIC and F, values of the yield of grain crops per 100 hectares of arable land for the analyzed year by the average in the Sverdlovsk region, the value of the yield of grain crops per 100 hectares of arable land for the analyzed year;
- \( L_{5.2} \)– the level of completeness of the use of bioclimatic capabilities of arable land for growing crops, calculated by dividing the actual average over the territory, in which agricultural organizations operate, subordinate to the department of the AIC and F, the level of harvesting grain crops for the analyzed year by the maximum possible level of grain yield for the corresponding natural and climatic zone of the Sverdlovsk region;
- \( L_{5.3} \)– the level of labor costs for the production of grain crops, calculated by dividing actual by territory, where agricultural organizations operate, subordinate to the department of the AIC and F, the level of labor costs for the production of grain crops (man-hours / 1 cent) by the standard level of labor costs for the production of grain crops.

The values of the levels, included in the formula (5), are taken as equivalent indicators, characterizing the efficiency of arable land use, as well as the rationality of the organization of activities in the cultivation of grain crops.

The index of the efficiency of arable land exploitation, as well as the rationality of the organization of activities in growing grain crops, we propose to calculate by the formula (6):

\[ I_6 = \sqrt[3]{I_{6.1} \times I_{6.2} \times I_{6.3}} \]  

where

- \( I_6 \)– the index of arable land exploitation efficiency, as well as rationality of organization of activities in growing grain crops;
- \( I_{6.1} \)– the index of the grain yield per 100 hectares of arable land, calculated by dividing the average by territory, in which agricultural organizations operate, subordinate to the department of the AIC and F, values of the yield of grain crops per 100 hectares of arable land for the analyzed year by the average in the Sverdlovsk region, the value of the yield of grain crops per 100 hectares of arable land for the analyzed year;
- \( I_{6.2} \)– the index of completeness of the use of bioclimatic capabilities of arable land for growing crops, calculated by dividing the actual average over the territory, in which agricultural organizations operate, subordinate to the department of the AIC and F, the level of harvesting grain crops for the analyzed year by the maximum possible level of grain yield for the corresponding natural and climatic zone of the Sverdlovsk region;
$I_{6.3}$—the index of labor costs for the production of grain crops, calculated by dividing actual by territory, where agricultural organizations operate, subordinate to the department of the AIC and F, the level of labor costs for the production of grain crops (man-hours / 1 cent) by the standard level of labor costs for the production of grain crops.

The values of the indices, included in formula (6), are determined by dividing the value of each relevant indicator, characterizing the efficiency of arable land use, as well as the rationality of organizing activities when growing grain crops, in the current period (analyzed year) by its value in the previous period (the year, preceding analyzed).

The level ($L_7$) or index ($I_8$) of labor productivity of agricultural workers, engaged in production, requires the inclusion of the indicator of gross agricultural output in 1994 prices per agricultural worker employed in production. The calculation of this indicator is carried out by dividing the average for the territory, in which agricultural organizations operate, subordinate to the department of the AIC and F, the indicator of labor productivity for the analyzed year by the average for the Sverdlovsk region indicator of labor productivity for the analyzed year.

Since we have taken the gross output indicator in 1994 prices per level of labor productivity per agricultural worker, engaged in production, as far as, respectively, the level of labor productivity of agricultural workers, engaged in production, we propose to calculate by the formula (7):

$$L_7 = LP_{7.1}/LP_{7.2},$$

where

$L_7$—the level of agricultural workers, employed in manufacturing, is an indicator of gross output in 1994 prices per agricultural worker, employed in manufacturing;

$LP_{7.1}$—the average for the territory, in which the agricultural organizations, subordinate to the department of the AIC and F, function, the level of labor productivity for the analyzed year is an indicator of gross output in 1994 prices per agricultural worker, employed in production;

$LP_{7.2}$—the average for the Sverdlovsk region labor productivity for the year analyzed is an indicator of gross output in 1994 prices per agricultural worker, employed in production.

The index of labor productivity of agricultural workers, engaged in production, we propose to calculate according to the formula (8):

$$I_8 = L_{8.1}/L_{8.2},$$

where

$I_8$—labor productivity index of agricultural workers, employed in production, is the ratio of the gross output indicator in 1994 prices per agricultural worker, employed in production, for the year analyzed to the gross output indicator in 1994 prices per agricultural worker, engaged in production, in the year, preceding the analyzed one;

$I_{8.1}$—the level of labor productivity of the analyzed year is indicator of gross output in 1994 prices per one agricultural worker, employed in production, for the analyzed year;

$I_{8.2}$—the level of labor productivity of the year, preceding the analyzed, is indicator of gross output in 1994 prices per agricultural worker, engaged in production, in the year, preceding the analyzed.

Thus, we propose to calculate the level of the overall efficiency of the management activities of civil servants in the departments of the AIC and F ($L_9$), using the formula (9):

$$L_9 = \sqrt[4]{L_1 \times (1 - L_3) \times L_5 \times L_7},$$

(9)
The index of the overall effectiveness of the management activities of civil servants in the departments of the AIC and F \( (I_{10}) \) we propose to calculate by the formula (10):

\[
I_{10} = I_2 + (1 - I_4) + I_6 + I_8. \tag{10}
\]

The presented index provides an opportunity to evaluate the change in indicators (or levels) of productivity (productivity) of workers in the department of the AIC and F; the economics of the department of the AIC and F; the efficiency of arable land operation, as well as the rationality of the organization of activities in growing crops; labor productivity agricultural workers, engaged in production (gross output in 1994 prices per agricultural worker, employed in manufacturing) in the dynamics of the values of the indicators analyzed in comparison with the values in the year, preceding the analyzed. Accordingly, an increase or decrease in the overall efficiency of management activities for the period under review (a number of years), from one year to another.

Comparison of the values of the annual indicators themselves or the levels of productivity (productivity) of labor of workers in the department of the AIC and F; economy of the department of the AIC and F; the efficiency of arable land exploitation, as well as the rationality of the organization of activities in the cultivation of grain crops; labor productivity of agricultural workers, employed in production (gross output in 1994 prices per agricultural worker, employed in manufacturing), rather than the ratio of the values of the indicators listed in the analyzed year to the previous one (i.e., indices) allows us to compare the overall efficiency management activities for a specific department of the AIC and F within individual (different) analyzed periods (years) or for several departments «within» one analyzed year or according to different analyzed years.

3. RESULT

Using the above formulas (9) and (10), we calculated the levels and indices of the overall management efficiency of civil servants of the following TBEBSP of the Sverdlovsk region—the departments of the AIC and F of the Ministry of the AIC and F of the Sverdlovsk region: Alapayevsky department of the AIC and F, Irbitsky department of the AIC and F, Kamensky department of AIC and F, as well as the Turinsky department of AIC and F.

The results of the application of the presented methodology for the quantitative assessment of the effectiveness of the management activities of civil servants of the TBEBSP of the Sverdlovsk region—the departments of the AIC and F of the Ministry of the AIC and F of the Sverdlovsk region in relation to the calculation of levels of overall management performance indicate, that the most efficient work team of Irbitsky AIC and F: during the entire three-year study period, the Irbitsky AIC and F department consistently ranks first among the above-listed AIC and F departments, advancing with Kamenskly –AIC and F, Alapaevsky –AIC and F and Turinsky –AIC and F respectively.

The calculation of the indexes of the overall management efficiency for the 2nd and 3rd years of the study period, as well as for the whole study period indicated above, also provides an opportunity to state the leadership of the Irbitsky department of the AIC and F, which is ahead of Kamensky Department of the AIC and F, Alapaevsky department of the AIC and F and Turinsky Department of...
the AIC and F respectively. The calculation of the indices of the overall efficiency of management in the 1st and 2nd years of the study period has the above mentioned departments of the AIC and F in the sequence, built to reduce the estimated values of the indices of the overall efficiency of management activities as follows: Turinsky department of the AIC and F, Kamensky department of the AIC and F, Irbitsky department of the AIC and F, and Alapaevsky department of the AIC and F.

4. CONCLUSION

The proposed quantitative methodology for assessing the effectiveness of the management system in the state authority at the level of the territorial agro-industrial complex is adapted to the specifics of the functioning of the TBEBSP of the Sverdlovsk region—the departments of the AIC and F of the Ministry of the AIC and F of the Sverdlovsk region.

Being a method of quantitative assessment of the effectiveness of the management activities of civil servants in the departments of the AIC and F, it can be recommended for individual and comparative assessment of the results of the work of the departments of the AIC and F of the Sverdlovsk region, including the dynamics over a number of analyzed periods.

The undoubted advantage of this methodology is the fact, that its application does not require the use of additional economic indicators, in addition to those, which are present in the developed and approved forms of the economic and the financial reporting of the departments of the AIC and F of the Ministry of the AIC and F of the Sverdlovsk region.

5. CONFLICT OF INTERESTS

The author confirms that the information and information presented in this scientific article do not contain a conflict of interest.

6. DATA AVAILABILITY STATEMENT

The used or generated data and the result of this study are available upon request to the corresponding author.

7. GRATITUDE

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8. REFERENCES


Brazhnik M.V. is a Candidate of Economics (PhD in Economics). His Scientific interests: Accounting, Auditing and Analysis; economy and national economy management; history of economic thought and national economy; evaluation of the management efficiency of economic systems; strategic management.

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