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Universal Simulation Results Reproduction Technical Capacities of the Various Sectoral Specialization

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Article is devoted to methods for evaluating the performance of the mechanism of reproduction of the technical capacity of grain subcomplex. Developed by the authors technique takes into account, in contrast to the known zoning areas, and also allows you to isolate the territorial-production clusters on a range of indicators, including the technical potential of grain subcomplex. In this case, the goal is to develop a set of interrelated methodological and practical recommendations for the reproduction of the technical capacity of grain subcomplex. This method is based on cluster analysis algorithm and strategic positions grain subcomplex. The developed method allows to classify multi-dimensional observations, which uses the approach of grouping, that is, in allocating the unit of observation in this or that group at the same time includes all grouping attributes, ie enables the construction of science-based groups (clusters), revealing the internal connections between the units of observations together, as well as the distribution of the studied series.

Key words: Cluster analysis, discriminant analysis, multivariate correlation-regression model, multicollinearity.

Cluster analysis provides a necessity to classify the existing factors to determine the degree of their influence on the assessment of the functioning of the reproduction of the technical potential of grain subcomplex. At the same time have been set the task making a set of strategic actions to achieve the target position. Also took into account the factors of internal and external environment of the agricultural organizations grain specialization, for analysis, the signs that can take any value in the algorithm. Choice of the metric, or a measure of proximity, is the focal point of research, from which depends mainly on the final version of the decomposition of objects into classes for a given algorithm partitioning. Cluster analysis of the classification of multivariate observations based on the determination of the distances between objects in order to obtain homogeneous groups in a certain sense.

Cluster analysis is used to create the existing classifications of factors to determine the degree of their influence on the assessment of the effectiveness of the mechanism of reproduction of the technical capacity of grain subcomplex. At the same time have been set the task making a set of strategic actions to achieve the target position. Also took into account the factors of internal and external environment of the agricultural organizations grain specialization for analysis were defined attributes that can take on any value in the algorithm. Therefore, depending on the purpose

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of the grain industry in the long term is chosen one or the other alternative, the implementation of which will set the reproduction of the technical capacity of grain subcomplex. At the first stage of the algorithm is analyzed values the of factors influencing the strategic positions Agriculture Organization of grain direction, characterizing efficiency. The second stage of the algorithm is performed quantification cluster by constructing a matrix using a statistical program. In the third step of the algorithm is carried out taking into account the clustering of factors internal environment logistics grain subcomplex of their values. In order to achieve the objectivity of the analysis of the data matrix are standardized, that is given in a single metric. Then calculated the distance between the factors.

In the fourth step of the algorithm is obtained clusters, including the factors that have the greatest similarity, or the smallest Euclidean distance. Building a tree diagram allows you to track how linked together more and more factors and aggregated more and more clusters consisting of more distinguishing factors. The successful analysis by combining determined by the number and content of clusters consisting of the most similar to the values of factors.

In the fifth step of the algorithm based on the existing hypotheses about the number of clusters produced clustering factors logistics grain subcomplex with the external environment metrics distances. Step allows to verify the hypothesis of the coexistence of clusters and their composition.

In the sixth step of the algorithm results clustering distance metrics allow us to calculate the average value for each cluster for each factor.

In the seventh stage of the algorithm is carried out work performance factors influence their value. Coefficients obtained allow to compare and to compare the different in character actions and manifestations of factors: competitiveness of domestic agricultural machinery, etc. Obtain comparable estimates of business conditions to determine the strategic position of the reproduction of technical capacity grain subcomplex.

Thus factors characterize the development medium with respect to the selected strategy. Therefore, depending on the purpose of the grain industry in the long term is chosen one or the other alternative, the implementation of which will set the reproduction of the technical capacity of grain subcomplex.

The distance between the units studied communities in various ways. In fact, cluster analysis represented by a set of algorithms that compute the distance or proximity between objects in different metrics.

Algorithm for clustering plays an important role in interpreting the results. Significant place in applied statistical research takes tree clustering, which is to combine the objects into clusters according to some measures of similarity or distance between objects.

Methodology

Cluster analysis provides the necessary classification of existing factors in determining the degree of their. Theoretical basis

As a result of the cluster analysis obtained a classification of agricultural organizations Chelyabinsk and Sverdlovsk regions for a number of selected performance indicators of agricultural areas.

In the Chelyabinsk region identified two clusters: the first cluster contains the largest number of agricultural areas 6, the second cluster of the smallest number of rural areas 4.

In the Sverdlovsk region identified two clusters: the first contains the largest number of rural areas 7, the second cluster - the smallest number of rural areas 4.

The key to determining the technical capacity and, consequently, the conditions of formation and development of technical processes in the agricultural sector is a natural-climatic zoning. As in the Urals region agro-climatic, soil and economic conditions are varied, then the approach to innovation here is to be versatile applicability organizations AIC.

As a result of the cluster analysis obtained a classification of agricultural organizations in the area of the Chelyabinsk and Sverdlovsk regions for a number of selected performance indicators. Established that agricultural organizations spread across the grain clusters and climatic zones unevenly. A direct relationship between the composition of the grain clusters and zoning of agricultural production. In the first and second clusters included agricultural organizations of the steppe and forest-steppe zones. Most of the

agricultural organizations of all areas of the steppe zone included in the first cluster. Respectively, and significant difference of grain clusters not only in the zonal location, but also on the specialization. Set the scope of the typical groups of agricultural organizations in the efficiency of production and sales of grain products, revealed their inherent qualitative features (Perch Y., 1974).

Accounting for regional differences in the effectiveness of activity was necessary not only for the purpose of comparing individual agricultural organizations in terms of production and sales of grain products, but also for the development of administrative decisions on the level of agricultural organizations in order to smooth the economic differences, to identify the individual factors on the assessment of the technical potential with the possibility of effect on them.

Using cluster analysis, guided by the fact that it allows you to distribute objects not on one parameter, and on a set of attributes. In addition, unlike most mathematical and statistical methods that do not impose any restrictions on the form of the objects and allows us to consider the set of initial data. It is important to predict the conditions when the figures have varied views, making it difficult to use traditional econometric approaches (Lawley D., Maxwell A., 1967).

For a more accurate assessment of the technical potential of agricultural organizations for grain followed by some combination of relative performance. This option appears when using a statistical method, which is called "the set of discriminant analysis". Its essence lies in the fact that with the help of mathematical and statistical methods are calculated parameters of the correlation function, and then set an indicator on the basis of which it is possible to make certain predictions.

To construct the feature space and a partition of agricultural organizations for grain classes was taken base values the of parameters, formed by materials of the Ministry of Agriculture and the Ministry of the Chelyabinsk area of agriculture and food of the Sverdlovsk region, which characterizes the level of technical and economic development of the agricultural organizations. These figures were processed using statistical software application.

For classification introduced the concept of similarity of objects by observable features. In each cluster should fall objects having similar characteristics or, in other words, in some sense, the homogeneous objects.

Within the framework of the proposed method, we used the method of correlation and regression analysis, which enables the assessment of technical capacity. The proposed method takes into account the zoning of areas, allows the grouping of farms in the context of rural areas, as well as economic indicators: the cost of 1 ha of crops, income from 1 ha of cultivated areas, the level of profitability.

The object of the study were business entities Sverdlovsk and Chelyabinsk regions. Next, we present the results of our research.

Research is based on economic and statistical, economic-mathematical, computational and constructive methods, and the method of expert estimates.

Analyzing the production and business activities in the agricultural sector of the Sverdlovsk region, it was found that during the period 2008-2012. yield was 24.25 t / ha in a group of farms of from 10.04 to 15.04 on the tractor 1 000 ha of grain crops, compared to 18.13 t / ha produced in farms having from 5.03 to 10,03 own tractors. In the group of farms with from 19.3 to 23.3 harvesters per 1 000 ha of grain crops was obtained yield - 28.9 c / ha, which is 10.77 t / ha more than in households with from 8.28 to 13.28 harvesters for every 1,000 hectares of crops. Last use the services of third parties at harvest. The limitations of their own financial resources and the high price of MTS services, repair and technical enterprises and PDT does not allow an increase in the cost of purchase of fertilizers and quality seeds in a group of farms where harvesting farm equipment missing (Popov E.V., 1996).

One of the factors of low yields may also serve the poor quality of services provided by service agencies agribusiness. Provision of private farms harvesting technology allows them to direct current assets by increasing the amount of fertilizers, plant protection products and the acquisition of high-quality seeds. Growth of cost items for the maintenance of plant and equipment for the improvement of the security holdings of agricultural machinery is compensated by an increase in the yield of crops, which positively

affects the production efficiency of the industry.

To quantify the relationships discussed in the group of successful performance indicators and security harvesting technique we used a method of simple regression (Figure 1, 2).

The curve $y = –0.0693x^2 – 2.044x + 0.4028$ in the analyzed period [to 4.41-24.45] changes the direction of the communication, namely the increase of the fall. The maximum of the function (14.75 c/ha) was achieved when the value of the explanatory variable, equal 15.47%.

The curve $y = y = – 0.0057x^2 + 0.224x +$ 18.09 in the analyzed period [7.47-54.85] changes the direction of the communication, namely the increase of the fall. The maximum of the function (19.65 c/ha) was achieved when the value of the explanatory variable, equal 20.29%.

For more in-depth study of the impact of the reproduction of technical capacity at the grain industry in the region in various groups of farms with arable land in the treatment of 229 hectares and over 633 hectares have been developed correlation and regression models, depending on 168 agricultural organizations in the Chelyabinsk region (steppe, forest-steppe), 150 agricultural organizations of Sverdlovsk region - lesolugovoy, mountain-, forest-steppe climatic zones (Figures 3, 4). The resulting regression analysis equation is: $Y = - 4{,}305x^2 + 0{,}041x + 0.2143$ in the Chelyabinsk region; $Y = - 0{,}0002x^2 + 0{,}2088x - 23{,}445$ in the Sverdlovsk region.

In total, considered factors explain variation in reproduction of technical capacity in the grain industry by 61%, and other internal factors account for 39%. The largest share of the variation of reproduction technical capacity accounts for the variability of the cost of 1 ha of grain (61%) in the fifth group with a load on one tractor over 633 hectares in the Chelyabinsk region, in the Sverdlovsk region accounts (44%) in the fourth group with a load on one of the tractor 480 to 560 acres.

Thus, reductions in grain yields, among other factors, due to the presence narrowed reproduction of technical capacity in the industry.

Grouping of the agricultural organizations of the Chelyabinsk region load arable land per 1 tractor has identified reduction efficiency of grain production and the level of productivity due to an increase in the parameters studied.

So, in the Chelyabinsk region in the first group of farms with a load on the tractor plowed on average 291 ha grain yield was 9 t / ha and increased to 12 t / ha in the group of companies with a load on the tractor over 1 633 hectares. The first three groups decrease the cost of 1 ha with 2,874 to 1,886 rubles. This can be explained by the fact that with increasing load on the tractor, taking into account the depreciation of the agricultural machinery, increasing the cost of maintenance of machinery in working order (Perch Y., 1974).

Thus factors characterize the development medium with respect to the selected strategy. Therefore, depending on the purpose of the grain industry in the long term is chosen one or the other alternative, the implementation of which will set the reproduction of the technical capacity of grain subcomplex.

Using cluster analysis performed clustering of permanent representatives of the grain industry, in order to build evidence-based classification, identification of internal connections between the units of the observed population (Markin B., 1980; Soshnikova L., 1999).

For classification introduced the concept of similarity of objects by observable features. In each cluster should fall objects having similar characteristics or, in other words, in some sense, the homogeneous objects.

In the methods of cluster analysis on the results of the classification influence unit benchmarks. If the classification for indicators measured in a variety of disparate units, the end results will be distorted due to different absolute values. To prevent this, the raw data were normalized to the maximum value i-th index (Shim J., Siegel J., 1986).

The distance between the units studied communities in various ways (Lysenko M.V., Semin A.N., 2014; Kolemaev C., Kalinina C., 2003; Gerstenfeld A., 1970). In fact, cluster analysis represented by a set of algorithms that compute the distance or proximity between objects in different metrics.

As a result of the cluster analysis obtained a classification of agricultural organizations Chelyabinsk and Sverdlovsk regions of the Russian Federation on a number of selected performance indicators.

Grouping of agricultural organizations of

the Chelyabinsk and Sverdlovsk region

Established that agricultural organizations are distributed across clusters and regions unevenly. A clear relationship between the cluster and the zoning of agricultural production. In the second and the first cluster includes agricultural organizations of the steppe and forest-steppe zones. Most of the agricultural organizations of all areas of the wall area included in the first cluster. Respectively, revealed significant differences between the clusters not only by zonal location, but also on their specialization.

Thus, in the course of cluster analysis were obtained typical group of agricultural organizations in the efficiency of production and sales, revealed their inherent qualitative features.

Accounting for regional differences in the effectiveness of activity is not only necessary to compare individual agricultural organizations in terms of production and sales of grain products, but also for the development of administrative decisions on the level of agricultural organizations in order to smooth the economic differences, to identify the individual factors on the assessment of the technical capacity with the ability to influence to them.

Big advantage of cluster analysis is that it allows you to split objects not on one parameter, and on a set of attributes (Becker G., 1993). In addition, cluster analysis, unlike the majority of economic and statistical methods that do not impose any restrictions on the form of the objects and allows us to consider the set of initial data. This is important, for example, to predict the conditions when parameters are varied views, making it difficult to use traditional econometric approaches (Zhukovskaya C., 1976; Lysenko M., Semin A., 2012).

For a more accurate assessment of the technical potential of agricultural organizations for grain followed by some combination of relative performance. This option appears when using a statistical method, which is called "the set of discriminant analysis" (Soshnikova L., 1999). Its essence lies in the fact that with the help of economic and statistical methods are calculated parameters of the correlation function, and then set an indicator on the basis of which it is possible to make certain predictions.

Discriminant analysis is a statistical method that allows you to rank the differences between two or more groups (Popov E., Fominykh I., Kisel E., 1996; Roger H., 1989). Discriminant method provides the desired results if the objects belong to one or more classes. Economic objects (characterizing parameters) are the units of analysis. They are classified by the principle of maximum similarity, and can be represented by a set of primary features. In practice, there are situations when the object can not be attributed to any of the existing classes.

Discriminant analysis integrates closely related statistical procedures which can be divided into methods of interpretation of intergroup differences and methods of classification of observations into groups. During the procedure requires interpretation to answer the question that whether this set of features to distinguish one class from another, how well these features allow you to make a distinction in the group and some of the features of the most informative. Classification methods are intended to provide features that ensure the separation of the regions in groups. Discriminant analysis is carried out as to the interpretation and classification (Robert ., 2003).

Given these limitations, it is necessary to analyze the parameters of the training samples to ensure that they meet the requirements of the use of discriminant analysis. To check for a close link between the resulting variables calculated the multicollinearity based on the original data from the data obtained discriminant analysis for each cluster.

Complexity and mutual interweaving of individual factors that make the test an economic phenomenon (process), can be manifested in the so-called multicollinearity (Kolemaev C., Kalinina C., 2003). One indicator of determining the presence of multicollinearity between the features is the excess of the value of the pair correlation coefficient 0,8 (rx_ix_j) and others.

To construct a multivariate correlation models one of the prerequisites validity of outcomes is the requirement of the least possible correlated traits included in the model factors. In the case of a linear relationship between the factors of the system of equations has no unique solution, resulting in the regression coefficient and other estimates are unstable, relationship factors difficult

economic interpretation of the constraint equation (Iberia K., 1980).

Elimination of multicollinearity can be realized through the elimination of the correlation model of one or more linearly related factor variables or initial conversion factor variables in the new, enlarged factors. The question of which of the factors should be discarded, is solved on the basis of qualitative and logical analysis of the phenomenon.

To quantify the technical potential of agricultural organizations for grain on the results of financial and economic activity of each cluster was built multifactor correlation-regression model of effective index of grain production.

In the multiple regression equation included the following significant factors identified in the discriminant analysis and calculation of multicollinearity:

X_1 - made in physical weight after rework on 1 tractor, kg/person;

X_2 - the average number of tractors of all types, units;

X_3 - annual average number of combine harvesters, a unit;

X_4 - the number of machine operators, people

Efficient attribute Y - Profit (loss) from the sale of crops, ths. rub.

Calculation of parameters of multivariate correlation-regression model efficiency index was performed with the use of application of statistical programs (www.StatSoft.ru; Byul A., 2001).

As a result, the data obtained following regression equations for each cluster (Table 1).

Table 1 - Criterion optimization to maximize the gross grain harvest

*Compiled by the authors. Note: Y - profit (loss) from realization of grain crops, thousand rubles; X_1 - is actually sown area, ha; $\%_2$ - gross grain harvest in initially capitalized mass, kg; X_3 - is the cost of 1 ha of grain crops, ru2.; X_4 - made in physical weight after revision 1 of the machine, kg/person

During the study identified a correlation between the income from realization of grain per hundredweight implemented grain and the main types of agricultural machinery will look as follows:

$Z = f(X; Y) = 42{,}542 – 0{,}007\%+0{,}66Y$

when restrictions

$$X \in (12{,}86;6700),\ Y \in (10;\ 2700),$$

$Z = f(X; Y) = -131{,}086+0{,}635X+0{,}738Y$

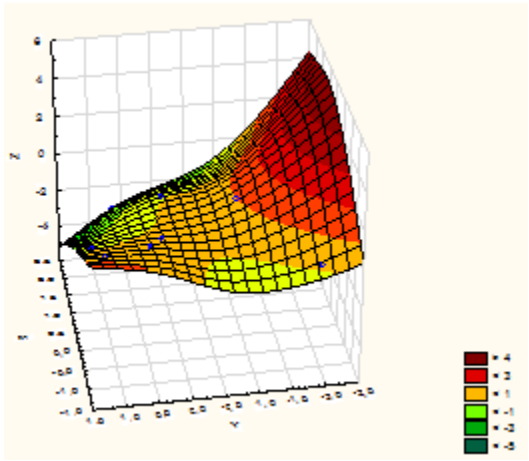
when restrictions

where Z is the profit per hundredweight implemented grain, ru2;

X - load per 1 tractor agricultural land, ha;

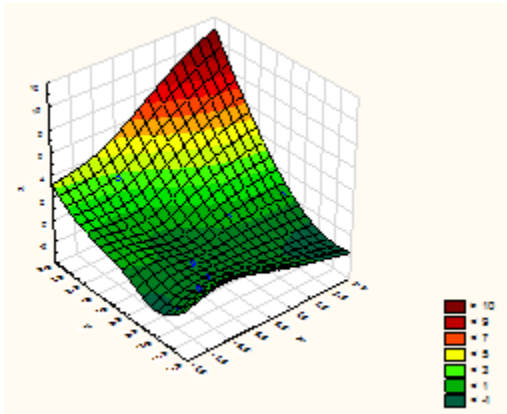
Y - the load on the combine harvester, ha

Graphically the relation between income per 1 centner implemented grain and technical resources is presented in figure 1.



X

Chelyabinsk region



Z - profit per hundredweight implemented grain, ruB.;
X - load per 1 tractor agricultural land, ha;
Y - the load on the combine harvester, ha

Fig. 1. Linear regression technical resources and profit per 1 centner implemented grain

Figure 1 shows that the presence of a load on a tractor or combine harvester in the Park of the main types of machinery in agricultural organizations leads to growth of the results of their operations.

From the above it should be noted that only innovation of production contributes to the achievement of success in enhancing the competitiveness of the agricultural organizations of the grain direction and becomes the best in the grain industry. In the Chelyabinsk and Sverdlovsk region, the development of clusters is one of the effective instruments of increasing the competitiveness of the agricultural organizations, as well as accelerates development of economy of agro-industrial complex (Lysenko M., Semin A., 2013; Lysenko M., Semin A., 2014).

The development of clusters of grain branch in the Chelyabinsk region influences the competitive ability in the following areas: enhancing productivity, innovation and industrial growth of the agricultural organizations, which will stimulate the formation of new associations that support innovation and expansion of the cluster, including the technical and technological modernization of agricultural production (Lysenko M., Semin A., 2012; Lysenko M., Semin A., 2014).

Taking into account the formed clusters for the assessment of the technical capacity of the organizations of grain branch, we have developed a system of scientifically based indicators. Using discriminant analysis, determining the multicollinearity was established that the most informative variables are: for I the cluster is

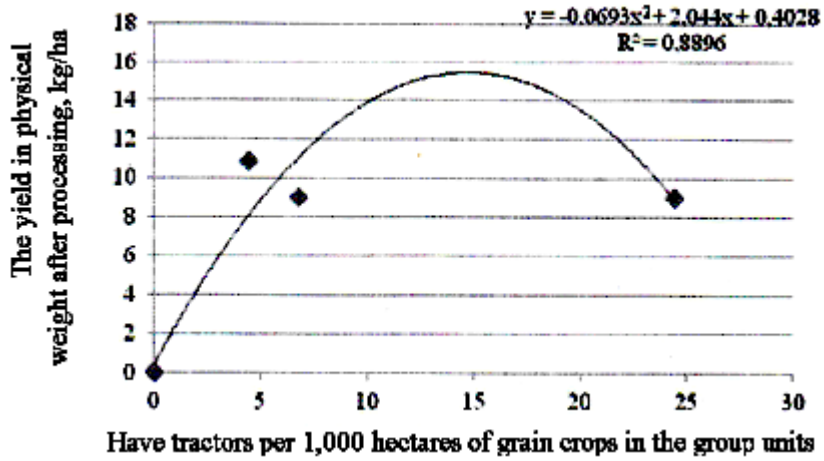


Fig. 1. The dependence of the grain yields of security tractors Chelyabinsk region

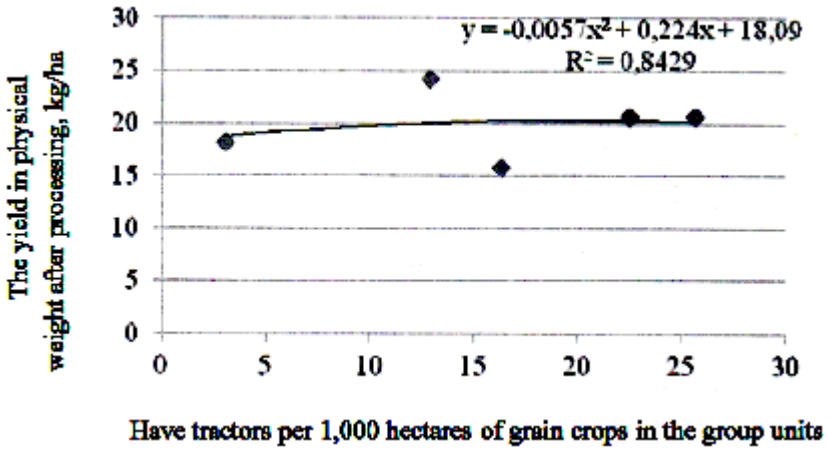


Fig. 2 . The dependence of the grain yields of security tractors Sverdlovsk region

produced in physical weight after rework on 1 tractor, kg/person; the average number of tractors of all types, units; the average annual amount of grain harvesters, a unit; the number of machine operators people; for cluster II-made in physical weight after rework on 1 tractor, kg/person; the average number of tractors of all types, units; thenumber of machine operators, people These variables were used to build the model.

RESULTS

The proposed algorithm for estimating the capacity of reproduction of the technical capacity of the grain sub region allows for the analysis and diagnosis of the technical equipment of the grain industry, assess the prospects for the development of the replacement level of technical capacity grain subcomplex, allocate clusters in climatic zones rice.

The algorithm provides. On the first stage, the analysis and assessment of the current state of the mechanism of reproduction of the technical capacity of the grain industry. Taking into account the system parameters estimated intensity of use of agricultural machinery; effectiveness and efficiency of the use of machine work.

On the second stage, a diagnosis of technical equipment of the grain industry. Clarifies the linkage of the studied parameters on a productive indicator (construction of the matrix of pair correlation coefficients).

3rd stage, the assessment of the prospects of reproduction technical capacity grain subcomplex. Determined significant coefficients in the regression equation for the resulting basis -

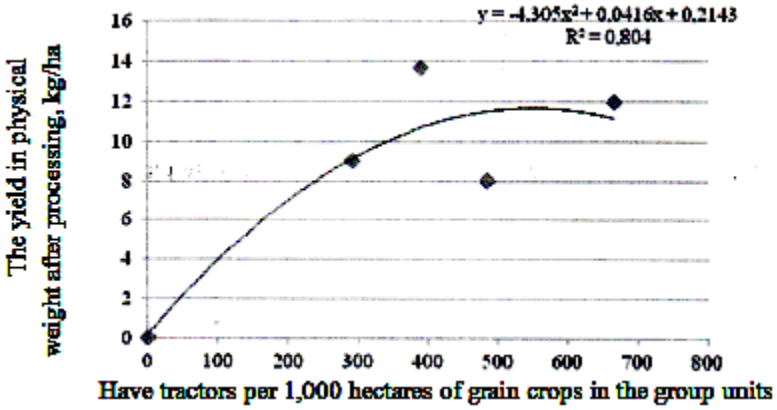


Fig. 3. Dependence of the grain yields of the load on one tractor in the agricultural organizations of the Chelyabinsk region

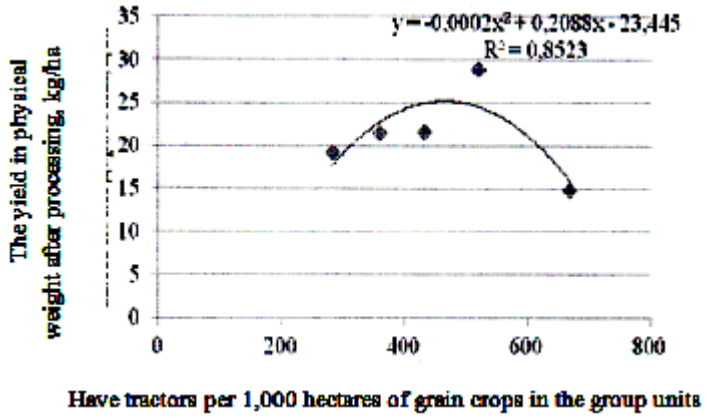


Fig. 4. The relationship between grain yields of the load on one tractor in agricultural enterprises of the Sverdlovsk region

profit (loss) from the sale of crops.

On the 4th final stage - allocated clusters, taking into account the technical capacity of reproduction grain subcomplex. The composition of the grain cluster region is as follows: the core of the cluster; external partners; Partners infrastructure and services sectors.

This organizational and management model allows for complex through targeted and strategic programs at federal and regional levels of the most important principles of reproduction and technical potential, such as the target, the principles of complexity, resource, self-sufficiency, objectivity, concreteness, transparency (transparency) and reality (Lysenko M., Semin A., 2012).

Algorithm for determining the capacity of reproduction of the technical capacity of the grain sub region was preceded by the development of methods to assess the effectiveness of the mechanism of reproduction of technical capacity.

With the help of the developed economic-mathematical model is established, that the creation of exceptionally clean grain cluster does not give the desired results. This is due to its narrow specialization that in modern conditions associated with increased risk to achieve high performance outcomes (sharp decline in gross grain harvests due to weather variability, changes in the situation of the grain market, and others.) And confirmed by the sharp fluctuations in grain yield of the analyzed period in Chelyabinsk and Sverdlovsk region (Lysenko M., Semin A., 2013).

Therefore, the cluster is appropriate to include all technology related industries and types agropredprinimatelskoy activities located in a compact area. This is especially important in the production of feed grains for animal husbandry, with the connection of such market agrostruktur as feed mills, meat and milk processing plants, wholesale food markets, widely diversified agroorganizatsii.

When ranking the selected performance indicators of agricultural organizations grain specialization can be used the guidance of agricultural organizations in order to improve logistics and efficiency of grain production; administrative authorities at the district and regional levels in order to bring to the specified dimensions of performance indicators implementation of government programs, such as the development of agriculture and regulation of the market of agricultural machinery (Lysenko M., Semin A., 2014).

The proposed methodology for assessing the effectiveness of the mechanism of reproduction of the technical capacity of grain subcomplex can be applied: the leadership of the agricultural organizations in order to improve logistics and efficiency of grain production; administrative authorities at the district and regional level in order to bring to the specified dimensions of performance indicators implementation of government programs, such as the development of agriculture and regulation of agricultural machinery.

As a result of methodological approaches were formed conceptual positions and set the following priorities as basic priorities for

Table 1 . Criteria optimization for maximum increase of gross grain gathering

The cluster number	The regression equation	Coefficient determination (R^2)
Chelyabinsk region		
I	Y=-0,869 X_1+1,872 X_2-0,317 X_3-1,174X_4 $1814 \le X_1 \le 2259$; $154 \le X_2 \le 537$; $80 \le X_3 \le 245$; $578 \le X_4 \le 2243$	0.8666
II	Y=0,149X_1+1,895 X_2-1,777X_4 $295 \le X_1 \le 1679$; $87 \le X_2 \le 374$; $367 \le X_4 \le 1985$	1.0
Sverdlovsk region		
I	Y=-1,754X_1-1,904X_2+3,242 X_3-0,147X_4 $910 \le X_1 \le 1974$; $268 \le X_2 \le 550$; $281 \le X_3 \le 706$; $1122 \le X_4 \le 4037$	0.996
II	Y=1,064X_1-0,034 X_2+0,51X_4 $862 \le X_1 \le 1462$; $173 \le X_2 \le 425$; $757 \le X_4 \le 1452$	0.850

improvement mechanism for the reproduction of the technical capacity of grain subcomplex of: a) the direction of the organizational and managerial issues; b) the economic and financial; c) technical and technological; d) motivation; d) legal nature. With regard to the priorities of the organizational and managerial issues, among them, requires a transition to the most effective organizational and administrative systems and structures, and in some cases (where it is most cost-effective and efficient) to the transformation of grain subcomplex in clusters with a strong "core" and effective management company, as the grain subcomplex (as in other product sub) no pronounced control system (Lysenko M., Semin A., 2014).

The following priority - financial and economic. This direction requires improvement in the first place, the current economic mechanism. Currently inefficient functioning elements such as pricing (we recommend using the mechanism of mortgage finance, the application of the minimum guaranteed prices for the products); lending (it is advisable to reduce the market interest rate to 2 - 3%, reduce the refinancing rate of the Central Bank to the level existing in developed countries); insurance (it is advisable to oblige insurers to shift from the formation of insurance reserves to the storage principle); subsidies (not related to increase income support up to 3 thousand. rubles. 1 ha, it is advisable to create a differentiated system of state support for the various zones and farms with different levels of profitability) (Lysenko M., Semin A., 2014).

Direction of technical and technological transition requires business entities grain subcomplex to the resource and energy-saving

Table 2. Average annual growth in agricultural production in the long term ,% (slow and innovative options, in comparable prices)

	2003-2007 years.	2008-2012 years.	2012-2015 years.	2016-2020 years.	growth 2008-2020 years.	2021-2015 years.	2026-2030 years.	growth 2008-2030 years.
				inertial version				
Urals Federal District	104,4	109,0	103,0	101,0	129,0	102,0	102,1	139,0
innovative option								
Sverdlovsk region	102,2	103,0	102,9	102,7	137,0	102,1	102,0	1,6
Chelyabinsk region	107,8	107,0	106,5	105,5	182,0	104,2	104,1	2,5

Table 3. verage annual growth rate of investment in fixed capital in agriculture in the Ural Federal District,% (innovative variant)

	2003-2007 years	2008-2012 years	2012-2015 years	2016-2020 years years	growth 2007-2020	2021-2030 years	2007-2030 years
Urals Federal District	109,1	118,0	131,0	143,0	4,0	118,0	5,8
Sverdlovsk region	108,8	119	134	142	4,1	118	5,9
Chelyabinsk region	119,0	123,0	136,0	140	4,2	119	6,1

Table 4. Prediction of grain production in the Urals Federal District (an innovative option)

	Corn (thousand. Bons)			
	2007	2010	2020	2030
Urals Federal District	5291,4	6160	7160	8050
Sverdlovsk region	583,6	720	880	950
Chelyabinsk region	1880,1	1950	2300	2600

technologies, as well as technology innovation nature relating to the "green economy". Need to increase state support in areas such as the provision of subsidies from the federal budget, the implementation of a financial lease (leasing), subsidies to producers of agricultural machinery in order to reduce the cost to agricultural producers, financing implementation of departmental projects and programs.

Motivational direction associated with the development of incentive systems of machine operators during the development of new agricultural machinery and high-tech; with the development of a mechanism retain young professionals in rural areas (engineering - technical personnel, agronomists, mechanics); with the development of scientific and practical recommendations for the adaptation of young specialists in managing subjects.

Priority areas of legal nature: Amendment of the Bill of standards relating to the establishment of arable land and crops load per unit of equipment (tractor and combine harvester), it has become possible due to the acquisition of holdings of high performance and multi-functional and the combined technique; drafting of the basic elements of the regional law "On the development of the technical capacity of economic agents, specializing in the production of grain"; development of proposals for the introduction of the Federal Law "On the development of agriculture" (from 29.12.2006 N 264 - FZ) separate independent film "The technical potential of agricultural producers" (Lysenko M., Semin A., 2013).

CONCLUSION

The proposed priority areas can be used by government agribusiness, both federal and regional levels, as policy measures. Developed in the research process involves the development of a strategic plan for agricultural industries, including grain products sub in two variants - the pessimistic and optimistic, but rather the inertia and innovation. The first option is a partial technological innovation and modernization of the sector. Beginning of its implementation should be carried to 2006 and the end - the beginning of 2016.

Development scenario of the second embodiment is also possible. This is due to the fact that the continuing trend of reducing the acreage and non-normative disposals of agricultural machinery. This version incorporates a number of priorities, including the partial application of resource-saving technologies; the use of high-yielding varieties of crops; high quality mineral fertilizers; innovative crop protection products and a number of other areas. This development scenario can be considered as a transition period for the investment growth. May happen to top 2016 partial import substitution at the regional agro-food market, as well as increase the level of priority of the agrarian sector of the economy. In this case, the gross grain harvest in the region does not reach $ 6 million tons (Markin B., 1980).

This development scenario, unfortunately, does not provide the necessary improvement of living standards of the rural population, although their share with incomes below the subsistence level to fall slightly. However, projected growth, and some agricultural products on the UFD (overall growth of agricultural production is possible in 2012-2020gg. 0mount to 129%), Table 2.

With regard to innovative options, then it is different from the previous scenario, a significant increase in the factors of innovation in the basic building blocks of the economic mechanism, such as administrative, financial, technical, and technological and legal. It is predicted that due to the complex nature of the innovative measures growth of agricultural production in the region in 2012-2020 will amount to 156%, and in Chelyabinsk and Sverdlovsk regions - 175 - 182%, which exceeds the Russian parameters. Should increase the investment attractiveness of agricultural production (Table 3) (Lysenko M., Semin A., 2014).

Projected increase in the volume of investment in fixed capital in agriculture in the district in 2020 to 4 times as compared to 2007 levels (the whole of Russia - 5 times). By 2030, the growth of investment will increase by 5.8 times.

For agricultural Ural Federal District opens up new possibilities of development of consumer markets on the basis of the creation of innovative technologies of production of various agricultural products, the development and application of the products of the fifth generation

(with specified healing properties), food products created using genetic engineering techniques. Increase significantly and grain production in the district due to technical re-equipment business entities grain products sub, table 4 (Lysenko M., Semin A., 2013).

Based on the above key issues for improving the reproduction mechanism implemented through a comprehensive and strategic programs at the federal, regional, and economic levels.

This kind of proposal arose from the fact that many elements of the mechanism of reproduction of the technical capacity of glitch that naturally adversely affects the reproductive process as a whole. So, still, disposal of agricultural machinery ahead of its input (in some regions in the 3.5 - 5 times); there was a destruction of the domestic system of tractor and agricultural machinery (the share of imports in total sales of agricultural machinery is 73%); macroeconomic admitted miscalculation of the technical and technological renovation of the grain industry (as at the park tractors 500 thousand. units annually supplied equipment only about 20 thousand. units); each of the years of intense field work on average for each subject of the Russian Federation is not enough 750 - 900 machine operators.

An evaluation of the effectiveness of the technical capacity of reproduction grain subcomplex allowed to form a medium-term forecast that by 2020, implementation of the subprogram "Technical and technological modernization, innovation development" (State Program for Development of Agriculture and Regulation of agricultural products, raw materials and food for 2013 - 2020). implementation of manufacturers of agricultural machinery agricultural producers will be 127.9 thousand. pcs. tractors and 52.8 thousand. pcs. harvesting, including new models of tractors (with the provision of state support) - 12.6 thousand. pcs., 5.3 thousand. pcs. combine harvesters, 1.3 thousand. pcs. forage. In this case, on the basis of the proposed models, will be the optimum composition of the acquired tractor fleet and solved the problem of maximizing the profits from the sale of grain (Lysenko M., Semin A., 2014).

These forecasts for the short and medium term (until 2020 .; to 2030) show that while maintaining the same mechanism of reproduction of technical capacity and previously pursued agricultural policy is very high likelihood of further deterioration in the projected (under consideration) indicators. This conclusion aims to correct the ongoing regional economic policy - namely, the application of complex systems approaches in the development and implementation of targeted programs and strategies to change the vector of inertial trajectory on the path of technical and technological modernization of the grain industry.

Thus, the mechanism of reproduction of the technical capacity of the economically justifies the efficiency of grain subcomplex. The developed techniques allow an assessment of the efficiency of the mechanism of reproduction of the technical capacity of grain subcomplex.

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