Asesorías y Tutorías para la Investigación Científica en la Educación Puig-Salabarría S.C.
José María Pino Suárez 400-2 esq a Lerdo de Tejada. Toluca, Estado de México. 7223898475
RFC: ATI120618V12

Revista Dilemas Contemporáneos: Educación, Política y Valores.
http://www.dilemascontemporaneoseducacionpoliticayvalores.com/
Año: VI Número: Edición Especial. Artículo no.:83 Período: Marzo, 2019.

TÍTULO: Clasificación de la reproducción de recursos económicos en las organizaciones del Complejo Agroindustrial por análisis de grupo modificado.

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RESUMEN: El propósito de este trabajo es aprobar métodos del autor para clasificar procesos según los datos de los estados contables (financieros) de los productores agrícolas, lo que permite evaluar el proceso de reproducción de recursos económicos en organizaciones en particular. El método de análisis de conglomerados se utilizó para clasificar las organizaciones agrícolas por tipos y tipos de reproducción a corto plazo, y la dinámica de la estructura de toda la población según su pertenencia a los tipos seleccionados. Los resultados del estudio de los datos de informes proporcionados por más de 400 organizaciones agrícolas de la región de Nizhny Novgorod para 2007-2016 permitieron identificar 16 tipos de reproducción de recursos económicos, combinados en 3 tipos.

PALABRAS CLAVES: reproducción, recursos económicos, factores de producción, análisis de reproducción, evaluación de la reproducción.

TITLE: Classification of the economic resource reproduction in the Agro-Industrial Complex organizations by modified cluster analysis.

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ABSTRACT: The purpose of this paper is to approve the author's methods to classify processes according to the data of the financial statements of the agricultural producers, which allows to evaluate the process of reproduction of economic resources in particular organizations. The conglomerate analysis method was used to classify agricultural organizations by types and types of short-term reproduction, and the structure dynamics of the entire population according to their membership of the selected types. The results of the study of the data of reports provided by more than 400 agricultural organizations of the Nizhny Novgorod region for 2007-2016 allowed to identify 16 types of reproduction of economic resources, combined in 3 types.

KEY WORDS: reproduction, economic resources, production factors, reproduction analysis, evaluation of reproduction.

INTRODUCTION.

The welfare of human society directly depends on the degree of the primary needs satisfaction, including the need for food, for which the AIC is responsible. There is no doubt that the agriculture provides the population with food, industry - raw materials. Moreover, this complex significantly affects the stability of society, is the base of, for example, the concept of social agriculture the state-

oriented food security, largely determines the parameters of economic growth as a whole (Papadopoulos & Markopoulos, 2015; Cannata, 1982).

The effectiveness and efficiency of agricultural organizations depends on the quantity and quality of resources at their disposal, but even the most equipped and efficient enterprise engaged in agriculture activities will not remain that long, if it does not update the available resources, and ignores the process of their reproduction. Moreover, as noted in foreign literature, it is necessary to balance the AIC development and the ecological situation in the region - in the agricultural production development, it is important to follow the strategy of ecological growth to prevent soil depletion and preserve the long-term productive potential (Li et al, 2016; Schneider, 2017; Damania et al, 2018).

In the scientific literature, there are many concepts of reproduction (Tlisheva, 2013). Reproduction, in our opinion, has the following basic distinctive characteristics: goal, tasks, object, subject, principles, and properties.

Defining those characteristics, we believe that the reproduction of resources in agricultural organizations is a cyclical and continuous economic process of influencing the qualitative and quantitative characteristics of economic resources (main, human capital, as well as information and land) to achieve the organization's goals. It should be noted that in the context of "knowledge-based agro-industrial model" formation (Egea et al, 2018), the rethinking of mechanisms for marketing agricultural products (Raynolds et al, 2004), the cooperation of agro-enterprises (Nuhoff-Isakhanyan et al, 2017), the inefficiency of land use (Santangelo, 2018; Shafeev, 2009). and the rapid change in external conditions and laws of economic environment management of this process are the key condition for productive work of agricultural producers, as evidenced by materials of the works (Nemchenko et al, 2015; Neganova & Askarov, 2008; Tlisheva, 2013; Agoshkova & Agoshkova, 2013; Saushkin, 2010; Erciano et al, 2017).

But to date, the Russian State authorities pay the insufficient attention not only to managing the economic resources reproduction of agricultural organizations, but there is also no unified policy in this area, no single information base in the field of resource reproduction, and no methodology for analyzing the dynamics of these processes. While the foreign scientists note the conceptual role of IT in the supply chains development for distributing the agricultural products, (Han et al, 2017) the importance of public management for introducing IT products to improve the overall performance of the entire state (Santos & Santos Jr, 2017). Neglecting that factor of production may cause a backlog of Russia from other countries on the overall AIC sector performance, especially in the context of the EU countries transition to the concept of bioeconomics (Lainez et al, 2018; Bell et al, 2018; Mengal et al, 2018).

The purpose of this work is to classify and analyze the reproduction of economic resources (basic, humanitarian, natural resources) in agricultural organizations of the Nizhny Novgorod region.

The climate in the region is not absolutely favorable for agricultural production, and the region is in the field of risky farming. In general, the region occupies a middle position among other regions of the Volga Federal District (which includes 14 regions), specializing mainly in the livestock and poultry production.

Materials and methods.

In the absence of a system for collecting information on the quantity and quality of economic resources in AIC organizations, the development of a system of indicators, on which the state of the production factors will be studied, is of particular importance. The present study analyzes the availability of following economic resources: fixed capital, operating capital, natural resources (note that natural resources are understood to mean the aggregate of land and biological resources acting as the basis of production processes, the result of which is the receipt of agricultural products), and human capital assets (a number of studies indicate the key role of human capital assets as a factor in

the growth of both the agro-industrial sector and the entire economy generally) (Blanco-Mazagatos et al, 2018; Vorobyova & Mineeva, 2008).

The study was carried out on the basis of following indicators (initial data for the calculation of indicators are contained in the set of annual reports of agricultural producers):

- Total value of fixed capital items, thous. rub (main quantitative indicator is OK).

- Average capacity of 1 fixed capital item (is a qualitative characteristic of fixed capital, calculated as the ratio of total capacity to the product of tractors, combines number. In the absence of fixed capital items of a certain type, the corresponding value in the formula is taken equal to 1);

- Number of conventional livestock (calculated in accordance with the coefficients of physical animals and poultry livestock transfer to conventional cattle of cattle, approved by the Ministry of Agriculture of the USSR on July 5, 1973, is the main quantitative indicator of the natural livestock resources);

- Total amount of arable lands, ha (main quantitative indicator of natural resources for plant growing);

- Ratio of proceeds from the sale of agricultural products to costs of the agricultural products (an indicator that characterizes the process of working capital circulation);

- Ratio of costs to the product of conditional livestock and arable land (describes the intensity of the production process);

- Number of employees (serves as a quantitative indicator of human capital);

- Average wages (acts as a qualitative characteristic of human capital).

419 organizations of the Nizhny Novgorod region for 2007-2016 acted as the study objects. Using these data, the authors carried out an analysis including:

- Clustering of organizations by the availability of their economic resources and, on the basis of this, the development of a classification of agricultural producers to ensure the production factors;

- Studying the dynamics of AIC organization structures on the basis of the classification carried out;

- Clustering of production factors reproduction (changes in the quantity and quality of economic resources at the disposal of the organization), and the classification of organizations by the reproduction process;

- Studying the dynamics of the structure of short-term reproduction kinds and types in the agricultural organizations of the region;

- Studying the reproduction of each economic resource in the medium term. In this case, the method of studying the dynamics of reproductive process consisted of a series of step:

1. Finding the most optimal distributions of studied indicators;

2. Finding the probability values according to the found distributions. Representing the values of analyzed indicators as a point on the n-dimensional hyper-plane; this transformation allows us to compress them and transfer to the region of the n-dimensional hypercube with side 1;

3. The transformation conducted allows us to obtain visually the vector characterizing the reproduction process.

4. The resulting n-dimensional (in our case, 8-dimensional) vector is divided into 2-dimensional parts, characterizing in this case the direction of reproduction for various economic resources.

All the calculations were carried out with Statistica 10.

Results. The cluster analysis carried out for the entire aggregate of agricultural producers in the region for clustering and classification made it possible to state the existence of 12 main types of organizations in terms of economic resource structure and quantity. Their characteristics are presented in Table 1.

Table 1 - Average values of indicators for different types of agricultural organizations

Type number	Total value of fixed capital items, thous. rub.	Average capacity of 1 of the fixed capital items, hp/un.	Number of conditiona l livestoc, cattle.	Total amount of arable land, ha	ratio of proceeds from the sale of agricultural products to costs of agricultural products	Ratio of costs to the product of conditional livestock and arable land, thous rub. / (cattle - ha.)	Number of employee, pers.	Averag e salary, rub.
1	74762	79	917	3094	1,047	14	115	8367
2	46069	175	228	1639	1,092	70	32	15777
3	21298	215	144	1318	0,946	62	23	9047
4	15007	120	36	770	2,872	13	9	6266
5	145618	93	530	8083	1,079	2	100	10816
6	197069	88	1129	3214	1,051	35	109	18103
7	284296	44	2293	5574	1,025	74	325	12347
8	224880	497	428	22622	1,127	4	181	11256
9	14855	184	158	1929	0,809	32	34	4143
10	8435	175	79	636	1,241	37	15	4795
11	728259	187	1255	3752	1,130	1627	245	19372
12	1378455	431	6630	5278	1,018	8	1129	19043

Source: Calculated by authors on the results of a cluster analysis of financial statements provided by the AIC organizations of the Nizhny Novgorod region for 2007-2016.

All the types of organization provided have different characteristics and are widely distributed in the AIC organizations of Nizhny Novgorod region. The structure dynamics of AIC organizations by those types is shown in Table below.

Table 2 – Percentage distribution of organizations by type of availability of economic resources.

Type number	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	15,55	21,17	20,15	23,31	20,29	16,89	12,63	9,75	2,47	0,42
2	0,31	1,60	1,81	1,96	2,69	5,69	8,02	11,41	37,08	42,48
3	2,18	6,94	12,89	18,86	22,62	42,36	44,89	43,57	25,84	20,76
4	1,56	3,38	2,00	1,78	1,97	1,14	2,81	1,87	1,12	1,19
5	1,40	1,78	2,00	2,85	3,23	3,42	3,41	4,77	3,37	3,58
6	0,00	0,53	0,36	0,89	3,23	4,93	7,82	12,66	15,96	17,42
7	1,56	3,02	3,45	3,56	3,41	3,42	3,61	3,32	2,92	2,63
8	0,47	0,53	0,36	0,53	0,36	0,57	0,60	0,21	0,67	0,95
9	49,3	37,54	36,30	25,80	17,77	7,21	5,81	3,32	3,37	2,63
10	26,91	22,60	19,60	19,22	22,98	12,14	8,42	6,85	3,82	3,58
11	0,47	0,53	0,73	0,71	0,90	0,95	1,40	1,87	2,70	3,10
12	0,16	0,36	0,36	0,36	0,36	0,38	0,40	0,41	0,67	0,72

Source: Calculated by authors.

Analysis of the structure of organizations, according to their type of organization outlined above has revealed three most prevalent groups of organizations in 2016:

- The most common (42.48%) organizations are classified as Type 2, which do not differ in extreme values for most of the organizations examined;

- Each fifth organization are classified as Type 3, which is characterized by a low value of all natural resources;

- 17.42% of organizations are classified as type No. 6, differing from others by the higher value of salaries; the organization of all other types totals about 19%.

In general, it is worth noting that in 2016 the ratio of large / medium / small AIC organizations is schematically described by the ratio of 7% / 66% / 27%, indicating the significant disparity in the size of organizations. At the same time, such a type-based structure was not stable. This is evidenced by the data in Table 3.

Table 3 – Characteristics of the dynamics of organizations distribution by the number of economic resources.

Type number	Average	Dispersion	Average for 2007-2011	Average for 2012-2016
1	14,26	62,54	20,09	8,43
2	11,31	238,37	1,67	20,94
3	24,09	232,13	12,70	35,48
4	1,88	0,54	2,14	1,63
5	2,98	1,01	2,25	3,71
6	6,38	45,39	1,00	11,76
7	3,09	0,39	3,00	3,18
8	0,53	0,04	0,45	0,60
9	18,91	297,77	33,34	4,47
10	14,61	74,90	22,26	6,96
11	1,34	0,86	0,67	2,00
12	0,42	0,03	0,32	0,52

Source: Calculated by authors.

To obtain more detailed information about the state of reproduction process in the AIC organizations, let’s turn to studying the processes of short- and medium-term reproduction of resources.

The clusterization and classification of the annual reproduction processes carried out on the basis of changes in the values of above identified indicators by cluster analysis method has revealed 16 main types of changes in the quantity and quality of economic resources at the disposal of agricultural producers. Their characteristics are given in Table 4.

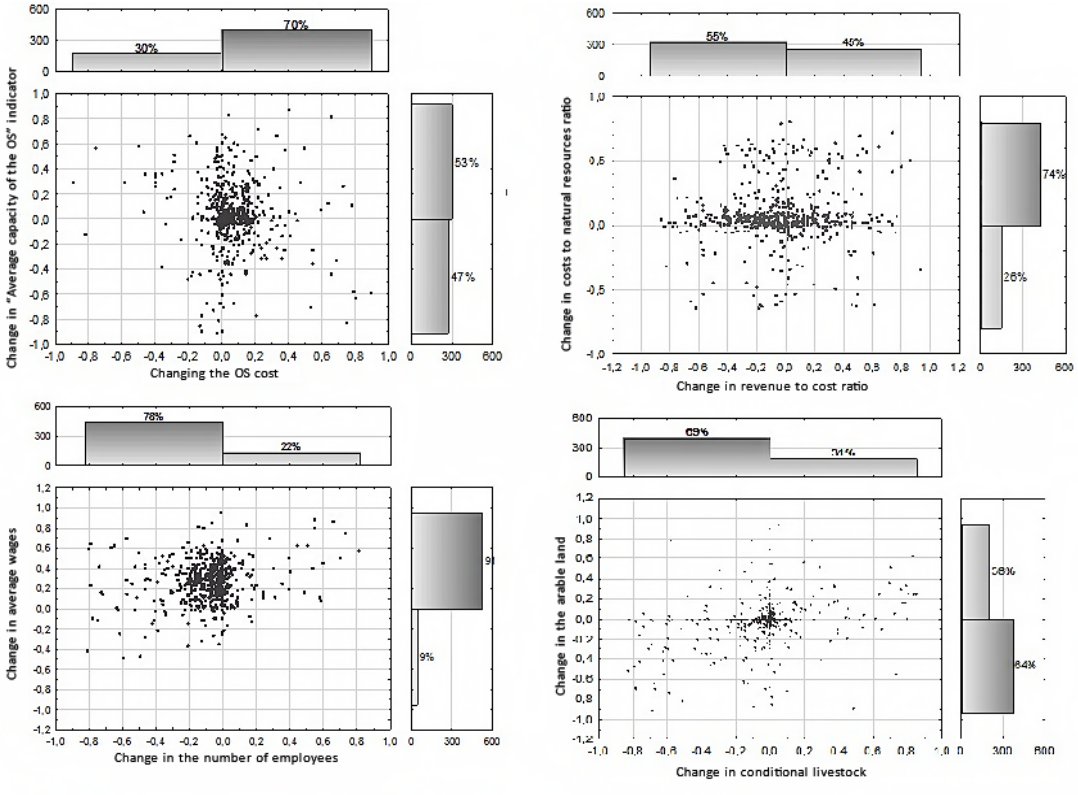
Table 4 – Average value of changes in indicators for different types of resource reproduction in the agricultural organizations.

Reproduction type number	Total value of the fixed capital items	Average capacity per 1 fixed capital item	Number of conditional livestock	Total amount of arable land	Ratio of proceeds from the sale of agricultural products to the costs of agricultural products	Ratio of costs to the product of conditional livestock and arable land	Number of employees	Average salary
1	2552,7	56,3	9,5	-55,8	0,1293	8,4	3,9	-492,0
2	-10054,2	-141,6	-165,6	-1201,3	-0,0089	6,0	-18,9	493,0
3	16137,5	99,7	168,7	517,5	-0,0546	-79,9	3,2	1722,9
4	-32554,0	169,3	-422,7	-1475,4	-0,0603	21,0	-40,2	-738,1
5	39077,2	-116,1	341,7	935,9	0,0718	-5,9	22,6	2003,8
6	-1115,0	-0,6	18,6	4,4	0,4288	-29,2	-4,0	554,7
7	14017,3	-21,3	-94,7	-299,0	-0,0158	0,3	-9,4	781,6
8	-5732,0	114,6	-192,4	134,1	-0,1274	0,9	-13,2	895,4
9	17979,8	-334,2	160,8	202,7	-0,0008	-1,0	-11,4	1874,5
10	7135,0	29,2	-16,1	140,9	0,1741	8,4	-1,1	3083,9
11	3910,8	-11,7	-19,0	-49,1	-0,3304	4,4	3,0	-620,0
12	1263,3	39,7	-25,2	-633,8	-0,0391	16,4	-5,6	2402,4
13	-1767,9	-21,6	31,2	213,1	-0,2740	-109,9	-2,4	482,3
14	15042,4	3,4	-79,5	858,7	0,0507	-1,5	-4,3	1393,8
15	15813,9	-12,5	-33,6	180,6	-0,3780	17,6	3,4	2763,0
16	13343,0	-77,7	113,0	-717,8	0,0349	153,1	-4,1	1651,2

Source: Calculated by authors.

Graphically, the economic resource reproduction in the medium term is shown in Figure 1.

Figure 1 – Graphical representation of the medium-term economic resource reproduction in the agricultural organizations of Nizhny Novgorod region.



Analysis of this figure allows us to draw a number of conclusions:

- 70% of regional organizations have increased the value of fixed capital over the past period;

- An increase in the average capacity of fixed capital items was recorded in 53% of AIC organizations of Nizhny Novgorod region.

- The majority (74%) of organizations have increased costs per unit of natural resources, which indicates the intensification of production.

- The overwhelming majority of organizations (91%) have increased the average salary of their employees, while in 4 out of 5 organizations the number of personnel has been reduced. This, together with an increase in fixed assets, speaks of technological processes and intensification of production.

Since each of the considered economic resources is characterized by us using 2 indicators, it is possible to draw a flow chart of reproduction, where a row reflects the decrease / increase in the indicator number 1, a column - decrease / increase in the indicator number 2 (Table 5).

Table 5 – Analysis of the prevalence of different types of medium term reproduction for fixed capital / working capital / human capital assets/ natural resources, %.

Decrease in indicator 1	Increase in indicator 1	
15.9 / 40.7 / 71 / 24.8	37.1 / 33.3 / 20 / 11.2	Increase in indicator 2
14.1 / 14,3 / 7 / 44.2	32.9 / 11.7 / 2 / 19.8	Decrease in indicator 2

Source: Calculated by authors.

Discussion.

Analysis of the selected types of AIC organizations (Table 1) allows us to characterize them as follows:

- Types 1, 2, 5, and 6 are typical for organizations that have average values for all the indicators presented, but Type 1 is allocated a low value of the average capacity of fixed capital, which, with a significant value of fixed capital, indicates a diverse structure of elements of fixed capital; Type 2 is distinguished by high cost per unit of natural resources (70 thousand rubles per 1 hectare- cattle); Type 5 is differentiated from the others by the large amount of arable land (8083 hectares) and an extremely low cost-per-unit ratio of natural resources (2 thousand rubles per 1 hectare-head), which suggests the propensity of these organizations to extensive type of production; Type 6 is characterized by a significant average wage (18,103 rubles / month) with reduced values of the average capacity of fixed capital (88 hp per unit of capital);

- Type 3 differentiates from the others by the low value of the amount of natural and human resources with a low efficiency of capital turnover (revenue amounts to 94.6% of the total cost, which indicates that the organization is unprofitable). In general, these organizations have a small amount of

resources, which is confirmed by a significant value of the average power of the OK elements, which indicates a low number of them;

- Types No. 4 differs in heterogeneous characteristics. With a significant amount of fixed capital and the highest efficiency of working capital, organizations have extremely low values of natural resources, very small staff (9-10 people) and reduced wages (6266 rubles). Obviously, these organizations are small and high-tech, but their further development may be impeded by the small amount of natural and human resources;

- Type 7 is largely an antagonist type 4 - these organizations have at their disposal a large reserve of natural resources (an average of about 5000 hectares and 2300 cattle of conventional livestock), a large team of workers and a large value of the monetary costs per unit of natural resources with weak technical equipment of farms. These are classical large agricultural organizations, oriented to an extensive development path;

- Type 8 is a type of organizations with significant specialization in crop production (average volume of land 22 thousand hectares). At the same time, attention is drawn to the high value of the average power of the elements of fixed capital with a low value of the cost per unit of natural resources;

- Type 9 describes a group of organizations for which a large amount of fixed capital is characteristic. However, in their activities these organizations are experiencing a number of difficulties, in particular, draws attention to the inefficiency of capital turnover, which indicates the loss of the organization and the lowest of all the average salary of employees;

- Type 10 in the structure of indicators is similar to type No. 4, but differs from it by a large amount of fixed capital, reduced efficiency of working capital, significantly lower wages of employees;

- Type 11 is an antagonist of type No. 10 - extremely low cost of fixed capital is compensated by a significant amount of natural resources, in particular, livestock numbers, high working capital

efficiency and a significant number of personnel at the highest wage (19,372 rubles) and cost-to-natural ratio resources;

- Type 12 is in many respects similar to type No. 11, but, unlike it, this group included larger cattle-breeding organizations (more than 6000 cattle of conditional livestock, more than 1100 workers), but having problems with the turnover of working capital (the turnover ratio is 1,018, which indicates that the organizations are on the border of profitability / loss).

Analysis of the data in Table 2 allows us to establish a significant difference in the structure of organizations in different periods. So, in 2007 the most common type was Type 7, which includes large agricultural organizations that are extensively developing (the share of these organizations steadily declined throughout the analyzed period, which indirectly indicates the lack of prospects for the extensive development path). Slightly more than a quarter of agricultural producers in 2007 belonged to type No. 10 (with the share of these organizations beginning to decline after 2011), the third most common type of organization is Type 1 (about 15.5%). Also worthy of attention is the fact that in 2012-2014.

The dominant type of organization (42-45%) was the type of organization No. 3, which can be explained by the consequences of the crisis, which led to a general decrease in the amount of resources at the disposal of the organization. In general, the high volatility of the structure of AIC enterprises by types is explained by the influence of a large number of external factors, the rapidly changing foreign policy situation in general and the economic situation in the country.

Also, as a result of the study, 16 main types of economic resource reproduction in AIC organizations have been identified:

- Type 1 reproduction resources (transfer-livestock) is typical for organizations that successfully carried out during the reporting period the process of insignificant diversification of the organization by redirecting resources to the livestock sector while overall intensification of production due to the

increase in the volume of fixed capital (FC). This is indicated by the figures - these agricultural producers are characterized by FC growth on average by 2.5 million rubles, capacity of 1 FC element by 56 hp/v., increase in profitability by 12.9%;

- Type 2 reproduction of resources (falling) is typical for organizations that sharply reduce the amount of available natural resources. In fact, these agricultural producers are preparing for the end of activities or a significant reduction in the size of the organization (a decrease in FC volume by an average of 10 million rubles, a decrease in arable land by more than 1000 hectares, a livestock by more than 150 cattle);

- Type 3 reproduction of resources (lag-investment) is an example of the rapid development of the organization - with an increase in FC of 16 million rubles, livestock and arable land, average wages of employees, there is a decrease in the overall efficiency of the organization (about 5.5%), which is associated with the inevitable delay in time the effect of investment. These agricultural producers have all the resources for further growth;

- Type 4 reproduction of resources (convergent-livestock) is typical for large or medium-sized organizations that have chosen the tactic of a sharp reduction in the size of the organization, but focused on preserving the livestock sector - this is indicated by an increase in the average capacity of fixed assets with a significant (about 32.5 million rubles) reduction of their volume, staff reduction (an average of 40 people);

- Type 5 reproduction of resources (spherically-extensive) is typical for organizations that have embarked on the path of prepared development and expansion by increasing the volume and quality of all economic resources at the disposal of the organization. According to statistics, in addition to the increase in FC volume by 40 million rubles, the number of livestock and arable land (by 340 cattle and 930 ha, respectively), the number of personnel (+22 people) and the average wage (more than 2000 rubles) The importance of increasing the efficiency of this economic system (+7.8% for the

ratio of revenue to costs), which is evidence of the significant work carried out by the organization's management of the organization of the investment process, in contrast to organizations of the type 3;

- Type 6 reproduction of resources (personalized-optimization) is an example of the effective work of management and the entire staff of the organization - with minor changes in the quantity and quality of the organization's resources, by reducing non-production costs (-29.2 thousand rubles/ha.), a significant increase in the efficiency of the organization's activities was achieved (+42.8% for revenue-to-cost ratio);

- Type 7 reproduction of resources (intensively -contemporary) is typical for organizations that have embarked on the way of technological production - with a decrease in the volume of natural resources, attention is drawn to the increase in the cost of fixed assets at the disposal of the organization (by 14 million rubles). At the same time, it should be noted that in this group, the effect of the activities carried out is mainly manifested in the medium-term time interval, therefore the observed slight decrease in the organization's performance cannot be an indicator of the effectiveness of development path chosen by the organizations;

- Type 8 reproduction of resources (convergent-cropping) is typical for organizations that have chosen the tactic of reducing the size of the organization while maintaining the crop sector. This is evidenced by the fact that with the reduction of the conventional livestock, the number of personnel, the volume of fixed capital and the number of its elements, the agricultural producer increases the volume of arable land. At the same time, the prospects of such organizations are rather vague - such a restructuring of organizations leads to a sharp drop in efficiency (-12.7% for the ratio of revenue and costs to the organization), which reduces the sustainability of the organization and its prospects for further growth;

- Type 9 reproduction of resources (extensive-technological) is typical for organizations with increased volume of natural resources, with increased cost of fixed capital, but lowered the number of own personnel. Apparently, these organizations are implementing a strategy for switching to more sophisticated equipment, as a result of which there is a decrease in the number of employees of the organization;

- Type 10 reproduction of resources (transfer-cropping) is typical for organizations that successfully carried out during the reporting period the process of insignificant diversification of the organization by redirecting resources in the crop sector and reducing the livestock sector by increasing the cost of fixed capital, increasing costs per unit of natural resources (by 8.4 thousand rubles / head - ha.). Particularly noteworthy is the focus of this group of organizations on the promotion of workers, which is an average increase in wages by more than 3,000 rubles and the effectiveness of the measures taken, which was reflected in an increase in the ratio of revenue/costs by 17.4%).

- Type 11 reproduction of resources (emergency) is characterized by significant problems with the process of working capital in the organization. Given the relative stability of the amount of economic resources at the disposal of the organization, a significant reduction in the company's revenues is worthy of notice (as evidenced by a one-third reduction in the revenue / cost ratio with a small increase in production costs), which is a consequence of inefficient production processes or inefficient marketing and sales services in the organization. In any case, these organizations need short-term financial support to overcome the consequences of the disruption of the production process;

- Type 12 reproduction resources (intensively transfer) combines elements of type 1 and type 7 - with a significant reduction in the volume of arable land there is a small increase in the size of fixed assets in the organization (mainly non-production), intensification of production (+ 16.4 thousand tons) rubles/cattle/ha), a significant increase in average wages. However, as shown by the performance figures of the organization, these measures did not bring immediate positive results, on the contrary,

this group of organizations has a decrease in the ratio of revenue / costs of 4%, which, together with the marked intensification of production, indicates a significant amount of unproductive costs and existing barriers on the way development of this type of organization;

- Type 13 reproduction of resources (crisis-depressive) is typical for organizations that have significant problems with the availability of capital in the organization - in addition to reducing the quantitative indicators that characterize the existence of the main and human capital of organizations, draws a catastrophic decline in the working capital (-109.9 thousand rubles/ha-cattle, -27.4% to the revenue/cost ratio). In fact, this type of organization is in the pre-bankrupt state due to inefficient production, which led to the beginning of the process of reducing the amount of resources at the disposal of organizations;

- Type 14 reproduction of resources (tunnel-cropping) is typical for organizations whose investment strategy is to support the development of the crop sector with a gradual reduction in the size of the livestock sector. Separately, it is worth noting the effectiveness of this policy - with an increase in the volume of fixed capital of about 15 million rubles. and increasing the volume of arable land by more than 800 hectares, organizations even in a year of such large-scale changes have achieved an increase in efficiency (+ 5% to the cost recovery);

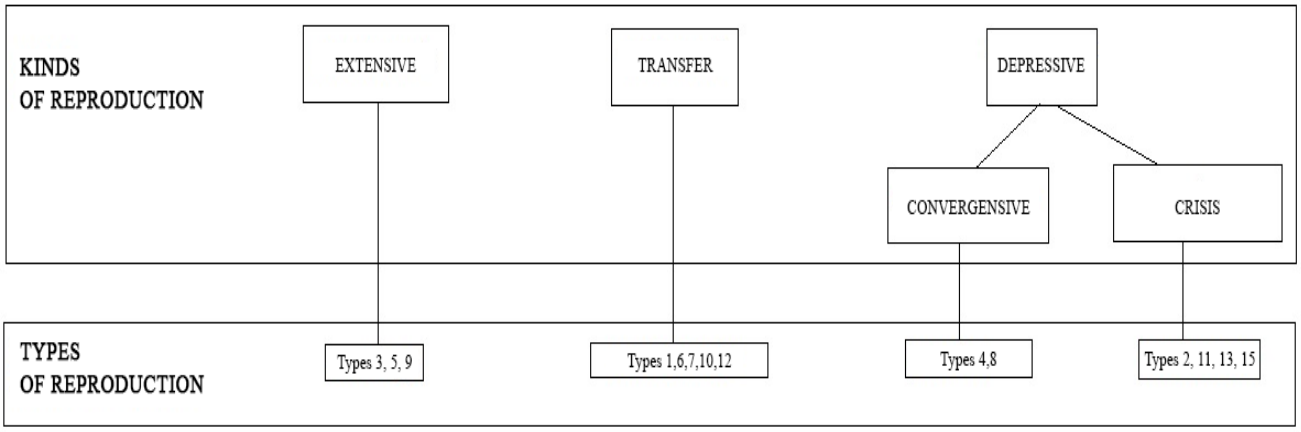
- Type 15 reproduction resources (emergency-investment) is typical for agricultural producers, who could not effectively organize the process of development of organizations (as the reasons for the inefficiency of investments may be the so-called "hypothesis error": as noted by A. Konovalova, "the hypothesis error can be caused by the impossibility carry out objective research of the need for innovation due to the instability of the conditions of management, and unqualified evaluation of the assessment subjects, and the effect of these and other factors (about 15 million rubles), the number of employees, the costs of the production process (+17,6 thousand rubles/cattle-ha) attracts attention

catastrophic the fall in cost recovery - by 37.8%. Obviously, the future of these organizations depends on whether they manage to establish the production process;

- Type 16 reproduction of resources (tunnel and livestock) is typical for organizations whose investment strategy is to support the development of the livestock sector. It is worth noting that these organizations, like organizations Type 14, have increased the efficiency of the organization.

Dedicated 16 types of reproduction process can be grouped into 3 major groups: extensive reproduction (increased volumes of economic resources at the disposal of the organizations), transfer reproduction (there is a redistribution of economic resources in the organization), and depressive reproduction (decreased volumes of economic resources in the organization). The ratio of selected types and kinds of resource reproduction in the AIC organizations is given in Figure 2:

Figure 2 – Ratio of selected reproduction kinds and types.



Of further interest is the study of the prevalence of reproduction types and kinds. The details are given in Table 6.

Table 6 – Dynamics of the structure of prevalence of different resource reproduction types and kinds in the AIC organizations.

Reproduction type number (kinds name)	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Extensive	**55,93**	**23,24**	**36,81**	**32,81**	**38,98**	**31,14**	**40,36**	**26,31**	**26,23**
3	18,47	7	10,19	10,34	9,46	7,73	6,8	2,87	6,49
5	10,29	5,32	9,26	7,19	6,88	5,91	9,52	3,11	5,45
9	20,84	2,8	9,49	6,29	10,32	9,09	7,94	4,07	9,09
14	0,26	5,04	2,08	3,15	8,23	4,77	15,42	1,91	3,9
16	6,07	3,08	5,79	5,84	4,09	3,64	0,68	14,35	1,3
Transfer	**18,73**	**21,56**	**31,02**	**37,58**	**31,83**	**33,64**	**27,44**	**45,94**	**32,47**
1	3,69	3,92	8,8	9,66	5,81	6,14	4,99	6,7	10,13
6	7,65	4,2	10,88	8,09	8,6	10,91	11,79	6,7	7,53
7	1,06	7	3,94	6,97	4,73	7,95	2,95	8,85	7,53
10	3,69	3,36	3,7	8,37	6,88	6,14	6,12	6,94	4,16
12	2,64	3,08	3,7	4,49	5,81	2,5	1,59	16,75	3,12
Depressed	**25,33**	**49,17**	**32,18**	**34,6**	**34,2**	**35,22**	**32,21**	**27,75**	**41,3**
Convergent	*7,65*	*23,53*	*12,73*	*10,56*	*10,75*	*11,36*	*9,3*	*6,94*	*9,61*
4	5,01	8,12	5,32	6,29	4,73	3,18	2,04	3,59	2,34
8	2,64	15,41	7,41	4,27	6,02	8,18	7,26	3,35	7,27
Crisis	*17,68*	*25,64*	*19,45*	*24,04*	*23,45*	*23,86*	*22,91*	*20,81*	*31,69*
2	3,17	5,6	3,94	6,07	4,73	6,59	2,27	5,5	3,12
11	2,9	9,8	7,64	8,09	5,38	6,14	5,9	5,74	10,39
13	8,71	3,8	5,09	4,94	4,09	7,95	8,62	5,26	10,91
15	2,9	6,44	2,78	4,94	9,25	3,18	6,12	4,31	7,27

Source: Calculated by authors.

An analysis of the prevalence of reproduction types and kinds made it possible to draw the following conclusions:

- In 2015-2016 years, a predominance of a depressive type of reproduction was observed (on average in 2 organizations out of 5). At the same time, the absolute value of the share of this type of reproduction was the maximum since 2008-2009. Of all depressive types of reproduction, Types 11 and 13 prevail, which makes it possible to talk about problems, first of all, in the sale of products, and secondly, problems in the organization of production process. At the same time, every fourth agricultural organization in the region develops under an extensive scenario, that is, it increases the volume of economic resources at its disposal, and the most common type of growth is Type 9, which involves a reduction in the number of personnel with an increase in the number of other economic resources;

- Retrospectively assessing the pattern of Table 5, you can identify a number of anxiety symptoms. First, in 2014-2016 years, the percentage of organizations with an extensive type of development has reached an absolute minimum since 2008. Secondly, in comparison with the crisis in 2008, the situation is somewhat more alarming: if at that time almost half of the depressed organizations developed according to a convergent scenario that envisaged systematic reduction of the size of the organization with significant but uncritical losses in the cost recovery, today most of the depressed organizations are catastrophically loses its effectiveness in the performance of its own activities, due to which for a short period of time it is on the verge of bankruptcy;

- Attention is drawn to the gradual increase in the share of the transfer type of reproduction, which in general can be interpreted as a transition to the search for domestic sources of growth; while the effectiveness of these activities remains low.

Summarizing the analysis results, the following may be mentioned:

- In the medium term (2011-2016), the development of the majority of AIC organizations in the Nizhny Novgorod region can be characterized as a technological one focused on the introduction of new technologies. At the same time, not all investments turned out to be useful, which resulted in a decrease in the cost recovery, which, in turn, led to a decrease in the volume of natural resources at the disposal of the organization;

- In the short term, the predominance of a depressed type of reproduction, problems in the sale of products and in the organization of the production process attracts attention, which actualizes the problem of evaluating the effectiveness of innovative investment projects (since, as noted in (Luo et al, 2017), innovation is a source of competitive advantage in AIC) and choice of effective solutions in the development of agricultural producers.

CONCLUSIONS.

The presented analysis allows us to speak about the presence of an imbalance in the economic resource composition of agricultural organizations of the Nizhny Novgorod region - economic entities are focused mainly on the reproduction of fixed capital, which today is a dead-end way of development (at least without corresponding increase in the quantity and quality of other factors of production).

However, the situation is not critical - despite the prevalence in 2015-2016 of a depressive reproduction of resources, a timely change in the development vector towards improving the composition and quality of personnel, the organizational structure, its educational level, can remedy the situation, prevent the emergence of a crisis and provide conditions for the continued growth of agricultural producers both in a specific region and the whole country.

To do that, it is necessary to conduct a number of studies in various fields of knowledge, in particular, to continue developing more accurate and informative methods for analyzing information on the

reproduction of economic resources, to pay attention to improving the system of information exchange between a society and agricultural producers.

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RECIBIDO: 5 de febrero del 2019. **APROBADO**: 23 de febrero del 2019.