

Methodological Approaches to the Distribution of Territories by the Level of Resource Potential Use

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Abstract—This methodology is based on the selection of indicators reflecting the availability, level of investment and efficiency of the following types of resources: labor resources, fixed and circulating funds, agricultural land area. To bring the system of heterogeneous indicators to a single basis, the normalization procedure is applied. An integral assessment is formed for each group of indicators, and then, by simple summation, an integral assessment of the resource potential. To consider the dynamic processes of the resource potential and its impact on the production and commercial economic results of agricultural entities, it is proposed to take into account the average annual growth rates of the entire resource potential of the territory, its functional components, as well as revenue from sales. This allows you to assess the degree of sensitivity (elasticity) of income for the main activity to a change in the level of use of a particular type of resource. At the end of this methodology, the distribution of territories by the level of elasticity of revenue from products' sales and the aggregate integral indicator of the resource potential of the territories is given. The calculations made it possible to group the Kurgan region's districts according to the final indicator and thereby form a "map" of the investment attractiveness of these territories.

Keywords—level of resource potential use, integral indicator of resource potential, 'map' of investment attractiveness of territories.

I. INTRODUCTION

Successful functioning of territories is largely determined by conditions of adaptation to the risks and threats of agri-food systems that they belong to. To counter threats, you need to have your own strategy and tactics based on the efficient use of existing resource potential. In agriculture, this issue is particularly acute, due to the fact that agricultural producers are forced not only to use their resource potential, but also to adapt it to the climatic, geographical and other economic conditions. The relevance of this scientific research is confirmed by the involvement of study on composition and effectiveness of the resource potential use by such scientists as A.I. Altukhova, G.V. Bepahatny, B.A. Reisberg, A.L. Pustueva, A.N. Semina, O.D. Rubaeva, T.I. Bukhtiyarova and others [1-13]. Meanwhile, the formation of methodological approaches to the distribution of territories by the level of resource potential use is still poorly studied. Therefore, the presence of this aspect predetermined the purpose of scientific

research. The objects of study were districts of the Kurgan region. Study period was in years of 2016-2018.

II. RESEARCH METHODOLOGY

The methodology is based on the selection of indicators reflecting the availability, level of investment and efficiency of use of the following types of resources: labor resources, fixed and circulating funds, agricultural land area. In order to bring heterogeneous indicators to a single basis, the normalization procedure was applied and an integral indicator of the use of each component of the resource potential was formed. Further, using the dynamics indicators, the degree of sensitivity of the growth in revenue from sales of agricultural producers to the level of resource potential use was determined [14-16]. The calculations made it possible to group districts of the Kurgan region according to the final indicator and thereby form a "map" of the investment attractiveness of the territories.

III. RESULTS

In the framework of a unified approach, the same number of indicators was selected for each type of resource, which reflect the presence, level of investment, and efficiency of its use.

1) Labor resources:

- Average annual number of employees;
- Labor costs per 1 ha of agricultural land;
- Average annual output of 1 employee.

2) Fixed funds:

- Average annual value of fixed funds;
- Fund security;
- Fund's payoff.

3) Circulating funds:

- Average annual value of circulating funds;
- Circulating funds per 1 ha of agricultural land;
- Turnover ratio of circulating funds.

4) Area of agricultural land:

- Area of agricultural land;
- Plow coefficient;

- Sales' revenues per 1 ha of agricultural land.

The development of an integral utilization coefficient of the resource potential requires the reduction of heterogeneous indicators to a comparable form, for which the normalization procedure is applied with the following formulas:

- if the dynamics of the indicator seeks growth:

$$C_N = AV / R, \quad (1)$$

- if the dynamics of the indicator seeks decay:

$$C_N = R / AV, \quad (2)$$

where C_N is the normalized coefficient; AV is the actual value of the indicator; R is the reference value of the indicator.

An integral assessment of the level of resource potential is determined by a simple summation of the normalized coefficients for each group of indicators, and for the whole population as a whole (Figure 1).

It should be noted that the cumulative integral indicator for the analyzed period decreased by 6 percentage points, primarily due to a decrease in the labor potential of rural territories. Agricultural producers are still experiencing an acute shortage not only of young highly qualified specialists, but also of workers in working specialties.

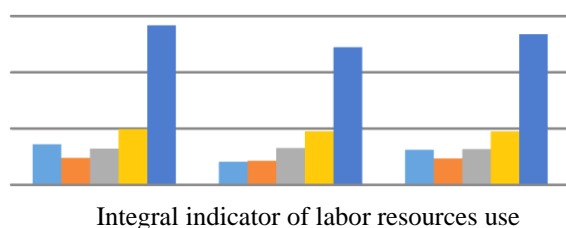


Fig. 1. Dynamics of an integral indicator of the resource potential level of agricultural producers of the Kurgan region.

In general, the districts of the Kurgan region were distributed according to the aggregate indicator as follows (Table I).

TABLE I. DISTRIBUTIONS OF THE KURGAN REGION'S DISTRICTS IN TERMS OF RESOURCE POTENTIAL

District groups by integral indicator	Districts	Level of resource potential use
2.0-3.5	Almenevsky, Belozersky, Zverinogolovsky, Prietobolny, Chastozersky	Low
3.5-5.0	Vargashinsky, Dalmatovsky, Kargapolsky, Kataysky, Makushinsky, Mishkinsky, Mokrousovsky, Petukhovsky, Polovinsky, Safakulevsky, Tselinny, Shatrovsky, Shumikhinsky, Yurgamyshsky	Average
5.0 and over	Ketovsky, Kurtamyshsky, Lebyazhievsky, Shadrinsky, Schuchansky	High

Most of them have an average level of resource potential use, which determines the need to develop measures to increase its level. Such districts as Ketovsky, Kurtamyshsky, Lebyazhievsky, Shadrinsky and Schuchansky, having a high resource potential, should become a "locomotive" in attracting not only state, but also private investments.

In general, the above methodology is able to assess the level of the resource potential of the territory, but does not take into account the dynamic processes of the subject of study and its impact on the production and commercial results of managing agricultural entities. In this regard, it is proposed to take into account the average annual growth rates of the entire resource potential of the territory and its functional components, as well as revenue from sales, which, on the one hand, is the final result of the product marketing process, and on the other hand, a criterion for the efficiency of the production process. Comparison of the average annual growth rates of sales revenue and integral indicators of the functional components of the subject of study will allow us to assess the degree of sensitivity (elasticity) of income in the main activity to a change in the level of use of a particular type of resource.

In general, the distribution of the Kurgan region's districts by the elasticity coefficient of revenue from sales of products and the integral indicator of the use of labor resources is approaching the normal law (Table II). Most of the districts have a rather high degree of sensitivity of indicators, which potentially indicates the need to increase the number of workers in agriculture and improve their qualification level [17-19].

TABLE II. EVALUATION OF THE SALES PROCEEDS' ELASTICITY TO CHANGES IN THE INTEGRAL INDICATOR OF LABOR RESOURCES USE

Group of districts by elasticity coefficient	Districts	Elasticity evaluation
0.7-1.1	Dalmatovsky, Zverinogolovsky, Ketovsky, Makushinsky, Prietobolny, Tselinny, Yurgamyshsky	Low
1.1-1.5	Belozersky, Kargapolsky, Kataysky, Kurtamyshsky, Lebyazhievsky, Mishkinsky, Polovinsky, Safakulevsky, Chastozersky, Shadrinsky, Shatrovsky, Schuchansky	Average
1.5 and over	Almenevsky, Vargashinsky, Mokrousovsky, Petukhovsky, Shumikhinsky	High

A similar assessment was carried out according to the degree of sensitivity of sales proceeds to integrated indicators of the use of fixed and circulating funds (Table III, IV). Almost half of the districts of the Kurgan region have a low level of revenue growth from sales to changes in the level of use of material resources.

TABLE III. EVALUATION OF SALES PROCEEDS' ELASTICITY TO CHANGES IN THE INTEGRAL INDICATOR OF THE FIXED FUND USE

Group of districts by elasticity coefficient	Districts	Elasticity evaluation
0.7-1.1	Dalmatovsky, Zverinogolovsky, Kargapolsky, Kataysky, Ketovsky, Makushinsky, Pritobolny, Safakulevsky, Tselinny, Yurgamyshsky	Low
1.1-1.5	Belozersky, Kurtamyshsky, Lebyazhievsky, Mishkinsky, Mokrousovsky, Polovinsky, Chastozersky, Shadrinsky, Shatrovsky, Schuchansky	Average
1.5 and over	Almenevsky, Vargashinsky, Petukhovsky, Shumikhinsky	High

TABLE IV. EVALUATION OF SALES PROCEEDS' ELASTICITY TO CHANGES IN THE INTEGRAL INDICATOR OF THE CIRCULATING FUND USE

Group of districts by elasticity coefficient	Districts	Elasticity evaluation
0.7-1.1	Dalmatovsky, Zverinogolovsky, Kargapolsky, Kataysky, Makushinsky, Priobolny, Safakulevsky, Tselinny, Yurgamyshsky	Low
1.1-1.5	Belozersky, Ketovsky, Kurtamyshsky, Lebyazhievsky, Mishkinsky, Mokrousovsky, Polovinsky, Chastrinozersky, Shadrinsky, Shatrovsky, Schuchansky	Average
1.5 and over	Almenevsky, Vargashinsky, Petukhovsky, Shumikhinsky	High

This situation reflects the need for a qualitative transformation of the material and technical base of agricultural producers, which will contribute to a higher level of return on the use of material resources.

The degree of sensitivity of revenue to changes in the integral indicator of agricultural land use shows that more than 90% of all territories have a low and medium degree of elasticity (Table V).

TABLE V. EVALUATION OF SALES PROCEEDS' ELASTICITY TO CHANGES IN THE INTEGRAL INDICATOR OF THE AGRICULTURAL LAND USE

Group of districts by elasticity coefficient	Districts	Elasticity evaluation
0.7-1.1	Dalmatovsky, Zverinogolovsky, Kargapolsky, Kataysky, Ketovsky, Makushinsky, Safakulevsky, Tselinny, Yurgamyshsky	Low
1.1-1.5	Belozersky, Kurtamyshsky, Lebyazhievsky, Mishkinsky, Mokrousovsky, Petukhovsky, Polovinsky, Priobolnoe, Chastrovozersky, Shadrinsky, Shatrovsky, Schuchansky	Average
1.5 and over	Almenevsky, Vargashinsky, Shumikhinsky	High

The introduction of resource-saving technologies capable of preserving and improving soil fertility will contribute to a high level of return.

The logical conclusion of the methodology is the distribution of territories according to the level of elasticity of revenue from sales of products and the cumulative integral indicator of resource potential (Table VI).

Only four districts have a high level of revenue growth to change the degree of use of resource potential. Such territories and the conditions of their management may be of interest to private investors, as able to provide a higher increase in income on invested resources [20-21].

TABLE VI. EVALUATION OF SALES PROCEEDS' ELASTICITY TO CHANGES IN THE CUMULATIVE INTEGRAL INDICATOR OF THE RESOURCE POTENTIAL USE

Group of districts by elasticity coefficient	Districts	Elasticity evaluation
0.7-1.1	Dalmatovsky, Zverinogolovsky, Kargapolsky, Kataysky, Makushinsky, Priobolny, Safakulevsky, Tselinny, Yurgamyshsky	Low
1.1-1.5	Belozersky, Ketovsky, Kurtamyshsky, Lebyazhievsky, Mishkinsky, Mokrousovsky, Polovinsky, Chastrinozersky, Shadrinsky, Shatrovsky, Schuchansky	Average
1.5 and over	Almenevsky, Vargashinsky, Petukhovsky, Shumikhinsky	High

From this point of view, the study allows us to draw up a "map" of the investment attractiveness of the districts, based on the elasticity of the commercial results of agricultural producers and the degree of resource potential use (Table VII).

TABLE VII. MAP OF INVESTMENT ATTRACTIVENESS OF THE KURGAN REGION

Districts	Evaluation of sales proceeds' elasticity to changes in the integral indicator of the use of: *				
	Labor resources	Fixed funds	Circulating funds	Land area	Resource potential
Almenevsky	H	H	H	H	H
Belozersky	A	A	A	A	A
Vargashinsky	H	H	H	H	H
Dalmatovsky	L	L	L	L	L
Zverinogolovsky	L	L	L	L	L
Kargapolsky	A	L	L	L	L
Kataysky	A	L	L	L	L
Ketovsky	L	L	A	L	A
Kurtamyshsky	A	A	A	A	A
Lebyazhevsky	A	A	A	A	A
Makushinsky	L	L	L	L	L
Mishkinsky	A	A	A	A	A
Mokrousovsky	H	A	A	A	A
Petukhovsky	H	H	H	A	H
Polovinsky	A	A	A	A	A
Priobolny	L	L	L	A	L
Safakulevsky	A	L	L	L	L
Tselinny	L	L	L	L	L
Chastoozersky	A	A	A	A	A
Shadrinsky	A	A	A	A	A
Shatrovsky	A	A	A	A	A
Shumikhinsky	H	H	H	H	H
Schuchansky	A	A	A	A	A
Yurgamyshsky	L	L	L	L	L

* H - high elasticity; A - average elasticity; L - low elasticity.

Territories with a low level of elasticity of indicators can provide a 10% increase in sales revenue with an increase in the use of resource potential by 1%. Such districts need, first of all, a qualitative transformation of their resources, and an increase in the efficiency of their use.

Those districts of the Kurgan region that have an average level of elasticity are able to provide revenue growth from 10% to 50% with an increase in the level of use of resource potential by 1%. Such territories will be "sensitive" to attracting both private and state investments aimed at

replenishing the corresponding types of resources with a concomitant increase in their quality characteristics [22].

Districts with a high level of elasticity of indicators are able to provide more than 50% revenue growth with an increase in the use of resource potential by 1%. Territories may be of particular interest for attracting investments, since there are ways to achieve high returns, both by attracting an additional number of resources and by increasing the level of intensity and efficiency of their use.

IV. CONCLUSION

The proposed method has several advantages. Firstly, it can be used to determine the level of resource potential of not only the territory, but also of a single economic entity. Secondly, the set of indicators included in the model can be expanded and supplemented depending on the goals and preferences of the analyst. Thirdly, the technique is not loaded by mathematical and statistical procedures, which makes it available for use.

The proposed methodological approaches may be of interest to scientists and representatives of the educational sector, analytical departments of various executive bodies in order to justify the investment attractiveness of certain territories.

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