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THE STATE POLICY OF ECOLOGICALLY SAFE USE OF AGRICULTURAL RESOURCES AS A CONDITION FOR BUILDING A FRIENDLY ECOSYSTEM THAT FAVORS THE DEVELOPMENT OF CONSTRUCTION SECTOR

Keywords: state agrarian policy, organic farming protection system, soil fertility reconstruction, agricultural resource usage efficiency.

Abstract

In the Russian Federation just as in the European Union countries, the ecologically safe ways of using agricultural resources and the reproduction of soil fertility resulting from the intensification of agricultural production are treated very seriously. The solution to this problem is possible through the development and implementation of agriculture systems based on fundamentally new ways of using natural resources, saving resources and biological methods in the process of increasing soil fertility by producers of agricultural goods. At the same time, an important role in the implementation of reproductive processes of agricultural land belongs to the state that implements ecologically safe use of agricultural resources policy through the state subsidy system.

The study found that in modern conditions of agricultural development in solving tasks related to increasing the efficiency of agricultural production, while preserving, increasing soil fertility, protection of the surrounding environment, requires a transition to adaptive-landscape farming systems by the producers of agricultural goods. The projected size of the culture fertility made it possible to calculate the size of the state subsidies for the soil fertility reproduction in the case of crop production in the Kursk region (Russian Federation).

Introduction

The state agrarian policy, being an external factor in the development of agricultural production, should be directed primarily at increasing the efficiency of agricultural production and the use of agricultural, labor and material-monetary resources.

Such approach can guarantee a decrease in the development of extensive agriculture limiting the possibility of implementing selected investment-construction projects in non-urbanized areas, while meeting the conditions of sustainable development.

The most important resource that determines the specificity of agriculture, which largely determines the effectiveness of the use of all resources and production, are agricultural resources. According to A.S. Kowali regarding agricultural resources, the agrarian policy of the state should represent the system of political decisions and legal norms, as well as economic measures aimed at ensuring food security of the country based on the domestic production, creating friendly living conditions and economic activity of the rural population, increasing the efficiency of agricultural resources use and their reproduction, agrarian technology development and increasing the ability to create competition in agriculture [1. - p. 41].

The agricultural resources management system is focused on effective use of them in the interest of all segments of society. According to A.S. Tarasow, it consists of three components: institutional environment (legislation, organization, tradition), economic mechanism (land price, tax regulation, mortgage) and resource security (scientific security, personnel, finance, information, technology), i.e. as a basic element it includes socio-state directions of influence on agricultural producers [2. - pp. 13-14].

Research methodology

The work of classic economic thought, and domestic and foreign economists were the scientific basis of the study. Available legal acts, studies of scientific and research institutions, normative and informative materials were used.

Sources of information consisted of materials from statistical institutions, annual reports of agricultural enterprises in the Kursk region (Russian Federation) for the 2011-2015 period. The following basic methods of economic research were used in the article: monographic, abstract and logical, statistical-economic, computational-constructive,

economic-mathematical, correlation and regressive analysis and others.

Results and discussion

Effective use of agricultural resources may be based primarily on an adequate, well-developed organizational-economic mechanism for the reproduction of soil fertility. As shown by world experience, market mechanisms are important for regulating the dependency of the use of agricultural resources and fertility reproduction. However, in the global practice, there is absolutely no free market for agricultural lands, as well as the food and agricultural resources market related to it.

In most countries with developed agriculture, relation of property to land and natural resources is shaped by the actions of developed market institutions. However, the redistribution of agricultural resources is connected to a whole range of restrictions related to the need of thorough control and regulation of not only the land market, but also ways to use it to prevent degradation and creation of irrational production structures, ecological pollution, etc. [3].

Most authors who have studied agrarian creation of agricultural relations (among them I.N. Buzdalow, N.W. Komow, N.G. Konokotin, A.E. Sagajdak) recognize that the state should retain control over the creation and development of institutions managing land ownership and its usage. The reasons of such interference by the state in the functioning of market mechanisms relating to the land are:

1) securing a sufficient level of utilization of agricultural land;
2) securing ecological requirements;
3) implementation of socially fair re-division of land and pension income [4-7].

The most important (basic) components of the economic mechanism are: price, tax and credit regulation. Price as an instrument of market economics is the main measure of the agricultural resources value. For the state, the value of land as the economic resource value is reduced to the amount of tax that can be provided by the plot, and for the owner - as the amount of investment resources that can constantly improve the efficiency of using the agricultural parcel [8. - p.18]. The economic concept of regulating the agricultural real estate market by state institutions is based on the price mechanism.

In the Kursk region, the quality of agricultural land is related to their fertility level, which is determined by the soil (humus and gray forest soil) and the degree of land drainage. The fertility level affects the production volume, and thus the land value as a resource for agricultural

production.

The research allowed to determine that the fertility of grain cultures on humus is 8-9% higher than on gray forest soils, and sugar beet – higher than 13-14% [9. -p. 126]. Using these values to assess the relative fertility and fertility of other agricultural cultures, dividing them into cultures of dense and intercropping sowing, as well as the actual structure of sowing areas that have formed in recent years, it can be determined that average productivity of humus is about 10% higher than gray forest soils.

To assess the impact of soil drainage on their productivity, the relative levels of fertility of agricultural cultures on the land with varying degrees of erosion and the actual structure of the sowing areas are used. The calculations show that the average relative fertility level on poorly run-off soils is 85% compared to non run-off soils, on average run-offs - 53%, on highly run-offs – 31-32%.

Assuming 1 is the fertility on moderately drained gray forest soils, relative levels of average productivity of other soils were calculated due to drainage and soil type, taking into account some larger differences in their productivity (Table 1).

Table 1. Relative levels of soil productivity in Kursk district

Soil runoff	Agro-soil region with the predominance of	
	chernozem	afisols
None	2,08	1,89
Poor	1,76	1,60
Medium	1,10	1,00

The average productivity of 1 ha in relation to the least fertile lands is 1.88. If we take into account that the value of 1 ha of the land on average in the Kursk region is about 50 thousand rub., the value of the worst plots will amount to 26.6 thousand. rub. The value of other agricultural parcels can be calculated according to the relative amount of their productivity. The highest value will have non run-off lands on humus, equal to 55.4 thousand rub.

Evaluation of the land based on the mentioned methodology according to the circumferences of the region shows that the highest value of 1 ha, equal to 53.4 thousand rub., is in the district of Pristienskom mainly with humus soils, and the lowest of 46.2 thousand rub. is in Zeleznogorskom district with a predominance of gray forest soils (Fig. 1).

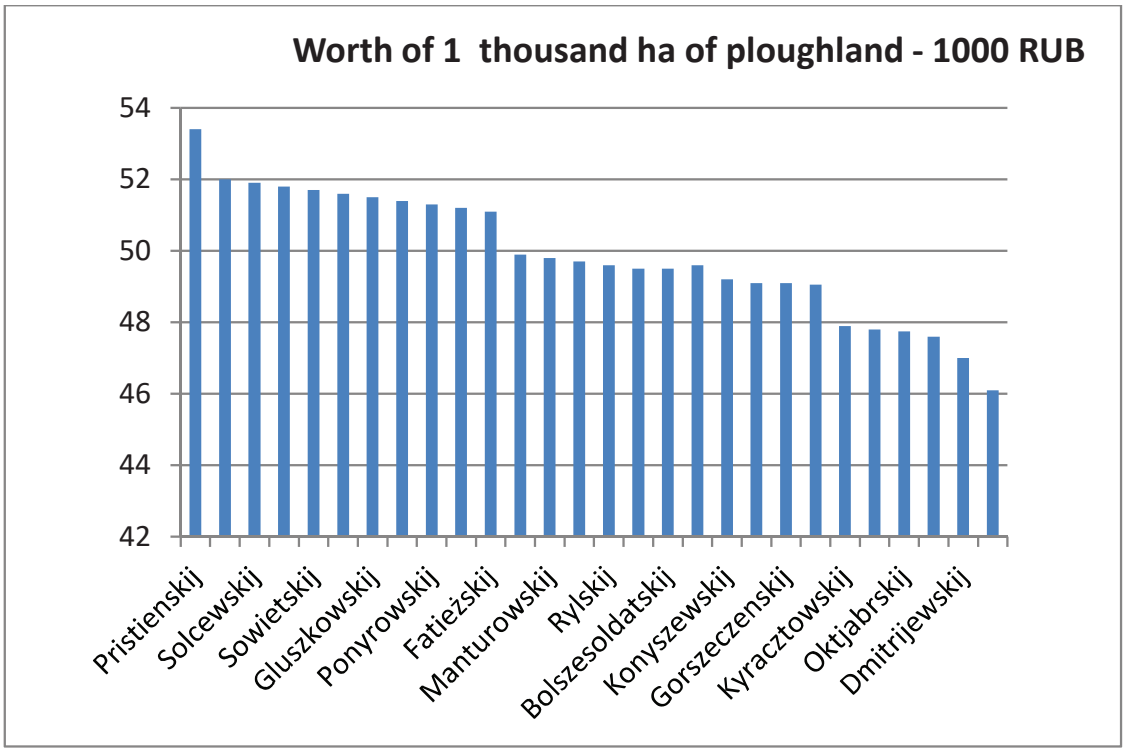

Fig. 1. Ploughland estimation according to administrative areas of Kursk district

The basic component of the economic mechanism for regulating agricultural relations in agriculture is the payment for land, which should correspond to regional conditions for agricultural production, stimulate the increase of its effectiveness development, and safeguard the agricultural resources reproduction process.

Obtained land value estimates can be used to calculate the cadastral value of the land, because they take into account its natural characteristics, as well as to determine the size of taxes from 1 ha of land.

At present, the rate of land tax, equal to 0.3% of its cadastral value, is weakly related to pension relation, because the methodology of determining cadastral values is not based on the size of the pension, let alone its various components. Due to the fact that the concept of pension is at the basis of the reproduction of agricultural resources theory, the evaluation of the tax base and tax rate should take into account pension relation.

Any part of the agricultural pension can be used for the reproduction of agricultural resources. However, appropriate conditions should be met for this. To use the absolute pension, the entrepreneur should be the owner of the land, differential pension I - state policy,

agriculture development and improvement of soil fertility friendly, differential pension II - long-term land lease terms.

For the simple reproduction of agricultural resources, an absolute and differential pension I should be used, which in the form of production-related expenses (lease and land taxes) should be included in the own production costs. Extended reproduction should be carried out through the differential pension II.

Evaluation of the value of land using the proposed methodology takes into account differences in the natural fertility of the lands, and thus the size of the absolute pension and differential pension I. The amount of the absolute pension can be determined starting from the market value of the worst plots and capital percentages. In the Kursk region, the worst plots, which are proposed to be used in agricultural turnover, are located on medium drained lands with gray forest soils whose value assessment in the calculations made corresponds to 26.6 thousand rub.. This part of the value of the land should not be subject to tax, and the income from its use should become the source for the land owner to reproduce minimum level of fertility, corresponding to the worst lands used. The minimum assessment of agricultural resources indicated should be taken as the basis for determining the lease payment.

The size of the differential pension I will be proportional to the part of the land value that exceeds its minimum evaluation. This value should be the tax base. As a result of using only a part of the value of land for taxation, the variation in the amount of tax payments per 1 ha of land will increase, which will stimulate more effective use of the most fertile lands. With the existing tax rate for land, equal to 0.3%, the size of tax calculations per 1 ha of the land on average for the perimeter is (49.8-26.6) x 0.003 x 1000 = 69.4 rub. with a differentiation from 58.9 to 80.2 rub. per 1 ha.

The sum of tax obligations using the proposed methodology amounts to over 88 million. In 2015, the calculated agricultural tax from agricultural organizations of the region was 174 million rub., which exceeds the predicted value 2 times. The proposed system of taxation of only a part of the agricultural land value, according to the calculations made, creates premises for increasing the demand on the agricultural land market and will include a larger number of agricultural plots in the market.

Additional funds and new investments are needed for the implementation of the extended land reproduction. Application of state funds from the budgets of various levels is an important source of funds

for the implementation of reproductive processes of agricultural land. The basic source here is the regional budget from the part that pertains to the inflows from the agricultural tax.

Experience related to the development and implementation of state programs to support the agricultural production development, including the program to preserve and increase the soil fertility, showed their low efficiency due to the imperfection of the state resources division.

The most effective method of solving the indicated problems, as shown by world experience, is the separation of subsidies for the production of specific types of agricultural goods. Because cultivating different agronomic cultures has a different influence on the land fertility (in particular on the balance of humus), taking into account this influence can also determine the size of divided state support measures.

Due to the fact that the basic task of agriculture is to provide food products to citizens, and of the processing industry - resources, the most important thing to fulfill this task will be to determine the subsidies per production unit. The size of this production will be easier to account for and document its size.

Calculations of the humus balance according to agronomic cultures, taking into account the loss of humus due to mineralization and supplementing it with post-harvest and root residues, is related to the fertility size.

In order to determine trends, which have an important significance for forecasting the fertility volume, a correlation-regressive analysis of the fertility dynamics for 1991-2015 was carried out. The use of the linear function gives the best results when processing a series of fertility crop cultures for 1994-2015 and the exponential function - for 1997-2015 (Table 2).

Table 2. Results of grain culture fertility analysis in Kursk district in 1991-2015

Period	Equation*	Determination factor	Significance *F*	Significance *t*	
				a	*b*
1997-2015	$Y=3,99t^{0,655}$	0,789	1,0E-04	0,001	1E-04
1994-2015	$Y=10,1+0,944t$	0,765	5,35E-05	0,002	5,35E-05

* t – starting number of the five-year period (t=1 for 1991r.)

The length of the timeline in this and other case is enough to forecast 5 years forward, and the fertility forecast is 37-38 q / ha. Taking into account the achieved fertility level of grain cultures in the last two

years, one can conclude that there is a quite high probability that its size in 2020 may be about 37 q / ha.

For the evaluation of the forecasted fertility for certain grain cultures, comparisons of their average fertility to the fertility of agronomic cultures for 2011-2015 were used, which are extrapolated to the period of up to 2020.

Analyzing the prognosis of the sugar beet fertility using the mentioned methodology, one can conclude that most likely in 2020 its fertility will be equal to approximately 400 q // ha.

The calculations of the humus balance, carried out according to the size of the forecasted fertility, show in the conditions of the Kursk region that its positive size will be only for spring grain cultures, and for annual and perennial grasses.

Safer sowing areas structure can lower the negative balance of humus using arable land. It is possible to achieve it on the basis of agricultural systems development and implementation, based on fundamentally new ways of using natural resources, resources saving and biological methods of increasing soil fertility, which should provide an extended reproduction and stable development of agricultural production [10, p. 3].

It was found in the study that in the present conditions of agricultural development, the solution of issues related to increasing the efficiency of agricultural production, preservation and increase of soil fertility, and protection of the surrounding environment, will require a transition to adaptive-landscape farming systems [11, 12].

Establishing a rational interdependence between natural and agricultural application as the most important factor for creating ecologically stable agricultural landscapes, determines in advance the need to optimize the structure of arable land use, which is a decisive condition for increasing the fertility of cultivated crops and increasing the efficiency of all agricultural activities.

The main requirement for designing the optimum structure of sowing areas is to take into account the agro-ecological inhomogeneity of the lands. Currently, in the Kursk region, intensive use is assumed for 1728 thousands of hectares of the land out of 1912 thousands, for 162 000 ha – limited use, for 22 000 ha - very limited use.

Optimization of the parameters of the industry structure of agricultural production was carried out in a diversified manner in two agro-ecological groups: intensive and limited use of the land. The land area with very limited intentional use is transformed into natural fodder

arable lands. For this, an economical-mathematical model has been developed that has a block structure. It took into account the need to preserve soil fertility expressed in the humus balance. In addition, the model used constraints to protect agronomic cultures with the best predecessors, which allows to distribute the optimal sowing areas in crop rotation (Table 3).

Table 3. Designed sowing areas and the structure of ploughland usage in Kursk District

Name of culture	Overall		According to ploughland category			
	ha [k]	%	Intensive usage		Limited usage	
			ha [k]	%	ha [k]	%
Grain – kultures	1078,3	57,0	980,9	56,8	97,4	60,0
Technical root crops	263,9	14,0	263,9	15,3	-	-
Potatoes and vegetables	71,5	3,8	71,5	4,1	-	-
Fodder	303,1	16,0	238,2	13,8	64,9	40,0
Clean set-aside	173,5	9,2	173,5	10,0	-	-
Ploughland overall	1890,3	100	1728	100	162,3	100

To determine the size of state subsidies intended for the reproduction of soil fertility, it was assumed that the sum of agricultural tax would be assigned for this. Its size is distributed among groups of agronomic cultures proportionally to the negative values of the humus balance, taken from the module. The total sums obtained were then correlated with the projected size of the sowing areas and fertility (Table 4).

Table 4. Calculation of subsidies for soil fertility reproduction in vegetable production in Kursk district

Name of culture	Predicted productivity t/ha	Humus balance			Subsidy	
		t/ha	Overall t [k]	overall t [k]	rub./ha	rubl/t
Grain comestible	4,04	-0,52	-280,0	29880	55,7	15,0
Grain comestible	3,65	-0,07	-32,2	3431	7,2	2,2
Porridge	1,34	-0,4	-26,4	2819	42,7	34,7
Grain –Grain overall	3,70	-0,31	-338,6	36130	33,5	9,9
White beet	40,00	-1,6	-184,4	19674	170,7	4,3
Sunflower	2,30	-1,92	-168,2	17948	204,9	89,1
Soy	1,90	-0,35	-10,9	1166	37,3	19,7
Potatoes and vegeta-bles	16,00	-1,8	-128,6	13725	192,1	12,0
Crops - overall	-	-0,48	-822,8	88643	51,9	-

Because part of animal production is based on fodder obtained from arable land, the production of which adversely affects the balance of humus, it is also necessary for such production to allocate state subsidies dedicated to the reconstruction of soil fertility.

Production related to cattle breeding assumes the use of fodder obtained from grain and fodder crops, as well as from natural fodder use. The positive total humus balance in the forecasted optimal sowing structure exceeds its negative size in grain-fodder cultures. Taking into account the possibility of using organic fertilizers, subsidies for production in the corresponding animal production industries (milk, live weight of large, horned cattle) in the proposed variant are not expected.

In the pig and bird breeding industries, which produce on the basis of their own forage, the basic part comes from cultivating grain-based cultures with a negative balance of humus. State subsidies should be granted to implement the reproduction of soil fertility. Their size was calculated starting from the demand for concentrated fodder, the amount of grain fodder and the sowing areas of grain-feed cultures per unit of production (Table 5).

Table 5. Calculation of subsidies for soil fertility reproduction in animal production in Kursk district

Production type	Need for realized production per ton	
	Area of grain feeding cultures, (ha)	Scale of subsidy (rub)
Live weight of pigs	6,0	13,2
Live weight fowl	4,5	9,9
Eggs [k]	0,17	0,37

When changing the sum of budgeted resources, the size of subsidies may be adjusted proportionally. However, the reduction of the sum will not allow for the simple reproduction of agronomic resources in agriculture. For the extended reproduction of soil fertility, additional resources should be applied.

Conclusion

The implementation of the proposed measures of state's impact on the processes of agricultural resources reproduction will allow to constantly maintain their fertility, reduce the ecological burden of the land and increase the efficiency of its use. This will create favorable conditions for increasing the economic efficiency of agricultural production, as a

result improving the social situation of rural residents, securing the food independence and security of the country, preserving natural agricultural landscapes and solving ecological problems.

The proposal aimed at achieving the above-mentioned results may prove to be helpful from the point of view of stimulating investment decisions of rural residents. Construction projects implemented in non-urbanized areas may turn out to be more attractive, provided that a policy of reproduction of agricultural resources is implemented.

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