Improving Forecasting for the Development of Agricultural Land Use in the Region

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Abstract: The article substantiates the need to improve the forecasting of agricultural land use in the region. The authors propose definitions of forecasting and projection of development of agricultural land use. Specific and particular principles of agricultural land use forecasting are formulated. Based on the performed investigations the disadvantages of modern system for forecasting of land use are determined. The complex mechanism for forecasting of agricultural land use development in the region is developed. The system implementation at the levels of forecasting for the Federation subjects, municipalities and land users is provided. The forecast of agricultural land use in Perm Region is performed. The complex measures for further development of forecasting system are proposed. The economic norms for the payments for land use are determined depending on the types and subtypes of soils in Perm Region.

Key words: Agriculture % Agricultural land use in the Region % The system of forecasting % Forecast performance

INTRODUCTION

The problems of stabilization and liquidation of negative tendencies in domestic agroindustrial complex and the development of agricultural production and agricultural producers are acute in all regions of the country. Realization of the national project for agriculture development to some extent depends on preservation of land and resource potential of the industry and organization of efficient use and protection of agricultural lands. That is why the state policy in the field of agricultural support is targeted at the increase of soil fertility, conservation and increase of the sown areas and involvement of unused productive lands in agricultural production.

The development of scenarios for the agricultural land use and production should be based on scientific prognostication in the field. In modern economic conditions forecasting plays an important role in the improvement of agricultural land relations, management of agricultural lands and development of agro-industrial complex. The solution to this problem is of high practical importance for the country as a whole and for its regions.

The need to address this problem in the current economic climate has led to the selection of this theme for the article, whose objective is to validate the theoretical aspects and methodical recommendations for improvement of the forecasting system for agricultural land use in Perm Regions.

Main Part: In modern conditions forecasting of productive land use shall be performed considering the reforms of agrarian relations and existing negative trends of agricultural land use; among them there are unregulated market turnover of lands, their irrational intersectoral redistribution and inefficient sectoral use, lack of efficient control over land use and compliance with land laws, as well as weakening of governmental role in regulating land relations.

The studies show that from 2006 to 2011, there were major structural changes in the land fund of the region. Thus, according to the Bureau of Russian Register for Perm Region, for this time the area of agricultural land in the region decreased almost by 3 thousand ha, which is caused by intersectoral redistribution of land resources, market turnover of productive lands and irrational use of land in agrarian sector of economy. Only for one year (2011) the area of agricultural land in Perm Region decreased by 300 ha [1]. Negative dynamics of agricultural land use negatively effects the development of

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agroindustrial complex of the region. This dictates the necessity of improving the mechanism for forecasting the development of agricultural land use in the region.

Our research has shown that current forecasting of land use should not be passive and reflect possible options of productive land use based only on the existing trends in land balance. The process of forecasting should actively effect the character of land use in order to stabilize negative dynamics and eliminate negative impacts in the field, as well as to properly focus the perspective development of land use in accordance with national interests.

In our opinion, the forecasting should be understood as determining possible trends of development of agricultural land use that appear to be a priority for the sector and society and identifying the means for reaching the predicted result in rational use of agricultural land.

Forecasting as applied to modern conditions should also take into account the needs of the community in conservation of productive lands as the most important national treasure. In this context we offer the following definition for forecasting of the development of agricultural land use: this is the system of reasoned concepts that are probabilistic but rather reliable and that relate to expedient development of agricultural land use for future needs in order to create necessary territorial conditions for agriculture development, preserve land and resource potential of the sector and for social development of rural areas.

Then, the objective of forecasting of agricultural land use during market reforms should be substantiation of strategic trends in improving land use in accordance with national, governmental and social interests in this field that ensure the priority of agriculture land use.

Determination of principles, being the basis and beginning of any action, is of great importance for forecasting. The principles of economic forecasting have been studied for a long time and their essence is revealed in the works of many researchers. Among the main principles researchers traditionally reckon: consistency, coordination, variance, continuity, verifiability and efficiency [2, 3].

The mentioned principles are common for the development of any economic predictions. During forecasting of the development of agricultural land use it is necessary to consider specific and particular principles reflecting the special character of the agricultural lands, namely as a resource, the production means, the natural object, property complex and the object of market relations.

Our results allow formulating the basic specific principles, namely:

C   Priority of agricultural land use.
C   Ensuring the development of market mechanism for land use.
C   Social development of rural areas.
C   Creating favorable territorial conditions for agriculture development.
C   Possibility of practical realization of prediction.

It should be noted that with regard to land use forecasting, the priority of agricultural land use functions not only as a specific but as a common principle; at that among other principles it acquires the utmost importance.

Only on the basis of such approach it is possible to develop the management system, providing rational use of land and other natural resources [4], intended for achieving the state and social interests in the field of land use [5] on the basis of modern cadastral systems [6]. The ongoing need to improve land use management, one of which functions is forecasting, is proved by the experience of the developed countries [7, 8].

Our investigations show that main domestic problems in forecasting of agricultural land use development are: lack of consistent policy of the state, regions and municipalities in agricultural land use forecasting; lack of consistent forecasting system for agriculture development and agricultural land use at intersectoral, sectoral and territorial levels; insufficient elaboration of forecasting concepts and methods applicable in current economic situation; lack of legal, regulatory, institutional, scientific, methodological, financial, technological and organizational bases for the development of sound projections; the marked negative trend of agricultural land use development; and limited resources and reserves for agricultural land development in the regions.

To solve these problems we have developed the complex mechanism for forecasting of the development of agricultural land use in the region (Fig. 1).

The developed mechanism implies implementation of the system at three levels of prediction: I-subject of the Russian Federation (within the system of federal level), II-municipalities (district, city, town) and III-land owners, land users, land tenants (land users).

During determination of perspective land use all existing trends, reserves and sources of new agricultural development in the field should be taken into account.
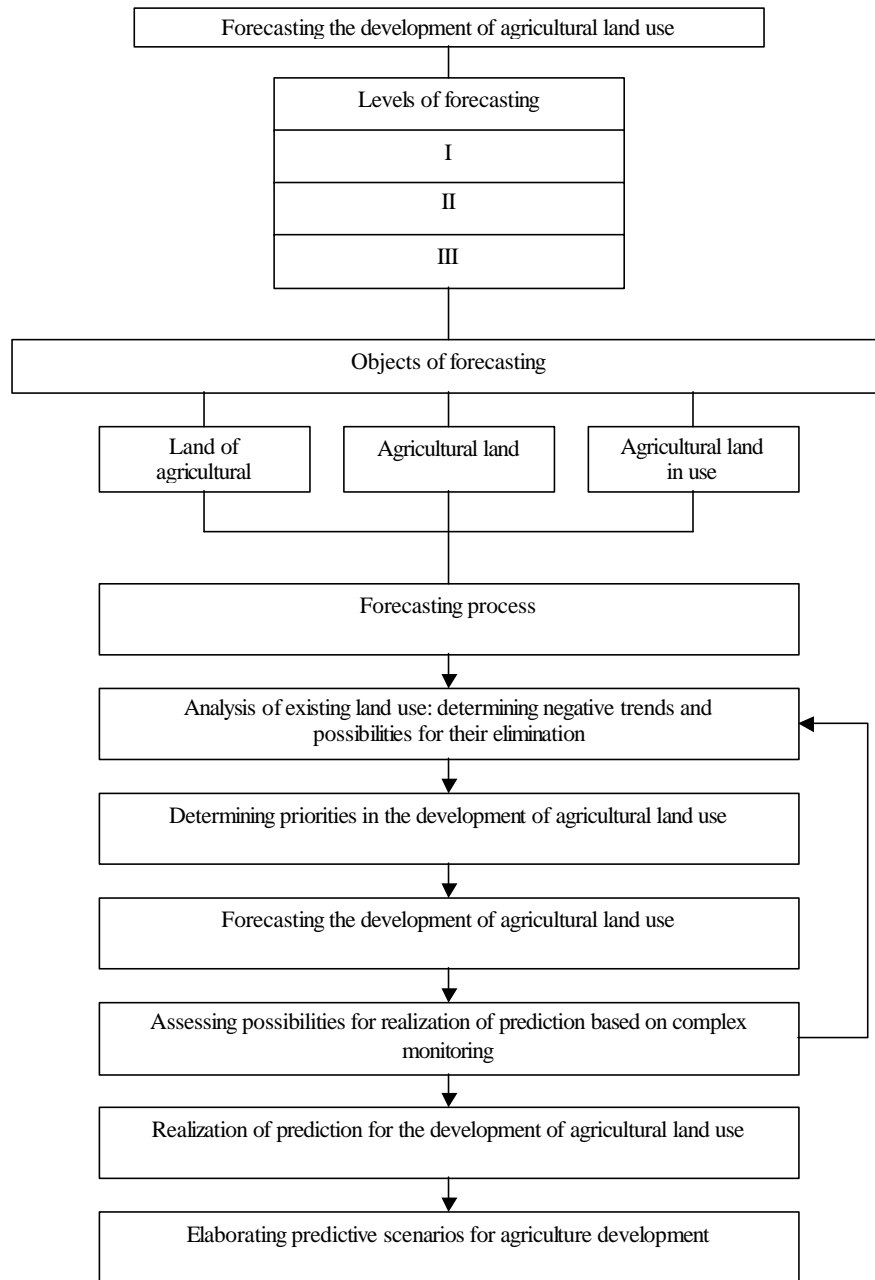
Fig. 1: Complex mechanism for forecasting the development of agricultural land use in the region.

Forecasting of agricultural land use in the region should be integrated. To ensure comprehensiveness the forecasting should be performed simultaneously on the following objects: lands of agricultural designation included in the Land Fund of RF subject; agricultural land included in different categories of the regional land fund; lands included in the land fund of RF subject practically used (or suitable) for agricultural activities.

Besides, in modern conditions forecasting should be performed considering the results of market reforms in the field of land relations. Therefore, the regional projections should reflect perspective distribution of land used for agriculture depending on their ownership and forms of management.

As any purposeful action, forecasting of agricultural land use development should be carried out in sequence. The process of forecasting should take into account such

necessary components as preparatory works, development and justification of direct prediction, interpretation of the obtained results of forecasting and practical realization of projection developments.

The proper process of forecasting, in our opinion, should be performed in several consecutive interrelated stages; the main ones are as follows.

C   Analysis of existing agricultural use in the region: assessing existing regularities, determining negative trends, identifying opportunities and ways for stabilization and elimination of negative consequences.
C   Determining the priority trends for the development of agricultural land use in the region considering interests of all subjects of land relations as well as national and social interests in this field.
C   Forecasting (development and justification of prediction) of the development of agricultural land use in the region based on the principle of priority of agricultural land use.
C   Assessing the possibility of realization of forecasting measures based on complex monitoring of the condition and use of land resources, compliance with the norms of land law, civil and environmental laws and policy provisions.
C   Realization of the forecast for the development of agricultural land use in the region by practical implementation of complex organizational and territorial measures.
C   The result of the entire forecasting process should be elaboration of predictive scenarios for regional agriculture development based on the prediction of agricultural land use development.

It should be noted that between the fourth and the first stages of forecasting it is necessary to provide the feedback for timely verification of the projected development.

In this paper the authors based on the assumption that the main regularities of development in the past will remain specific in the nearest future as well. Therefore, for forecasting we used the statistic method of extrapolation. The background information for the study consisted of the data on the dynamics of agricultural land in Perm Region.

Forecasting starts with selection of the function $Y = f(x)$, reflecting the trends in the changes in the land area, where we substitute the respective values of (x)-the period of prediction [9]. Using the computer we managed to select the needed functions describing the dynamics of agricultural land use.

It should be noted that the forecasting results reflect the existing trends in the changes of productive land area. The area of the land will go on decreasing in future, if radical organizational and economic measures are not realized to prevent the land and resource potential of the sector (Table 1).

Realization of the organizational and economic mechanism of forecasting developed by the authors is intended for slowing down and stabilizing the negative processes in redistribution of land resources, perspective provision of positive dynamics of land use, development of agricultural production and rural territories and preservation of rural lifestyle in the region.

For further development of forecasting system there is a need in a complex of interrelated measures aiming at improvement of the forecasting technology and the forecasting object and increase of practical significance of the forecasting results.

The authors consider technological improvement of the forecasting system as developing coordination between individual predictions, determining the place of forecasts in a general system of regional forecasting and strengthening justification of projection developments.

Table 1: Perspective projection of agricultural land use in Perm Region

Type of land	Initial period		Year 2015		Year 2020	
	Thousand ha	%	Thousand ha	%	Thousand ha	%
Arable area	1554.0	74.9	1334.46	68.8	1258.43	65.9
Perennial plantings	14.6	0.7	16.12	0.8	16.68	0.9
Grasslands	452.9	21.8	519.22	26.8	551.11	28.8
Idle field	53.4	2.6	70.67	3.6	84.46	4.4
Total land	2074.9	100	1940.47	100	1911.38	100

Calculated by authors according to the data of the Bureau of Russian Register (Rosnedvizhimost) for Perm Region.

Table 2: Norms of cadastral value of agricultural lands and costs of agricultural development of lands according to the types and sub-types of soils in Perm Region, thousand rubles/ha

Types and sub-types of soils in agricultural lands	Norms	
	Cadastral value of lands	Cost of development
Dark-gray forest, sod calcareous, peaty cultivated	13.56	187.81
Gray and light-gray forest, sod-weakly podzol, flood-plain, meadow, turf on noncalcareous rocks	12.62	174.69
Dark-gray forest and sod-carbonate eroded	11.97	165.66
Sod-podzolic, gray, light gray, forest and grassland gleyey	11.14	154.18
Sod-podzolic, gray, light gray forest eroded, floodplain meadow gleyey	8.53	118.10
Sod-podzolic, gray and light gray forest gley; floodplain meadow gley, peaty gley	7.17	99.23
Slimy bog, swamp low-land	6.10	84.47
Soil of ravine complex	2.19	30.34
On average, in Perm Region	10.07	139.42

In particular in our opinion, there is a need in the development of interaction between the regional and municipal forecasts of use and protection of land resources. In the municipal projections there should be a detalization of the general issues related to forecasting of the use and protection of productive lands, justified in the predictions of the regional level, that in turn, should be included in the united forecasting system of the use and protection of the country land resources. The forecasting results of municipal level should provide for the correlation with specific project developments and organizational and territorial measures aimed at practical realization of predictions. In our case projections on the development of agricultural use of the region may be reflected in the traditional system of organization of the rational use and protection of land resources, as well as development of agro-industrial complex; it may be presented, on the one hand, as components of respective schemes of land management and on the other hand-as sections of respective concepts and programs for regional agriculture development. This will foster the development of coordination in the forecasting system, improvement of land management, combination of sectoral and territorial interests in agricultural land use and protection.

Radical changes in the existing dynamics of agricultural land use in the region are impossible without the system of targeted organizational and economic measures for creating the conditions necessary for developing the forecasting object. Our results show that among the priorities of agricultural land use in the region (as an object of forecasting system) we should reckon the legal and economic aspects.

Improvement of the system in terms of legal norms and regulations should include: toughening of legal norms regulating the order and conditions of agricultural land withdrawal for non-agricultural purposes; listing especially valuable lands which withdrawal from agricultural use is prohibited; limiting market turnover of agricultural lands; improving the procedure of agricultural land buyout by RF subject for preserving their targeted use; developing legal norms determining requirements to rational use of land resources in agriculture; providing legal norms and regulations for controlling the targeted use of agricultural lands and compliance with the norms of rational land use.

Economic improvement of the system for the development of agricultural land use in the region, in our opinion, should provide for introduction of the complex one-time and current payments for land that would stimulate the development of agricultural use [10] as a forecasting object. The following complex of payments is proposed: for withdrawal of productive lands from agricultural turnover for non-agricultural purposes; for the disposal of land from agricultural production as a result of market turnover; for reclamation of disturbed lands and land development for future agricultural use; for unauthorized use of agricultural lands; for discontinuance of land use for agricultural production; for using valuable agricultural lands as less valuable; and for the decline of land quality as a result of their agricultural use.

In addition to these payments being primarily of compensatory or preventive nature (for prevention of potential losses), the complex of economic instruments should be complemented by differential payments for land use (land tax and rent).

As a guide for determining the value of specific payments we should consider the following: the cost of land development for using in agriculture-139.42 thousand rubles/ha; and the cadastral value of agricultural land-10.07 thousand rubles/ha. Practical application of these indicators may be significantly widened by their differentiation depending on the land quality.

To determine the differential values of land payments the basic norms are differentiated considering the valuation scale of Prikamye soils according to main soil types (Table 2).

Calculated by authors on the data from the Bureau of Russian register for Perm Region and materials of soil surveys of Perm Branch of "Uralgiprozem" Institute.

Development of land use forecasting system requires increasing the practical value of developments. In our opinion, the forecasting of agricultural land use should be used to develop the predictive scenarios for agricultural production in the region. In particular, to develop complex projections for agriculture development it is necessary to use the following information: (obtained as a result of land-use forecasting): area of land of agricultural designation; agricultural land area; land distribution by ownership and forms of management; an area of disturbed agricultural land; an area of unused, abandoned, contaminated agricultural land; an area of land development for agricultural use; an area of land used for non-agricultural purposes; an area of irrationally used agricultural land; the cost of agricultural land reclamation; the cost of agricultural recultivation of disturbed land; cadastral and market value of agricultural lands; and land tax and rent for agricultural lands.

CONCLUSION

The results of this study focus on the development of theoretical and methodical bases for improving the mechanism, of forecasting and increasing the efficiency of agricultural land use in the regional agro-industrial complex. The results of this work are of interest for governmental agencies, self-governing bodies, administrations of agro-industrial complexes and land resources and for agricultural enterprises. Implementation of these results aims at improving the practical value and effectiveness of predictive scenarios of agriculture development and agricultural use in the region.

Practical realization of our proposals is to contribute to preservation of fertile lands, development of agricultural production and agricultural land use, social development of rural areas and increasing food safety in the region.

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