Determining A Technology for Development of the Mechanism of Anti-Crisis Management of the Agro-Industrial Complex

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Abstract

This article is devoted to effective management of the agro-industrial complex (AIC) in the context of crises, the impact of which on the economic efficiency of AIC subjects was made on various aspects of economic activity. A variety of factors, from a sharp change in the level of inflation to a change in energy prices and demand for agricultural products, have determined the need for a timely response of AIC subjects, as well as the adaptation of the system and management methods to the sharply changing environmental conditions.

The structural and logical scheme is proposed, which will allow structuring the general process of crisis management and determining its main functions and monitoring tasks.

The structure and the system for calculating the alternatives for the development of crisis situations are complex and cover all elements of the regional AIC. Moreover, they are based on a combination of technical and software tools, implementing automation ideas and methods based on modern mathematical tools.

Keywords: System, management, monitoring, organization, region, agro-industrial complex, economy, development, efficiency, production.

1. Introduction

The main goal of the crisis management monitoring system is the development of a managerial solution to prevent a crisis situation in the agro-industrial complex (AIC), which is reflected by a possible change in the value of the objective function in changing environmental conditions. To understand the essence of the monitoring and management mechanism (MMM), it is advisable to structure the objectives of its functioning. The structuring of the objectives allows determining the technology for developing an anti-crisis management mechanism and determining the range of specific tasks. At the same time, it is assumed that the structure of goals is a sequence of hierarchical levels, which is depicted as a connected graph – the objectives’ tree [5]. The main goal of developing a tree of anti-crisis management objectives is to link the set of subgoals with the actions that are necessary at present to organize and operate the MMM.

2. The Main Part

The structuring or the objectives’ tree (Figure 1) of the anti-crisis management system allows concluding that the entire structure of goals is divided into 3 levels.

The third aggregate level is represented by the goals aimed at creating and functioning of the information system, as well as the choice of methods for forecasting the AIC development and optimization methods for calculating alternatives to achieve the main goal.

The objectives of this level include:

- development of the initial set of goals and objectives, management, subject to be solved during the operation of MMM;
- choice of the method of expert analysis of the crisis situation and development of the management object;
- obtaining the information that allows receiving sufficiently accurate and reliable analytical and expert assessments of the crisis situation development.

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The main goal of the third level of the structural and logical scheme of the MMM can be formulated as the creation of an information and technical base, the adoption of decisions of the anti-crisis management of the region's AIC. The monitoring and management tasks, which should be formulated at this target level, include tasks of forecasting and analysis, optimizing the operation of the control object, calculating the efficiency of alternative decisions [12]. The formulation of these problems, which is correct and corresponding to the crisis situation and the specifics of the object, permits to select adequate research methods. The formulation of goals and objectives of the third level of the structural and logical scheme of the MMM should be performed in all structures and at all management levels of the regional AIC.

It is proposed to divide the entire set of tasks into a permanent and a variable part. The tasks of forecasting, optimization, analysis, and partial calculation of efficiency are constantly being solved during the functioning of the MMM. The variable tasks should include the tasks aimed at developing emergency anti-crisis solutions.

The second target level unites the objectives of determining alternatives to AIC development under different alternatives of the development of crisis situations.

Sub goals of this level are the purposes of analytical analysis of the development of crisis situations in various AIC branches, on the basis of data obtained at the first target level: alternatives for the crisis in crop production, livestock production, vegetable production, etc.

At the same time, it is about solving complex problems formulated at the previous level, which are connected by the unity of the strategic objectives of the analysis. The composition and structure of information resources, providing a solution to these problems, should be adequate to the composition and structure of functional tasks [14]. The achievement of goals should ensure the completeness and diversity of information, which is necessary for preparing and decision-making at the highest target level, as well as the availability and efficient use of functional tasks-making at all management levels of the AIC.

The structure and the system for calculating the alternatives for the crisis situations’ development should be comprehensive, encompass all elements of the regional AIC, and be based on a combination of technical and software tools, implementing ideas and methods of automation based on modern mathematical tools [10].
At the same time with the analytical analysis of alternatives for the development of crises in various spheres of AIC, this target level provides for the expert groups’ organization in accordance with the functional tasks formulated at the first level. At the same time, expert groups’ specialists should have a sufficient degree of competence, since the diagnosis and analysis of the crisis situations development are characterized by high uncertainty and dynamism, as well as the availability of a huge amount of information to be processed. Special professional training is necessary to master expert technologies. Expert groups can be created as permanent or temporary groups aimed at analyzing certain functional tasks. At the same time, it is necessary to attract specialists of different management levels to the expertise. Experts should be able to analyze not only feedback information, but also evaluate analytically calculated alternatives of crises’ development. The first target level focuses on the objectives for obtaining expert assessments of both the economic situation and those obtained at the second target level of analytical assessments and decision making alternatives. The analysis of expert assessments should be an objective basis for making the final management decision, developing recommendations and transferring them to the first information level.

As it can be seen from the presented scheme, the functions of the MMM are comparable with the basic management functions. Their specific content is presented in Table 1.

Due to the fact that every managerial decision inevitably includes an explicit or implicit evaluation of future events based on monitoring of the external and internal environment of the object [1], it is important to note the necessity of separating the functions of the MMM from the general management system. In this case, the realization forms of the MMM can be different depending on the formulated tasks.

The general set of tasks, solved by the MMM, can be represented by the following groups:
- tasks of collecting and processing external and internal information;
- tasks of forecasting changes in external influences;
- tasks of analytical optimization and alternatives’ development;
- tasks of expert analysis;

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Table 1. Comparing the functions of the MMM with the main management functions.

<table>
<thead>
<tr>
<th>Function name</th>
<th>Function content</th>
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<tbody>
<tr>
<td>Organizational and methodical function</td>
<td>Development of a methodology for collecting, processing and issuing information by all elements included in the regional management system of the AIC. Organization of information collection for forecasting. Providing methodological assistance in the AIC subjects. Organization of work of AIC management subdivisions on developing forecasts.</td>
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<tr>
<td>Information and diagnostic function</td>
<td>Preparation and transmission of all kinds of information. Analysis of incoming information. Diagnosis of development problems of the AIC. Setting tasks of forecasting further analytical calculations.</td>
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<tr>
<td>Function for making decisions</td>
<td>The choice of one of the solutions, the development of activities and recommendations.</td>
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<tr>
<td>Control function</td>
<td>Current monitoring of the course of the crisis management process.</td>
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</table>

The transition to the market relations has violated the existing information ties in the agriculture [7]. At present, the Ministry of Economy is the main center, where information is concentrated, coming from various ministries, departments, territorial and
district government structures. At the same time, the common practice of presenting analytical materials and normative documentation in the most favorable light has not got widespread. As a result, the processed information is available only to a narrow circle of users.

Solving the problems of analyzing and optimizing the functioning of the AIC requires the availability of various types of information data [9]. These data can be classified according to various characteristics:

- in terms of the degree of certainty: deterministic and probabilistic;
- in terms of completeness: complete and incomplete;
- according to the mode of presentation: point and interval.

In terms of reliability, the same information for solving various problems can be represented in various ways. However, if while formulating the problem, uncertainty is ignored, and a deterministic approach is used, the solutions can be ineffective and sometimes erroneous.

Solving the problems of collecting and processing information does not make it possible to make well-founded decisions to the full, because in this case the processed information is an ordinary set of data, usually "incompatible" for some reason among themselves. At the same time, the management bodies of the AIC need to have specific information on how in the immediate or distant future the following factors will affect the magnitude of the overall efficiency of the region's AIC: external ones – product prices, taxes and weather conditions; internal ones – the chemicalization of agriculture, the use of new technologies, etc. [8]. In this regard, there is a need to create a system for obtaining private forecasts based on economic and mathematical methods.

At the same time, the role of mathematical modeling increases, taking into account such AIC properties as stochasticity, dynamism and negativity [3].

The tasks of analytical optimization make provision for the use of well-known methods for solving the problems of managing agricultural processes, which make it possible to raise their efficiency [6]. The works of R.A. Isanchurin, A.I. Kuev, A.P. Kurnosov, S.V. Lomakin and others in the field of modeling agricultural production are widely known [2].

The main models of managing agricultural production and processes include:

- a model of plant life cycle that considers the state of a plant in different periods of time and the processes taking place between these states;
- a model of the vegetation period of individual crops, making it possible to assess their responsiveness to fertilizers in different periods of growth, which allows establishing the optimum number and timing of fertilization;
- a model of optimal planning of the internal economic location of crop production, with the help of which the structure of sown areas is determined, taking into account crop rotations and tasks for gross harvesting of a certain crop;
- a model of distributing crops’ cultivation taking into account their nutritional properties;
- an economic and mathematical model for determining the optimal structure of the machine and tractor fleet, which allows determining the types of machines, their quantitative composition, depending on the size of farms and types of work being completed, agro-technical terms, the existing availability of machines while minimizing costs per unit of manufactured goods.

These models are universal and can be used for a wide range of agricultural enterprises [4]. However, one of the main drawbacks of these models is that they do not account for such important factors as the dynamism and stochasticity of the management object, the parameters of the external and internal environment of enterprises, as well as special features of market conditions of management [11].

In accordance with the above tasks, it is intended to consider the following forms of anti-crisis management:

- functional and information one;
- information and analytical one;
- expert-analytical one;
- expert commission one.

3. Conclusion

The functional and information form of the MMM assumes the solution of information tasks at the level of the functional services of the regional Ministry of Agriculture and the transfer of information for analysis and decision-making to the third target level. At the same time, the work of collecting and processing information is not centralized; analytical tasks are not being solved. The functioning of the anti-crisis management system focuses on the top level of the management structure. The information and analytical form means solving not only information tasks, but also the tasks of analysis, analytical estimates, forecasting and development of analytical alternatives. At the same time, the information and analytical form can be presented in a centralized and decentralized form.

In the first case, analytical problems are solved in a specialized structural subdivision, which coordinates and concentrates all the work concerning analytical analysis. In the second option of this form, the solution of analytical tasks is assigned to the functional subdivisions of the ministry.

The expert-commission form of the anti-crisis management means the organization of expert councils or commissions which, based on current information, develop alternatives and recommendations for the further AIC development.

The expert-analytical form is represented by a separate structure of the regional ministry, which, based on the current information, analytical forecast estimates and calculated solutions, issues comprehensive recommendations. At the same time, the work aimed at achieving anti-crisis goals is executed continuously. It is important to note that the centralized expert-analytical form of anti-crisis management corresponds most closely to the structure of objectives defined above.

Given any organization form of the anti-crisis management system, the tasks of forecasting the AIC development are of greatest importance under the changing conditions of the external environment.

References


