DEVELOPMENT OF AGRICULTURAL INDUSTRY IN THE PARADIGM OF SUSTAINABLE DEVELOPMENT

Isa Basnukaev[1], Zelimkhan Musostov[2], Margarita Shestakova[3]

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[1]Grozny State Oil Technical University named after M.D. Millionshikov, RUSSIA
[2]Chechen State University named after A.A. Kadyrov, RUSSIA
[3]Financial University under the Government of the Russia
i.basnukaev@mail.ru

Abstract

The article explores and substantiates the theoretical and methodological foundations of the environmental component of resource conservation management of agricultural enterprises in the context of ensuring sustainable development. The main directions of the negative impact of the activities of agricultural enterprises on the environment are identified, including: land depletion and loss of soil fertility, soil erosion, soil compaction, loss of biodiversity, groundwater pollution. Indicators characterizing the environmental efficiency of resource conservation management of agricultural enterprises have been determined. It is noted that the culture of resource conservation should become a mandatory element of the general culture of behavior of employees of agricultural enterprises. The article defines the main stages of the formation of organizational culture at an agro-industrial complex enterprise, which contains a component of resource saving.

Keywords: agriculture, ecology, efficiency, management, resource conservation, sustainable development

I. Introduction

Agriculture is one of the largest economic sectors in the world. Farmland and grassland make up about 50% of the Earth's habitable environment and provide habitat and food for large numbers of people. Today, for most modern agricultural enterprises, it is relevant to identify areas of economic and management activity that will help to effectively use natural resources in the same way that a reasonable approach will help preserve and restore the habitat, protect and improve the quality of soil and water. In addition, the agro-industrial complex is the basis for the formation of food security of the state and has a significant impact on the state of the country's economy. In addition to providing enterprises and the population with raw materials and food, the agro-industrial complex provides employment opportunities for a significant part of the population. Thus, according to 2022 data, about 4 million people are employed in agriculture in the Russian Federation [5].

In the international arena, our country is positioned as an agrarian state. Over the past decade there has been a significant increase in agricultural production. At the same time, not all agricultural enterprises understand the importance of using resource-saving technologies and apply the principles of sustainable development in their activities. The current stage of development is characterized by an intensification of anthropogenic impacts on the environment, since the widespread use of new technologies in the activities of agricultural enterprises accelerates the need to meet the needs of the population for various types of resources and raises the issue of their conservation.

Considering the exceptional importance and priority of agriculture for the national economy, the issue of increasing the effectiveness of development of the agro-industrial sector of the

domestic economy has always occupied a central place in the scientific works of domestic scientists. Scientists studied the directions and mechanisms for ensuring the efficiency of agricultural production and development of rural areas, determined strategic models and foundations for increasing the level of its competitiveness and improving the quality of life of the rural population, worked out mechanisms of state support for the industry and analyzed the results of agrarian reforms. All this ensured the emergence of a significant number of scientific and applied developments, which are extremely useful for the theory and practice of increasing the effectiveness of development of the agricultural sector.

II. Methods

Current problems in the development of the agro-industrial complex and the use of resource-saving technologies and techniques are reflected in the scientific works of domestic and foreign scientists, in particular V.V. Aleksashina [1], P.V. Druzhinin [4], D.A. Zimin [4], Kh.Z. Mantaev [2], S.A. Nikolskaya [3], Z.P. Okazov [2], O.V. Potasheva [4], Z.V. Totikov [2], E.S. Tskhovrebov [7], G.T. Shkiperova [4] and others. However, most domestic agricultural enterprises have significant shortcomings that relate to the formation of an effective resource-saving management system in the context of the environmental component, which necessitates the need to find ways to improve their activities.

The purpose of the article is to study the theoretical and methodological foundations of the environmental component of resource conservation management of agro-industrial complex enterprises in the context of ensuring sustainable development, as well as to determine the impact of agro-industrial complex activities on the environment.

In the context of modern trends and changes in the management paradigm towards socially responsible business, financial, in particular, investment markets are quite sensitive to companies that carry out corporate governance on the principles of sustainable development. Experts have a clear consensus that social, environmental and economic behavior of businesses can significantly improve the financial performance and performance of companies. The implementation of sustainable development goals into the corporate strategy of companies helps to obtain long-term value for owners and investors, improve the corporate reputation of the company, and ensure an increase in financial performance indicators. Since the 90s of the last century, the economic literature has examined and confirmed the connection between socially responsible business behavior and its financial results. Today, the concept of social responsibility of business is expanding, complemented by the principles of strategic programs for sustainable economic development and approved at the level of government in individual countries and their associations. Recognizing business opportunities based on factors that take into account the preservation of the natural environment and the company's concern for social issues is now seen as a strategic factor in increasing business productivity and competitiveness. Business ideas that arise and are implemented on the basis of sustainable development form the potential for a company’s competitive advantages (new technologies, resources, products, markets), which increases the ability to generate profits and improve financial performance.

The main benefits from the implementation and implementation of sustainable development goals in the strategic management of companies can be identified as follows: 1) improvement of corporate image, which leads to improved financial performance; 2) increasing the level of investment attractiveness and expanding the financial and production potential of the company; 3) maximizing profits through better satisfaction of consumer needs and the formation of a reserve of competitiveness; 4) obtaining non-financial (social and environmental) benefits for a wide range of parties.

III. Results

Sustainable development of agriculture is part of the overall global concept of sustainable development until 2030, which was adopted in 2015. The universal principle of the concept of "sustainable development" is to meet the needs of the modern generation without risks and threats for future generations to provide for their own. The main emphasis of the concept of sustainable development of agriculture is a focus on meeting the needs of humanity (in terms of improving the quality of life of the population) in the conditions of preserving and restoring bio and ecosystems.

The introduction and implementation of the concept of sustainable development in the practice of domestic agribusiness should be accompanied by the delineation of clear positions, principles and elements that will form a unified architecture for sustainable development of agribusiness not only at the level of individual economic entities, but also at the level of agriculture, rural areas, the agro-industrial sector, as part of the national economy as a whole.

Agricultural production is a priority for the economy of any country and is important for the three main elements of sustainable development: ecology, economy and society. Solving the strategic problem of ensuring food security both at the national level and in the context of the global dimension in modern conditions is accompanied by significant environmental and socio-economic compromises. In particular, the need to increase food production volumes leads to the emergence of the problem of disappearance of biological diversity, the widespread use of GMOs, the loss of natural characteristics of biological resources, their modification, the acceleration of the main biological processes of transformation of biological assets based on an increase in the level of intensity of agricultural production (the use of chemicals, mineral fertilizers, drugs stimulating the growth and maturation phase of biological assets, etc.).

The range of environmental challenges and threats is complemented by socio-economic factors, among which the low level of income and quality of life of the population of rural areas, underdeveloped social infrastructure, a high degree of unemployment in rural areas and the intensification of migration processes are characteristic, which actually leads to the destruction of certain rural areas.

Despite the fact that in recent years the domestic agro-industrial complex has demonstrated stable economic growth, the problem of food supply for the country's population remains relevant both at the national and global levels.

Agriculture is a basic sector of the domestic economy, the level of development and efficiency of which today determine the strategic priorities of foreign economic trade, the possibility of forming the country's budget, ensuring food security and the raw material basis for the development of technologically related types of economic activity. The agro-industrial sector in the domestic economy represents the basis of economic development, forms the strategic prerequisites for attracting investments, strengthening the level of competitiveness of the national economy and improving the level of well-being of the country's population. Solving these problems is impossible without ensuring the effective development of agribusiness, solving problems of improving the quality of life of the rural population and food supply for current and future generations.

Crop and livestock production have a major impact on the environment. They are the main source of water pollution with nitrates, phosphates and pesticides. The agricultural sector is also the main anthropogenic source of greenhouse gases methane and nitrous oxide, and also contributes to other types of air and water pollution [6]. Agriculture also has negative impacts on the environment due to land degradation, salinity, over-extraction of water and reduction in genetic diversity of crops [3].

Most modern farms have abandoned skilled farming, which was once the leading principle of land cultivation. Today the emphasis is solely on productivity - it's a big expense for a high return.

Agricultural business owners do not take into account what happens to the land, crops and people consuming agricultural products [6].

More than two-thirds of water used by humans is for agriculture. Groundwater contamination from agricultural chemicals and wastes is a serious problem in almost all developed countries and, increasingly, in many developing countries. Water consumption, in turn, tends to increase.

Fertilizer contamination occurs when more fertilizer is applied than crops need, or when it is washed off or blown off the soil surface. Excess nitrogen and phosphate may leach into groundwater or flow into waterways. This nutrient overload causes eutrophication of lakes, reservoirs and ponds, leading to an increase in algae that overwhelms other aquatic plants and animals [1].

Domestic agricultural enterprises widely use insecticides, herbicides and fungicides in their activities, which leads to contamination of fresh water with carcinogens and other poisons that have a negative impact on the environment. Pesticides also reduce biodiversity by killing weeds and insects and, therefore, food species of birds and other animals [4]. The use of pesticides has increased significantly over the past few decades. In some regions, recent growth rates ranged from 4% to 5.4%.

Agriculture is also a source of air pollution. The dominant anthropogenic source of ammonia is livestock farming, which accounts for about 40% of global emissions, mineral fertilizers – 16%, and biomass burning and crop residues – about 18% [3].

The burning of plant biomass is another major source of air pollutants, including carbon dioxide, nitrous oxide and smoke particles. Projections show that by 2030, ammonia and methane emissions from the livestock sector in developing countries could be at least 60% higher than currently. Ammonia emissions from agriculture, according to forecasts by ecologists and economists, will continue to grow in both developed and developing countries [4].

Agriculture, forestry and fisheries negatively impact land and sea biodiversity. Species richness is closely related to wild habitat range. As the area decreases, so does the number of species. Deforestation, consolidation of fields with accompanying reduction of edges and hedgerows, and drainage of wetlands for agriculture are reducing the total area available to wildlife [2; 4]. Pesticides and herbicides kill many insects and plants, thereby reducing food supplies for some animals. Pressures on biodiversity over the next decades will result from contradictory trends. Extensive methods usually give way to intensification, which in turn may give way to organic agriculture [1].

The main directions of the negative impact of the activities of agricultural enterprises on the environment are: soil depletion and loss of soil fertility; soil erosion; nitrate runoff; soil compaction; loss of biodiversity; air emissions; groundwater pollution.

By using more sustainable production methods, the negative impact of agriculture on the environment can be reduced. Among the areas for reducing the negative impact on the environment from the activities of agricultural enterprises, the following can be highlighted: increasing the efficiency of fertilizer use; distribution of rice varieties that emit less methane; improving livestock waste management; restoration of degraded lands; improving crop residue management; expansion of agroforestry and reforestation; supporting the mobility of livestock in pasture areas prone to drought, etc. In particular, the use of agricultural waste will help increase the energy autonomy of agricultural producers.

IV. Discussion

At the same time, part of the produced energy can be sent for sale to third-party consumers, which will help reduce greenhouse gas emissions into the atmosphere and strengthen energy independence. However, the effective use of biofuel to obtain energy in agricultural production, and especially from agricultural waste, requires optimization of technical and technological

processes for the production and use of biofuel and scientific technical justification of the rational parameters of machines and equipment used for the production of biofuel and the production of energy based on it.

The transition of the agricultural sector to a new level of development is possible only under the condition of a radical change in the nature of the development of productive forces, a rejection of the extensive type of economic growth, and a transition to intensive factors. To do this, it is necessary to solve the problems of rational, economical use of resources. Therefore, the state and the managers of agricultural enterprises are faced with the task of ensuring effective resource conservation [2; 4].

Resource conservation management of agricultural enterprises should be a comprehensive process associated not only with improving economic and social efficiency indicators, but also contain an environmental component [7]. The group of indicators characterizing the environmental efficiency of resource-saving management of an agro-industrial complex enterprise includes the following coefficients (Table 1).

Table 1. *Main indicators of environmental efficiency of an agricultural enterprise*

Indicators of efficiency of resource-saving development	Characteristic	Possible threshold value/normative value
Nature intensity coefficient	Ratio of costs of used natural resources to net income from sales	Decrease
Natural resource productivity coefficient	Ratio of net income from sales to expenses of used natural resources	Increase
Ecological intensity coefficient	Characterizes the level of harmful effects on the environment per unit of useful product	Decrease
Resource intensity ratio	Characterizes the costs of energy, water, land and other resources per unit of useful product	Decrease
Eco-Friendly Factor	Ratio of purely beneficial effect to spent natural resources	≥ 1
Waste capacity coefficient	The ratio of the mass of waste reduced to a single volume, taking into account differences in the degree of their harmfulness per unit of production	Decrease
Ecological production factor	The difference between the cost of raw materials taken from 1 and the cost of waste produced	→ 1

It is advisable to calculate the integral indicator of management of environmental efficiency and resource saving using the formula:

$$К\ экол.эф. = \sqrt[7]{К1 * К2 * К3 * К4 * К5 * К6 * К7}$$

where K1 is the environmental intensity coefficient; K2 – coefficient of natural resource productivity; K3 – environmental intensity coefficient; K4 – process resource intensity coefficient; K5 – coefficient of environmental friendliness of the object; K6 – waste capacity coefficient; K7 – coefficient of environmental friendliness of production.

In conditions of limited resources and increased competition, resource conservation ensures the sustainable development of agricultural enterprises, which leads to the need to resolve issues of organizational and personnel support for business entities [4]. The formation of an effective management system for resource conservation of agricultural enterprises should include a number of components (management system; organizational support; financing; motivational programs) included in the culture of resource conservation.

The culture of resource conservation should become an obligatory element of the general culture of personal behavior and the culture of professional activity of employees of agricultural enterprises. The formation of resource-saving behavior of personnel should become an element of the corporate culture of a business entity [4].

The main stages of forming and adjusting the organizational culture at an agro-industrial complex enterprise, which contains a resource-saving component, are the following:

Stage I: analysis of the state and prospects of organizational culture regarding the presence of a resource-saving component.

Stage II: development of a resource saving strategy (defining priorities, principles, norms, patterns of personnel behavior, etc.).

Stage III: planning activities aimed at mastering the norms and values of resource conservation.

Stage IV: influencing the organizational culture in order to minimize ineffective methods of using resources, developing positive traits that will contribute to resource conservation.

Stage V: assessing the effectiveness of the impact on organizational culture and adjusting the necessary actions.

Today, agricultural production is witnessing a decline in productivity due to degradation of natural resources, increased biotic and abiotic stresses, low seed replacement rate, damage to the natural ecosystem due to excessive and indiscriminate use of pesticides, changes in soil microbial dynamics, lack of quality plasma, etc.

According to the forecasts of ecologists and economists, it is expected that in the coming decades, climate change will not lead to a decrease in global food availability, but it may increase the state's dependence on food imports and weaken the level of food security.

The implementation of the concept of sustainable development in the practical activities of agricultural enterprises today creates real economic benefits for all participants in the process of public agricultural production and development of rural areas. The beneficiaries of the results of activities based on the principles of sustainable development are: 1) agricultural producers who can improve the quality and competitiveness of products, maximize revenue and profit from the sale of environmentally friendly products and expand the sales market, attract additional financial flows in the form of investments in environmental agricultural production; 2) employees who are participants in social and labor relations, guaranteeing staff high standards of quality of working life; 3) residents of rural areas who receive bonuses from ecological land use, environmental improvement, conservation of natural resources, investments in the development of infrastructure for the implementation of investment projects for sustainable development, including those of a social nature; 3) food consumers who will be able to consume high-quality, environmentally friendly and safe food products; 4) regions, the state and society as a whole due to economic growth in the agro-industrial sector, which today appears to be the basis for economic development, solving the problem of ensuring food security, improving the quality of life of the country’s population, taking into account the interests and needs of future generations.

The development of the domestic agro-industrial complex at the present stage is characterized by the presence of a significant number of acute problems, but at the same time, domestic agricultural business remains one of the most effective and profitable types of economic activity. Preserving and increasing the development potential of agribusiness and rural areas today cannot be ensured without strategic initiatives to implement the concept of sustainable development, the foundations of which are now quite clearly outlined in domestic science and practice. Strategic priorities in the context of the concept of sustainable development should become a guideline for the domestic agricultural sector, not only to increase the level of competitiveness of the national agro-industrial complex, the level of quality of residents of rural areas and solve the problem of ensuring food security, strengthening the domestic economy, meeting the needs of the country's population and its future generations. The key tools for achieving the goals of sustainable development of agriculture and rural areas should be science,

innovation and modern digital technologies, and sufficient financial support for strategic and current development programs.

Current problems of environmental protection and conservation of natural resources in today's conditions are of great importance. More and more domestic agricultural enterprises are concerned not only about making a profit, but also about how to minimize the negative impact on the environment. One of the effective directions for the development of agricultural enterprises is to increase the efficiency of resource conservation management not only in the context of the economic component, but also the environmental one.

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