Socio-ecological-economic aspects of effective land use in agriculture

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Abstract. Nowadays, agricultural enterprises operate in difficult socio-economic conditions, but even taking this into account, they must minimize the negative impact of their activities on the environment. The article deals with the problems and tasks of the ecological direction in agriculture. At the same time, land administration mechanisms continue to improve. The article deals with the issues of normative regulation of the main directions of the greening of agriculture in the field of the use of land resources. As a result of the study, it was concluded that it is necessary to strengthen the role of the state in the socio-ecological-economic direction, in the development of technologies with environmental potential. The role of environmental education, the need for the formation of new environmental thinking is noted. Measures are proposed to preserve the environment, the effective functioning of agricultural enterprises, taking into account social, environmental and economic factors. The purpose of this research is to improve the theory and practice of effective land use in agriculture. The main research methods used in writing this article are observation, analysis and synthesis, a systematic approach.

Greening the economy makes it impossible to recognize the stable development of human society with the degradation of nature. In conditions of increasing impact of natural and anthropogenic factors, it is necessary to foresee in the long term long-term environmental consequences as a result of economic activities and negative impact on the environment. The topic of a balanced sustainable type of development is reflected in the reforms of the legislation of the Russian Federation, as well as in various state programs and projects. "The Fundamentals of State Policy in the Field of Environmental Development of the Russian Federation for the Period up to 2030" (approved by the President of the Russian Federation on April 30, 2012), adopted in April 2012, normatively enshrine environmentally oriented economic growth and preservation of a favorable environment.

However, for the population, of course, the solution of social and economic problems is more urgent, but in recent years the state of ecology and the intensity of the use of natural resources have become of interest to many. For example, in the Amur Region, emissions of pollutants per inhabitant of the region amounted to 142 kg in 2019. 71.87 million cubic meters of water was withdrawn from all sources in the same year (101.3% to the level of 2018). Including for production needs - 33.76 million cubic meters (106.1%), for irrigation and agricultural water supply - 0.33 million cubic meters (89.2%), for household and drinking needs - 34.87 million cubic meters (102%).

Sustainable socio-ecological-economic development of the region largely depends on the effectiveness of structural reforms in the economy, budget opportunities, and the efficiency of land
use. To achieve these goals, program activities are carried out at various levels. The development of any industry is now also based on environmental trends [1].

At the same time, environmental activities must be compatible with other areas of activity. Figure 1 shows the influence and relationship of various factors at the level of an economic entity. On the analysis of these factors, the development of acceptable solutions to the problem of resource conservation and environmental management of an economic entity is based.

![Factors affecting the activities of an economic entity](image)

**Figure 1.** Social, environmental and economic factors affecting the economic activities of the enterprise.

Nevertheless, many enterprises that use natural resources do not comply with the rules of environmental safety. As practice has shown, most enterprises agree to pay fines for harmful emissions, rather than design, build and operate environmental facilities, since this is associated with significant capital investments. At the same time, the amount of payments for pollution is insignificant in relation to the damage to the environment.

Consequently, at present, to prevent various kinds of negative processes and phenomena in the use of natural resources, a systematic approach is required, since the solution of environmental and economic problems requires adjusting many environmental regulators of the business sector in relation to economic entities. For example, adjustments to the regulatory and legal framework in terms of preferential terms should affect the Budget and Tax Codes, as well as by-laws. The draft amendments to the Tax Code, providing for the introduction of an environmental tax, should improve environmental efficiency. This will stimulate the introduction of resource-saving technologies by natural resource enterprises, the use of which will have a positive effect on the natural environment. [2]

Agriculture is a specific branch of social production associated with natural factors that have a strong impact on the formation of technological production processes. The main factor of agricultural production is land, which, like air and water, is subject to pollution, the source of which is human economic activity. The interaction of agricultural production with the environment is regulated by regulations, some of which are shown in figure 2.
Currently, the need for environmental improvement in rural areas is great. In general, the following main problems of agriculture in the environmental direction can be distinguished:

- under the influence of agriculture and crop production, degradation of the soil cover occurs, especially with the irrational use of land; pollution of surface and ground waters with fertilizers, industrial waste; formation of waste lands.
- under the influence of animal husbandry, degradation of natural vegetation on pastures occurs; pollution of surface waters with animal waste. [3, 4, 5]

At the present stage, digital technologies are used in agriculture to ensure environmentally oriented modernization of the industry. Precision agriculture (navigation systems, remote sensing, differential fertilization, etc.) contribute to the development and greening of agricultural production; various unmanned aerial vehicles, sensor sensors, etc. [6, 7]

The use of modern digital technologies allows you to reduce material and energy costs for the production of a unit of production, preserve soil fertility, etc. Currently, a new approach to land management involves digital inventory and certification of all accounting objects in agriculture. The reliability of information increases the investment attractiveness of land resources, and also makes it possible to judge the ecological state of land. When using information technologies during control and supervisory activities, it becomes possible to receive information in real time and promptly respond to identified violations of the law. [8, 9]

Figure 3 shows the areas of land use and protection in which it is advisable to apply digitalization.
Figure 3. Areas of application of digitalization for the use and protection of land.

It should also be noted that 2020 presented another threat that negatively affects the efficiency of agricultural land use, which also affected the economic activities of enterprises in the agricultural sector, when agricultural producers worked in an unfavorable epidemiological situation. Even the presence of fertile land did not guarantee farmers high yields if, due to the threat of the spread of coronavirus infection, the sowing or harvesting dates were shifted. Perhaps in the future, innovative agricultural machinery in the fields will work completely without human intervention, but such super-modern machinery will not be available to all farmers due to its high cost. It should also not be forgotten that, while developing and introducing digital technologies in the organization of land use and protection, it is important to prevent the enthusiasm for technologies to the detriment of the maintenance and ensuring the effectiveness of the functioning of the land management system as a whole.

Of course, an important condition for ensuring the environmental friendliness of production is the awareness of economic goals, taking into account environmental restrictions. In turn, with the help of methods and mechanisms of strategic management, including territorial planning, regional and municipal authorities should create conditions for the growth of the economy and its greening. To do this, it is necessary to take into account external and internal institutional constraints, which creates favorable legal, social and investment conditions in rural areas. The effective development of rural areas is largely predetermined by the administration's ability to organize the rational use of the existing potential. [10] The main component of the development of rural areas, which is the basis of territorial interests, is the inhabitant of the rural area. One of the ways to improve the efficiency of the real economy is to use this resource. In this regard, the main task in the development of rural areas is to ensure year-round employment of rural residents, and at the same time, increase the level of profitability of rural labor.

On this path, it is necessary to form an economic base for securing youth in the countryside and increasing the attractiveness of the rural way of life. Attractiveness is formed, first of all, by good housing conditions, road support, availability of social infrastructure facilities, etc. Jobs should contribute to the preservation and restoration of the environment. Currently, information technologies are being introduced into all spheres of life, including in rural areas. For this, rural areas must be provided with an accessible and permanent Internet network. [11, 12]

Recently, the unregulated process of rejection of agricultural land for various non-agricultural facilities has been gaining momentum: housing, summer cottages for townspeople, warehouse and retail facilities. All this leads to the loss of development control and destruction of natural landscapes. At the same time, the interests of the rural population are ignored.
In agricultural production, in order to prevent various kinds of negative processes and phenomena in the use of land resources of agricultural enterprises, a fundamentally different approach is needed. To improve the efficiency of agricultural production, measures are proposed that take into account social, environmental and economic factors in the use of land resources, which can serve as a logical addition to the traditional recommendations for increasing income, that is, increasing the economic effect of agricultural organizations (figure 4).

![Diagram: Activities of agricultural enterprises]

**Figure 4.** Measures for the effective functioning of agricultural enterprises, taking into account social, environmental and economic factors in the use of land resources.

Thus, land has always been the main and basic component of the territorial-spatial socio-economic development of the country, and effective and rational use of land potential can ensure the development of rural areas, a decent level and quality of life. But so far the trends are such that the settlement network is shrinking and the population is being drawn to cities, which in the long term may lead to the degradation of rural areas. At present, in this area, it should be recognized that progressive changes in the spatial organization of society are impossible without the purposeful
influence of the state. In general, territorial development should be based on the balance of national, regional and municipal interests, while rational use of land resources is impossible without territorial planning. [13]

So, the most important measures to reduce the degree of pressure on the environment include:

- Development of the most effective environmental policy;
- Improvement of the regulatory and legal mechanism of nature management;
- Improvement of the economic mechanism of nature management, analysis of the effectiveness of environmental costs;
- Increasing the volume of financing for environmental protection measures.

Environmental education of the population plays a huge role in the greening of economic development and environmental protection. Environmental education should ensure a responsible attitude of man to the environment, the basis of which is the development of the principles of a rational relationship between man and nature. [14] Environmental education is a priority in the development of the education system. It should form an ecological culture and a responsible attitude towards the environment. New ecological thinking is needed.

In general, the transition to sustainable agriculture is highly related to policy and investment. The priorities of the agrarian policy should include the preservation of soil fertility, ensuring the safety of agricultural products, and the ecological living conditions of the population.

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