

World Tendencies Of Land Use Development

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Abstract— The article discusses the role of land in society, the essence of land use as a socio-economic and environmental phenomenon, an objective continuous managed multi-purpose process of land use by society. Their key role in agriculture is noted, the state and use of productive lands is analyzed, the growing tendency of land depletion and their degradation, which threatens food security, is emphasized. It is concluded that the main condition for increasing the efficiency of agricultural production in order to ensure food security and preserve natural ecosystems is the transition to a model of sustainable development that provides radical modernization, innovative activity and significant investment in agriculture and land use.

Keywords— Food security, agriculture, land use, resources, degradation, sustainable development, modernization, investment, innovation, ecosystems.

Situational analysis

Land - the most important component of the natural complex, is a place of settlement, habitat and human life. Society cannot exist without using land resources. Land use is an objective condition for the functioning of society, a socio-economic and environmental phenomenon that develops in accordance with applicable laws of the development of nature and society [1]. Land is used in all sectors of the economy and social sphere, without exception, as the main means of production, means of production, spatial operational basis, and in the conditions of the functioning of the land market - and as a commodity. Therefore, land use is seen as an objective continuous multi-purpose process of land use by society [1]. Land use is a complex material-abstract managed system, including subsystems of land use and management of this process.

The world's land resources make up 13.392 billion hectares, or 26.2% of the planet's surface area (1523 billion hectares without the surface of Antarctica). Productive lands make up 8.57 billion hectares or 64.0% of the land fund, less productive - 2.816 billion hectares (21.0%) and unproductive - 2.006 billion hectares (15%) [2].

Research

Land plays a special key role in agriculture, where it acts as the main means of production and is a source of food for the population, and a number of industries with raw materials. Currently, 11% of the earth's surface is already used for growing crops, world agricultural lands make up 4.559 billion hectares or 8.9% of productive land, including arable land - 1.356 billion hectares (10.1%), orchards and plantations - 0.093 billion hectares (0.7%), meadows and pastures - 3.110 billion hectares (23.2%).

Agriculture consumes 70% of all water obtained from aquifers, streams, and lakes. Over the past 50 years, sown areas in the world have increased by 12%, including twice as much on irrigated lands, and the volume of agricultural production has grown 2.5-3 times as a result of increased yields of major crops [2]. At the same time, a global increase in production in a number of regions led to land degradation, a deterioration in the quality of landscape ecosystems, and the growth rate of agricultural production is slowing. Management structures in the field of land use do not provide an adequate response to the increased intensity of agricultural activity. About 1 billion people in the world are starving, mainly in Africa and Asia, as a result of which global food security has been and remains the global task of agriculture. Lands suitable for agriculture are distributed unevenly with respect to regions and countries, which, first of all, negatively affects the underdeveloped countries. The specific area of cultivated land in low-income countries is two times lower than in high-level countries. Land degradation has an increasing trend. The growing trend of land withdrawal from agricultural circulation, land degradation has turned into a significant problem. Climate change and the unpredictability of crop yields in this connection are becoming increasingly problematic. The technologies and farming systems used by the general public for the most part are low-cost systems with ineffective management that cause soil degradation. In many regions of the world, whole land use systems are threatened that do not realize their production potential due to the significant demographic burden, limited land and water resources and the lack of a unified management system for them, the instability of agricultural practices, which reduces their ability to ensure food security.

World rainfed (rain, rain-fed) agriculture is the predominant agricultural system. The unpredictable level of precipitation and moisture content in the soil reduces by more than half the potential yield of crops in many low-income countries, rural residents remain vulnerable in socio-economic terms. In these regions, agricultural

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Article History: Received: Nov 02, 2019, Accepted: Dec 28, 2019

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production efficiency is more limited by water scarcity than by the availability of land resources. The continued growth of irrigated land reduces attention and proper investment in rainfed farming, and inhibits the expansion of its land.

The higher efficiency of irrigated agriculture is due to the significant intensification of this type of land use on the basis of irrigation, mechanization and electrification, land reclamation, large investments in the use and reproduction of these lands. Although a significant part of the lands suitable for irrigation has already been developed, the demand for water resources is growing, and the area of irrigated lands in the world is increasing by an average of 0.6% per year. The tendency for the use of groundwater for irrigation is growing; groundwater is either basic for irrigation or complementary to surface water by 40% of its area.

However, the achieved increase in agricultural production in many regions of the world due to poorly managed, entailed land degradation, salinization and depletion, loss of biodiversity. In most countries, existing land use systems are ineffective, do not meet the increased requirements of agriculture, are on the verge of depletion and degradation, and are not able to fully realize the objectives of ensuring food security.

A radical reform of the land use system is needed, optimization of its institutional base, introduction of effective organizational and economic forms of management, ensuring the priority role of environmental factors in the planning, use and reproduction of land resources, development and streamlining of the land market in order to ensure redistribution of cash flows in sectors economies and increasing their flow to agriculture. These and a number of other conditions for reforming the land use system require modernization not only of its infrastructure, but also of its organizational and managerial structure. In general, increasing water scarcity limits the possibility of increasing food production on irrigated lands in the arid climatic zone. Many irrigation systems in the world, in view of their imperfections, cannot realize their full potential, are not adapted to the needs of modern agriculture and require modernization, updating of infrastructure and modern management systems.

According to FAO, by 2050 the world population will be 9.1 billion people against 6.9 billion people existing. It is necessary to annually produce an additional 1 billion tons of grain and 200 million tons of livestock products. The required increase in demand for food products will be characteristic, first of all, for low-income countries, which determines its global growth rate of 1% per year and up to 2% per year in low and middle-income countries.

Food needs determine, on the one hand, the need to increase its production in the world by 70%, and in developing countries - by 100%, and on the other hand - increase the already high anthropogenic pressure on land resources. Realization of this task is the most difficult for developing countries, since it requires allocation of additional investments in agriculture from the budgets of national budgets, increasing the efficiency of existing agricultural land with limited land resources, and ensuring faster growth in production compared with population growth.

The necessary growth in agricultural production can be achieved through reasonable investment in agriculture, modernization of land use, water use and mechanization systems based on innovative technologies and methods, provided that negative trends in the use of land and water resources are overcome.

First of all, it is necessary to ensure the harmonization of the interests of society and the natural complex, and the prevention of the degradation of natural ecological systems in the face of increasing demands for land and water resources in order to achieve food security. Achieving this goal can be achieved as a result of further intensification of production by modernizing the agricultural system based on the growth of investments, the introduction of high-tech and resource-saving technologies, effective organizational and economic forms of management and integrated management methods in land use and water use. The growing influence of the demographic factor and the global climate change factor require mandatory consideration and a radical change in the existing agricultural production system, including land use and water use systems.

The world community has realized that the model of economic growth, along with its positive aspects and, above all, with a significant increase in the level of material production, has turned out to be environmentally vulnerable, because it is peculiar to: irrational use of natural resources, their depletion, degradation of natural systems, lack of harmonization of interests of society and nature, a significant deterioration in the quality of the environment and living conditions of the population in many regions of the world. In this regard, it was deemed advisable to make the transition from a model of economic growth, which has exhausted its potential, to a model of sustainable development, which contributes both to the rational use of natural resources and the protection of the natural complex, as well as to the sustainable development of the world economy, including agriculture.

The definition of sustainable development reflected in the materials of the Conference "Innovative approaches in land administration and land protection: problems and their solutions" [6] says that it involves such development that meets the necessary needs of the existing generation and retains the same prospects for future generations [3]. Sustainable development is based on the concept of development of social systems, including economic, environmental management, etc. The concept of development of social systems, in turn, is based on the theory of artificially-evolutionary development of society, in which the priority role in the development process does not belong to the evolutionary principle, but artificial evolutionary, that is, the intellect of the subjects of society [4, 5]. The intellectual activity of the subjects of society is a process of thinking and thought activity, the result of which are innovative ideas. Since the intellectual activity of the subjects of society is objectively continuous, the

process of developing innovative ideas and proposals with their subsequent implementation in practice is aimed at continuous improvement of the systems which are being studied, that is, at their development. In this regard, the innovative activity of the subjects of society is the main driving factor in the development of social systems and is the basis for sustainable development of the world community system.

Knowledge plays the determining and irreplaceable role in sustainable development. It is the materialized basis of the mental activity of the subjects of society and the total intellectual potential of society. The result of continuously increasing volumes of knowledge and increasing intellectual potential is an ever deeper knowledge of the essence and patterns of development of the natural complex and society, natural and social systems.

In turn, the continuous growth of the intellectual potential of society is the objective basis and driving force for the development of new increasingly high-tech and resource-saving technologies and methods for improving (modernizing) environmental management systems and material production, that is, innovative activities. Knowledge or intellectual potential is considered as the main factor of material production along with land, capital, labor. In other words, innovation and the modernization of environmental management systems and society are an indispensable condition for sustainable development and are organically linked to investment activities.

Given the different level of economic development of countries, the international community has identified the main conditions for the transition to a model of sustainable development of the economy [2]:

- some voluntary reduction in the level of consumption by developed countries and the anthropogenic load on natural resources in order to restore and preserve natural systems; It is also recommended to transfer modern technologies and methods to developing and poor countries, which will allow these countries to catch up with developed countries in terms of consumption, ensure food security in the world and preserve the natural complex;

- a slight increase in the intensity of production by developing and poor countries in order to achieve an average world consumption level in these countries, under the condition that the rational use of natural resources is limited, and the burden on natural resources is limited to preserve natural ecosystems. Thus, the world community has recommended a model of effective sustainable development for developing and poor countries.

The essence of the model of effective sustainable development involves the modernization of existing inefficient and highly costly systems (agriculture, land use, irrigation, mechanization, land reclamation, chemicals, stimulation of the rational use of natural resources) based on a significant increase in investment in innovation with the aim of introducing into the production of highly scientific and resource-saving technologies and technical methods of farming.

Strengthening the influence of the demographic factor, limited land and water resources, their degradation, deterioration of the ecology of natural systems and the environment require a radically new approach to the use of natural resources, based on the model of sustainable development, activation of innovative activities in the field of nature management and a significant increase in volumes investments in agricultural production, modernization of agricultural systems, land use and water use.

According to FAO estimates, the increase in agricultural production is possible due to further intensification of agriculture based on improving the land use system, the increasing role of irrigation and increasing the efficiency of water use, productivity growth, subject to the transition to a new environmental policy in agriculture. Land use and water use systems in agriculture require radical modernization based on the application of various innovative agronomic and technical approaches, optimization of their organizational and functional structure.

This requires realistically justified investment in agriculture. According to FAO experts, "the total investment needs for the development and management of irrigation systems from 2007 to 2050 will amount to about 1 trillion. US \$ In addition, another 160 billion US dollars will be required for the protection and development of land resources and soil conservation. The resumption of a more thoughtful investment in modern agriculture is now seen as a vital element of global recovery "[2].

For this purpose, various specialized funds can be used to move to a model of sustainable land use. Investments must be directed to the development of roads, storage facilities, and the protection of land resources; financing of institutions promoting land use management, research and development of regulatory systems, land use planning and management; development of programs to attract investment in land use, including private, modernization of its organizational and managerial structure and infrastructure.

Results

An analysis of the problems of world agriculture and the need to ensure food security in the context of a continuous population growth, land and water scarcity, significant degradation, climate change, inefficient environmental policy, insufficient innovation, reduced investment and lack of modernization of land use systems and water use, give reason to conclude that the main trends in the prospective development of agriculture are:

- intensification of agriculture on the basis of modernization of land use and water use systems, increasing the efficiency of land-water and other resources to increase production on a global scale by 70-100% by 2050 (respectively, in developed and developing countries) and ensuring food security in the world;

- transition to a model of sustainable agricultural development, ensuring food security, improving the efficiency of land-water and other types of resources;

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- ensuring a certain decrease in food consumption and anthropogenic load on natural resources in developed countries;
- the transition of developing and poor countries to a model of sustainable and efficient use of natural resources, taking into account environmental requirements, in order to achieve their average world consumption level;
- intensification of innovative activities in the field of land use and water use, a significant increase in investment in these areas of activity in order to develop and implement highly capacious and resource-saving technologies and modern methods of conducting agricultural production;
- ensuring the restoration and preservation of natural ecosystems, improving the quality of natural resources, improving the living conditions of the population in rural areas.
- improving market relations in land use of agriculture, the development of a multistructure form of management in land use on the basis of the introduction of more effective organizational and economic forms of management;

Findings

The unreasonable maximum use of natural resources practically without taking into account their depletion and reproduction, on which the model of economic growth in the second half of the twentieth century was based, has led to a deterioration in the ecological state of natural systems (especially land) and the whole environment.

The expected population growth of the world by 2050 to 9.1 billion people. determines the need for an increase in agricultural production by 70-100%, including 1 billion tons of grain and 200 million tons of livestock products, which determines its global growth rate of 1% per year and up to 2% per year in countries low and middle income.

Additional food requirements increase the already high anthropogenic pressure on land resources, and the shortage of land and water resources.

Improving agricultural efficiency can be achieved by:

- its transfer to a model of sustainable development, which provides for the priority role of environmental factors in agricultural production and its intensification based on the strengthening role of irrigation, mechanization, and chemicalization:

- modernization of agricultural, land and water management systems based on the introduction of innovative technologies and methods in the use of land resources;

- reforming the organizational and functional structure of the land use and agriculture system;

- attracting significant investments in land use and agriculture from various sources, including state, private, special funds and others;

- widespread introduction of market relations in land use and agriculture;

- development of the scientific field of "land use", training qualified specialists for the industry providing for the intensification of agriculture on the basis of strengthening the role of irrigation, mechanization, chemicalization in agricultural land use.

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