IMPORTANT ASPECTS OF FOREIGN EXPERIENCE ON IMPROVING THE EFFICIENCY OF LAND RECLAMATION MEASURES

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Abstract

This article gives information about foreign experiences related to land reclamation measures, the formation, and important aspects of foreign experience in land reclamation in agri-culture, etc. In addition, the state of land degradation in the world, regional aspects of improving the efficiency of water resources use, developing infrastructures in the field of land reclamation of the republic are presented in this paper.

Introduction. Changes in the global ecological situation on a large scale, taking place in the subsequent period, in accordance with the growth of the world's population, the possibilities for the development of irrigated agriculture become limited, the priority of the development of industry and other sectors in the world economy is growing from the priority of agricultural production, and the reduction of irrigated lands in the sector has negative impact on agriculture. In this situation, based on the natural and climatic conditions of the regions, the issue of effective organization of land reclamation measures in order to preserve the natural fertility of the soil, and form expanded reproduction has become one of the urgent problems on a global scale.

Observation of the main trends and forecasts in the study of land use and melioration problems in the world economy allows us to draw the following conclusions:

1. In the last century, the consumption of natural resources as a result of economic activity was greater than in the entire history of human civilization. Due to the fact that the development of the world economy is based on extensive factors, and due to a significant increase in resource consumption, environmental problems have become relevant.

2. 11% of the world's land fund (1450 million hectares) are arable lands and orchards. Ecologists estimate that the limited amount of arable land is 1,500 million square meters. should not exceed one hectare. So, practically all stocks of arable land are used by mankind. Otherwise, there will be a sharp increase in the ecological crisis [1].

3. The reduction in land area occurs mainly due to two cases, i.e. processes of urbanization and degradation as a result of increasing world population. According to forecasts, by 2030 the weight of cultivated land per capita in the world will decrease from 0.10 ha to 0.08 ha [2]. As a result of various levels of degradation processes, about 2 billion hectares of fertile lands have been lost in the entire history of the development of civilization [3]. This is more than the total area of agricultural land available today.

Materials and Methods. According to the results of the analysis of scientific and practical sources, in most of them, the process of land degradation on a global scale is interpreted as conditionally divided into four types, and the main directions of ways to eliminate them are presented (Table 1).

It can be seen from the table above that 1/4 or 25% of the land resources used in the world today are severely or completely degraded. The possibilities for their restoration are practically limited: 42 percent of the land is partially or less degraded, and only 10 percent of the land is in a state of sustainable use.

Table 1.

The state of land degradation in the world [4]

Types of land degradation	Exclusion Optio
1. Severely degraded or fully degraded land - 25 percent	Take measures to restore or p consequences in cases where as economically feasible.
2. Degraded and partially degraded land - 8 percent	Elimination of the con degradation based on restoratic
3. Lands in a stable state and less degraded - 36 percent	Regular reclamation activities
4. Developing, that is, stable lands - 10 percent	Ensuring an enabling enviro improved sustainable land systems

4.In recent times, there is a possibility of observing a dangerous trend of decreasing water resources and increasing the frequency and duration of droughts. Because under the influence of economic activity in many countries of the world, the annual flow of rivers is decreasing.

5.The last century can be considered the century of irrigation and chemicalization. Because over the past century, the consumption of mineral fertilizers in agriculture has increased 10 times, and the area of irrigated land sharply increased from 48 million to 278 million hectares between 1900 and 2000. 35-40 percent of irrigated lands are secondarily saline and waterlogged due to ecological imbalance. For this reason, on average, 10 million hectares of irrigated land are withdrawn from the agricultural cycle every year [5].

6.Global climate change also creates the need for a climate change-adapted agricultural production system in the future. After all, experts recognized that from the middle of the 19th century to the beginning of the 20th century, the temperature on our planet increased by 0.7 degrees [7], and by 2100 this figure is expected to increase by 3.7-4.8 degrees [8]. According to the calculations of climatologists, an increase in air temperature above 2 degrees has serious negative consequences.

In general, in the context of the noted negative trends in the full use of agricultural land, especially in developed countries, arable land loss is achieved through effective reclamation measures, increasing crop yields based on the organization of production on an innovative basis, but the opposite is observed in developing countries. In fact, the purpose of land reclamation in different countries is different. Because in some countries the goal is to maximize profits, in others - to solve the food problem, and in others - to protect the environment.

Also, the growth rate of irrigated land in the countries

of the world also depends on the state of economic development of these countries. According to the analysis, the growth rate of irrigated land in developed countries has decreased since the 1980s. This is explained by the goal of increasing crop yields and processing volumes based on effective land reclamation measures in these countries, and on the other hand, mitigating the impact of production on the environment.

The growth rate of irrigated land in developing countries (with the exception of the Central Asian republics) continued until 2000. This is explained by the need to increase food production, despite the limited water resources and the deterioration of the natural environment. In the countries of Central Asia, this indicator is explained by the reduction of water resources and the deterioration of reclamation of irrigated lands (appendix).

In conclusion, if we characterize the general direction of modern solutions to improve land reclamation, then in recent years the issue of sustainable management of natural resource protection processes has changed pre-existing ideas on a global scale. This necessitates an increase in food production while reducing the impact of production technologies on the natural environment. Of course, traditional approaches to environmental management and existing socio-economic conditions in developing countries limit the ability to carry out this task.

Based on the analysis of the data presented above, it should be recognized that the application of land reclamation practices of developed countries to the conditions of Uzbekistan requires a detailed assessment of the natural, socio-economic conditions and characteristics of our country, and most importantly, an analysis of the adopted system of values and goals. According to the results of the analysis, organizational and economic measures for land reclamation and their improvement have sharp differences in the countries of the world, and we will try to analyze some of them within the framework of the goals and objectives of this research work.

Based on the foregoing, the United States of America on the creation and application of advanced high-tech reclamation systems, conservation, restoration and development of irrigated lands in the future, advanced training of industry specialists, retraining of personnel, promising research and development, as well as the creation and implementation of innovative technologies in the field of reclamation are important aspects of his experience are noteworthy.

Discussion and analysis. The US experience in this matter is unique, and land reclamation in the country and their rational use are under constant control of the Ministry of Agriculture. The process of using reclaimed land in the United States is mainly carried out in five directions.

The first direction - the elimination of negative environmental consequences (land degradation, contamination of soil and water resources with chemical and nuclear residues, etc.) is the primary and main task of the US Department of Agriculture. One of such activities is active participation in environmental programs. It is known that in the 70s of the last century, 37 percent of cultivated land in the United States was severely eroded due to intensive use of reclamation lands. That is why the government decided to temporarily stop the use of eroded lands or completely exclude them from agricultural circulation. In this way, in a difficult and lengthy process, measures to restore soil fertility are carried out on the basis of large economic costs.

The second direction includes activities for the inventory of natural (land and water) and other resources (reclamation equipment, irrigation systems). The main objective of these activities is to produce every five years a specific information database on soil fertility issues such as the state of soil erosion, the quality of water resources, soil salinization, etc. The nationwide inventory of natural resources, which is carried out every five years, is considered important not only for solving soil fertility problems of federal significance, but also at the territorial level of states and local agricultural associations. It should also be noted that during the implementation of these activities, specialists from agricultural universities, scientific institutions and colleges specializing in agriculture will conduct their research work together.

The third direction involves the use of resource-saving technologies, such as rain or drip irrigation, to increase the productivity of reclaimed lands. Drip irrigation helps to prevent or reduce soil salinization, which in turn reduces the cost of tillage by 2-2.5 times. It also saves up to 40 percent of water in the irrigation process associated with the irrigation system.

Fourth direction includes the development of measures for the "alternative use of reclamation lands", which were put into practice in the 60s of the twentieth century. Alternative land use is based on a complex of reclamation methods: tillage, crop rotation, changes in the composition and condition of sown areas, biological methods of plant protection, etc.

The fifth direction is advanced training and retraining of personnel. According to American scientists, the main factor in economic growth in the course of human development is not capital or production methods, but knowledge and new ideas aimed at ensuring the production of competitive products, that is, human capital.

One of the attributive elements of the development of innovative mechanisms is the introduction of a knowledge extension service, i.e. information and advisory service, which is an effective function of managing agricultural production and coordinating production volumes in accordance with market requirements. It was first applied in Great Britain in 1840 and made a significant contribution to improving the efficiency of agricultural production and expanding the scope of consumption.

Information and consulting services are a systematized organizational and structural form of multifunctional processes and tasks. The main ones are:

- help farmers analyze achievements and determine the most effective ways for the near future;
- implementation of the results of scientific research in the agricultural sector in the educational process and practice;
- proportional development of intensive and extensive factors of agricultural production, assistance to farmers in the development of resource-saving innovative technologies;
- strengthening the motivation of farmers to implement the options and technological solutions chosen by farmers;
- making decisions and giving advice related to the production of environmentally friendly products, services and other issues by farms

In conclusion, it is appropriate to recognize the following main conclusions that emerged as a result of research on the effective use of reclaimed land in the United States:

- the experience of developed countries shows that the

priority of state administration in improving the efficiency of land reclamation is of particular importance;

- the use and implementation of alternative farming or "organic" farming, increasing productivity and soil fertility is one of the most important factors in the effective use of reclaimed lands;

- one of the main factors for increasing the efficiency of land reclamation is the increase in the level of knowledge and advanced training of personnel and their retraining. It is recognized that the implemented activities are connected with each other in a chain and are implemented in stages. That is, this unity is clearly manifested in fundamental and applied agricultural research, the development of educational institutions, advanced training of personnel, the effective application of new scientific developments, the systematic training of personnel in various areas of the agricultural sector, and the retraining of agricultural personnel.

At present, it is appropriate to recognize China's experience in the efficient use of reclaimed land. The People's Republic of China has repeatedly surprised the world with its achievements in various fields and non-standard solutions to problems. Also in the field of agriculture, they have achieved many successes in the productive use of reclaimed land. Intensive type of agriculture is suitable for this country. Corn, wheat, soybeans, rice and sugar cane are grown on the black soil of the Northeast Plain, corn, wheat, millet, cotton, vegetables and fruits are grown on the black-brown soil of the North China Plain, rice, vegetables, tea and fruits are grown in the Lower Yangtze Plain. Vegetables, rice and wheat are grown several times a year in the brown, moist soil around Lake Sichuan.

With just 9 percent of arable land and 6 percent of the world's resources through land reclamation, the country manages to feed the Chinese, who make up 22 percent of the world's population. However, the lack of water will seriously affect the further development of agriculture. Because every year the number of industrial enterprises using water is increasing. The current situation has required intensive research to find ways to more efficiently use the water used for irrigation in agriculture.

It should be noted that almost all types of highly efficient land reclamation technologies have been used in China over the past twenty years. The effectiveness of land reclamation was achieved through land reclamation, systematic distribution of arable land, distribution of surface and ground waters, prevention of channel filtration, and improvement of various land reclamation works. This brings the per capita income from agriculture to $316.7.

Comparing the experience of the People's Republic of China in the efficient and economical use of reclaimed lands with the experience of our republic, the following features should be recognized:

- in this country, the role of state administration in the management of land reclamation and the centralization of water management complexes is significant. However, it does not contradict the development of the market mechanism and the interests of private entrepreneurship. All measures implemented by the state are aimed at the production of new land reclamation technologies that save resources. As well as scientific and technical support for land reclamation, management of large irrigation systems with water consumption and collective forms of farms, lease of land use within the framework of the state system of land reclamation;

- development of melioration and irrigation in mountainous areas and pasture districts, organization of state funds and financing of the reconstruction of irrigated lands, which saves up to 41% of water used for irrigation;

- the organization of the main reclamation funds and medium-sized irrigation areas is carried out at the expense of state funds. Yard irrigation networks are organized on the basis of joint activities of farmers and communities of agricultural enterprises based on the support of central and local authorities with the help of state subsidies.

It is strictly forbidden to damage ameliorative structures and technical and technological systems. At all levels of government, the state uses administrative methods to attract private investment to develop irrigation systems and improve the efficiency of land reclamation.

Despite the fact that the People's Republic of China occupies the highest place in terms of scientific and technological development, the country pays great attention to improving the skills of personnel based on best practices at the level of international standards. The Institute of Irrigation and Drainage was opened under the Ministry of Water Resources.

Land reclamation research, as well as training of land reclamation engineers, is carried out in the Beijing National Irrigation Technology Center, many special departments of provincial water resources institutes, universities, colleges, 50 polytechnics and 44 higher technical schools.

Scientific research and high-tech work in the field of land reclamation has led to the establishment of relations with a number of international organizations and countries. In cooperation with Japan, the programs "Center for the Study of Irrigation and Drainage Technology in China" and "Research on Water Supply in Large Irrigated Areas in China" are being implemented. Also, with the support of the World Bank, the project of modern China and the UK "Ways to Eliminate Poverty through the Development of Water Supply in the Chinese Agricultural Sector" is being implemented.

Recently, the experience of our republic in improving land reclamation in the conditions of irrigated territories has been recognized, but, despite this, in our opinion, it is advisable to give a wider place in this research work to the experience of Israel. Because even in conditions of scarcity of water sources in our country, there are universally recognized great achievements in the field of rational use of land resources, increasing soil fertility, producing environmentally friendly agricultural products, and their wider research. and introduction into agriculture of our republic is of great importance.

The territory of Israel is not so big, but its achievements in the field of agriculture are remarkable. First, 80 percent of the purified water is used for growing organic products, including cotton fields and several vegetable fields. Secondly, there is a system of wider and continuous introduction of intensive factors into production processes. In accordance with the regulatory legal acts established by the government, an innovative direction called "Organic Agriculture" has become widespread. Therefore , it is important to study the results of scientific research conducted in the State of Israel regarding the development of agriculture based on an innovative model in the conditions of our republic.

It should be noted that there is a drip irrigation system in Israel, which has created 230,000 hectares of irrigated agricultural fields. An irrigation system consisting of plastic pipes allows crops to be supplied with water at the

standard level to the roots. Thus, the efficiency of water use has doubled, that is, from 30 percent to 60 percent. This method is widely used, especially in the field of cotton seed and vegetable cultivation. Irrigation rate is 5.0-5.5 thousand cubic meters.

According to the NAAN company in Israel, the drip irrigation method is noteworthy in that it fully covers the costs of cotton raw materials obtained in the second year, and provides an opportunity for additional profits for agricultural production entities. Under the conditions of cotton cultivation, the highest yield was 6.3 t/ha, and the average yield was 5.0-5.5 t/ha.

Due to the scarcity of running water sources, the rational and economical use of water resources in Israel's agriculture is one of the main problems. In this direction, one of the largest scientific and practical achievements of the country is 100% automation of rain, drip (in open ground) and aerosol (in greenhouses, greenhouses and other types of enclosed structures) irrigation technologies.

As a result, firstly, by meeting the needs of each crop in water within the specified norms and terms, cases of under- or over-expenditure of water are completely excluded. Secondly, nitrogen, phosphorus and potassium fertilizers, as well as microelements, are prepared in liquid form, mixed in appropriate quantities (doses) and applied directly under the roots of crops during irrigation. At the same time, the simultaneous implementation of a multitude of agrotechnological works not only makes it possible to drastically reduce the cost of production, but also ensures the complete assimilation of fertilizers and other essential microelements by agricultural crops during the growing season, and absolutely prevents the deterioration of the soil composition and land reclamation.

At the same time, it should be noted that the effectiveness of land reclamation measures should be considered not only as a result of these measures, but also depends on a complex of other agrotechnological measures, as explained above. For example, on lands with good reclamation, agricultural crops can grow healthy and productive, but untimely protection of them from various diseases, pests and weeds will lead to the loss of a certain part of the crop that can be used, and hence to a decrease in the effectiveness of reclamation measures and the costs spent on them. For this reason, in the State of Israel, much attention is paid to this area and sufficient appropriate resources are allocated - materials, technologies, financial resources, intellectual factors, scientific and technical developments and products.

Innovations used and newly created in the system of plant protection against various diseases and pests in the country have made it possible to completely solve this problem. In particular, a number of innovative drugs created by the country's scientists in the field of pest control are widely used not only in the country, but also in the United States, Europe and a number of other countries. This system is mainly based on innovation in three areas, namely:

- crop care facilities (greenhouses, greenhouses, etc.) are surrounded by

newly developed insecticide-impregnated (pesticides, fungicides, and other preparations) films, fine-mesh membranes, and similar materials that prevent the entry of harmful insects. Harmful insects or various disease-causing bacteria get on these treated materials and die in the environment itself. Therefore, the speed of their spread in the future will be sharply reduced, and as a result, in addition to closed structures where agricultural which are considered natural enemies of harmful insects, is important for the protection of crops, as well as for growing organic products and protecting the environment from various pollution. Therefore, bio-farms are widespread in the country, where wild insects, but useful for plants and the environment, are bred. Today, their products are exported in large quantities even to the industrialized USA and European countries. In addition, the use of new types of bacteria and fungi, which almost completely destroy harmful insects created by Israeli breeders, makes it possible to fully preserve crop yields.

In general, the innovative activity of the State of Israel in the field of agriculture creates a solid foundation for bringing products produced not only in agriculture, but also in the livestock industry, to the leading positions in the world both in terms of quantity and quality. It is noteworthy that a number of companies in this country have created greenhouses and greenhouse facilities suitable for any natural and climatic conditions with the appropriate infrastructure, they can be operated in all regions of the world, and most importantly, conditions have been created for their guaranteed commissioning with noteworthy assistance from the company's specialists and financial resources. The distribution of greenhouses and greenhouses of this type to all regions of our republic, taking into account local conditions and mental needs, is of great importance not only in terms of continuous provision of the population with agricultural products throughout the year, but also in the regular improvement of reclamation conditions.

It is worth noting that in this country it is customary to introduce new agricultural technologies every year for the production of high-quality and cheap agricultural products, and this process is supported by the state through the creation of various preferential mechanisms and conditions.

Assessment of land reclamation and their effectiveness in agriculture strengthening the legal foundations of this activity, this process is one of the factors directly affecting the effectiveness of management . In this regard, the experience of the Russian Federation in this direction is considered important. First of all, the Law "On Land Reclamation" was adopted in our country, and the adoption of this law combined into one system various phrases, terms and concepts used in practice in the field of land reclamation, and the interpretations given to them, and served to form uniform meanings and tariffs for terms, concepts and categories.

Methods have also been developed and implemented for assessing the economic, environmental and social effectiveness of funds spent on land reclamation, determining the amount of damage caused to agriculture when using natural resources, especially due to the deterioration of land reclamation. Most importantly, the adoption of this law and relevant regulatory documents makes it possible to determine the main directions of state policy in the field of land reclamation , to use state resources for these purposes, and to develop effective mechanisms for state financial support for the industry, and economic stimulation of agricultural producers .

In general, the important aspects of the experience of improving the agricultural land reclamation in foreign countries, analyzed in the course of the study, and their significant aspects can be expressed as follows (Table 2).

Table 2.
Important aspects of foreign experience in land reclamation in agriculture

Important aspects of foreign experience	Important aspects of use in the economy of the Republic
In the direction of providing regulatory documents on land reclamation and assessing their effectiveness:	
Land Reclamation Law (Russia)	The legal framework for activities related to the control, regulation and use of land reclamation will be improved. It also combines phrases, terms and concepts and the interpretations given to them into a single system and serves to form uniform meanings and tariffs for terms, concepts and categories.
Methods for assessing the economic, environmental, social efficiency of land reclamation measures (Russia)	It will be possible to manage the effectiveness of land reclamation measures and the investments spent on them, as well as to develop plans for the future.
Methods for determining the amount and extent of damage caused by nature management (Russia)	It will be possible to determine the size and extent of losses incurred by agricultural enterprises when using natural resources, in particular, from the deterioration of the ameliorative state of lands. Thanks to this, economic incentive mechanisms for agricultural entities will be introduced.
In the direction of organizational measures aimed at improving land reclamation:	
Development and implementation of a conservation program (USA)	It will be possible to implement measures to restore soil fertility based on long-term and high economic costs.
natural (land and water) and other resources (reclamation equipment, irrigation systems) (USA)	Every five years a specific information database on soil fertility issues is formed. On this basis, it will be possible to control land reclamation.
reclaimed land (USA)	Opportunities will be created for soil cultivation, crop rotation, changes in the composition and condition of sown areas, the introduction of biological methods of plant protection, etc.
Extension Service, i.e. Information and Advisory Services Organization (USA)	Based on the systematization of multifunctional processes and tasks, an effective service for agricultural producers is formed.
Establishing links with international organizations and countries of scientific research in the field of land reclamation (China)	A base will be created for the creation of an innovative information and analytical center for reclamation control.
Creation of biofarms (China)	Insect breeding activities that are beneficial to plants and the environment are carried out.
In the direction of encouraging the economical use of natural resources [6] :	
If consumers use water in excess of the limit, a fine of 10 times the cost of excess water will be charged (Israel).	It will be possible to establish effective penalties or incentives for exceeding water consumption.
$0.50 fine for each cubic meter of water discharged by a consumer who takes water for irrigation purposes (Israel).	A basis will be created for the application of financial incentives or, conversely, penalties to a producer that saves water resources.

[1] Developed by the author.

Conclusion. One of the main conclusions arising from the content and significance of the above foreign experience is that modern advanced technical and technological methods developed in developed countries for the efficient use of reclaimed lands, as well as achievements in the field of economic and financial support of agricultural production entities, and step by step implementation of those measures in our republic should be considered as an important direction.

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