

METHODOLOGICAL ASPECTS OF THE DEVELOPMENT OF AGRICULTURAL RECLAMATION

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Abstract

This article gives information about methodology related to agricultural reclamation, the formation, and concept of agricultural reclamation, scientific approaches of researchers concern-ing land reclamation, etc. In addition, water problems, using resource-saving technologies, regional aspects of improving the efficiency of water resources use, developing infrastructures in the water management system of the republic, and improving the efficiency of water management by the state are presented in this paper.

Keywords: agricultural reclamation, crop rotation, irrigation methods, agricultural technologies, land reclamation.

Introduction. Land reclamation-related initial views, ideas, and actions have a long history in Central Asia. Indeed, according to historical sources, they have traveled a long historical path of 6 thousand of years from the first simple ideas to the most complex teachings. It should be said that these simple ideas formed the basis for the creation of complex teachings. Even in the most ancient sacred books, the culture of land use and water use, economic, legal, social, and even environmental aspects of their use are shown in detail.

In particular, "Avesta", the holy book of the Zoroastrian religion, pays special attention to the issues of agriculture based on artificial irrigation, respect for mother nature, and improvement of soil conditions. "Irrigation of lands and crops, drainage of wastelands - ideas about land reclamation indicate that one of the four vital elements - soil, water, fire, and light - is extremely important for the conditions of that land" [1].

Islamic jurisprudence also pays great attention to issues of property and property relations. In particular, tax relations were clearly defined when using land, and in the 7th century, a differentiated taxation system was introduced in the amount of 25, 33, and even 50 percent of the crop, which was taken from a unit of land area, depending on its quality and irrigation methods [1].

Literature review. It can also be noted that special attention is paid to the rational use of thousands of discoveries and developments created by our ancestors and recognized by the world community. In this regard, the economist, prof. It is described in detail in the scientific work of A. Razzokov "Economic turmoil". In particular, the construction by our compatriot Ahmed al-Fargani of a structure that measures the water level and flows in the Nile River, the introduction in our region of the cotton-alfalfa-grain crop rotation method, irrigation canals, used rivers, canals, and even wells from underground to the surface to still in use in the US, widespread use in India and Pakistan, public water use arrangements, Ahmed Donish's development of the first Amu Bukhara canal project, many examples could be cited. However, they are not put into circulation as scientific theories and laws for objective and subjective reasons.

The first scientific and methodological approaches to the concept of land reclamation as a whole were formed in the 17th century, and initially, it was called "reclamation", from the beginning of the 19th century. it was called "landscaping". At present, generalizing the meaning of the term melioration, it is considered an approach

to improving the condition of land plots in a mutually balanced way between society and nature, based on the interests and needs of man.

In this regard, the joint balanced action of society and nature has an undeniable classification, which requires them to be purposeful in all respects and to know the laws of nature, the principles of their operation, and to strictly observe them. Failure to observe such principles, which are the basic condition and requirement of joint action, will naturally lead to the worst and most dangerous consequences. For this reason, representatives of classical economic science have seriously paid special attention to this mentioned issue.

The use of non-scientific agricultural technologies in the cultivation of agricultural products caused irreparable damage to the upper layers of the soil, the development of the desert territories of Kazakhstan and Uzbekistan during the former USSR (in the 50s of the last century), the development of a difficult environmental and economic situation, land degradation, water and wind erosion From history know what caused it. Also, as a vivid and irrefutable example of such situations, one can cite the major environmental crises that occurred in the 1930s-1970s as a result of the use of irrational tillage technologies in US agriculture. It should be noted that as a result of it, large-scale erosion processes occurred, as a result of large sandstorms, highly fertile soil layers were destroyed on tens of millions of hectares of land.

Among such failed projects, it is necessary to name the island's destruction and ecological disasters that occurred in coastal areas due to the development of lands around the upper and middle reaches of the Syr Darya and Amu Darya and the formation of irrigated agriculture.

Materials and Methods. In general, based on the research results of representatives of a number of scientific schools, the development concept of agricultural melioration can be systematically systematized in the following order and sequential directions (Table 1).

Discussion and results. The ideas of interdependence between man and nature related to the development of land reclamation were embodied in the research of classic naturalist scientists and scientific figures of the XIX-XX centuries (N.I. Vavilov, V.V. Dokuchaev, I.V. Michurin, etc.) and were advanced compared to their time. it is distinguished by the fact that the idea was pushed, was recognized by the world, and has not lost its value even today.

Table 1.
Formation and directions of development of agricultural melioration

Conceptual (school) directions	Causes of the theory (school).	Summary
Naturalists (representatives of the Russian classical school) XIX-XX centuries.	The formation of the theory of natural formations, provided the emergence of the science of the landscape.	The emergence of this theory has created a need for a comprehensive study of natural systems.
The school of Soviet scientists was formed in the 30-40s of the 20th century.	Formation of different ideas about soil science as a medical object.	The theory of the melioration of saline soils was formed mainly in the field of soil science. A large database of soil systems and properties has been collected.
Including, Scientists of the All-Union hydro-technical and reclamation and research institutions of the Union republics.	Adapted technical means, technologies, and geocological restrictions have not been formed, and the influence of irrigation methods on the development of the reclamation system has not been studied.	A theory of irrigation has been formed, which provides for the optimization of irrigation methods, taking into account the level of water absorption in the soil.
Modern supply concept From the 90s of the 20th century to the present	The level of degradation of the natural environment and the agroecosystem is recognized as aggravating. As a result, there was a need to improve the ways of linking the requirements of the natural environment with economic activity.	It was recognized that the only way out of this situation is to focus technical and technological development on solving environmental problems. On this basis, the theory of the "landscape system of agriculture" was formed.

The uniqueness of the scientific research carried out by them is that they are characterized by the interpretation of nature in time and space, as a natural single and general being.

However, it should be noted that the main motto of land reclamation for many years to this day is the opinion of M. V. Michurin that "one cannot expect favors from nature". Because the current ecological situation and approaches to land use processes lead to an aggravation of the conflict between nature and man.

V. Dokuchaev, the founder of the science of soil science and melioration in Russia, who laid the foundation for the creation of the theory of landscapes and the founder of the idea of natural areas, paid special attention to this approach. His theory is based on the idea of a comprehensive study of natural systems based on the system of organization of agriculture (optimization of natural systems (landscapes)). In his work "Our Deserts - Yesterday and Today", he recommends a system of measures to prevent and combat such threats in the future, based on the experience of combating coastal erosion. In his opinion, such activities "should be in a certain sequence and strictly systematized, like nature itself" [2]. Also, this scientific work includes complex measures against coastal erosion, in particular: hydrotechnical, anti-erosion, thermal and wind reclamation, plant and agro-reclamation, river reclamation, agro-reclamation, and agrotechnical measures.

In the 30s and 40s of the 20th century, scientific views (representations) related to the soil as an object of reclamation, due to objective reasons, did not receive regular development. The reclamation system emphasized that soil science is the theoretical basis for the reclamation of saline lands and for solving the problems of reclamation of irrigated lands. In the early 1950s, in connection with the intensive development of land reclamation, many databases were created on the soil regime and its properties in wet landscapes. At the same time, reclamation is noted as the main factor in the intensive development of agriculture, and its negative consequences are also studied.

It should be noted that Academician A. N. Kostyakov made a significant contribution to the development of land reclamation science. This scientist was the first to develop and improve the scientific foundations of the

science of land reclamation. However, until that time, land reclamation was considered a practical part of the science of "Agricultural hydraulic engineering". The scientist conducted land reclamation research and experiments in

the republics of Central Asia, the Caucasus, and the Volga region. A. Kostyakov introduced into science the concept of a hydro module, a method for calculating the irrigation regime for agricultural crops based on the water balance, an irrigation system, a method for calculating drainage and salt flushing, and irrigation theories were created.

A great contribution to the development of the science of land reclamation was made by scientists from the Russian Research Institute of Hydraulic Engineering and

Land Reclamation and the Moscow University of Natural Improvement. They were among the first to develop a conceptual model for managing reclamation systems.

A new stage in the development of agricultural production began in our country in the 60-70s of the last century due to land reclamation. One of the main reasons for this is that the former Union government (March 1965 Plenum) outlined promising (for 10 years) directions of agrarian policy, which set the task of intensive development of agriculture based on three main factors, i.e.,

mechanization, chemicalization, and land reclamation. When implementing this Program, the issue of organizing the production and material and technical bases of water management organizations and special institutes, and research institutions were considered. During this period, such large research institutions as "VNIIGiM", "SANIIRI", "VolzhNIIGM", "DalNIIGiM", and regional experimental stations operated in all republics. In 1966, new special scientific centers were established. In general, by the 1970s, the activities of more than 20 scientific and practical organizations were aimed at developing the scientific foundations of land reclamation.

This situation has led to the improvement of the methodology for conducting scientific research on land reclamation. This, in turn, as noted, led to the formation of various ideas about the development of land reclamation; many scientific sources and literature are devoted to it. In particular, scientific schools have been created in Uzbekistan to improve the efficiency of agricultural reclamation measures in the agriculture of the republic. For example, K.I.Lapkin, F.K.Kayumov, J.Medetullaev, K.A.Choriev, O.P.Umurzokov, N.S.Khushmatov contributed to the improvement of the scientific-theoretical and methodological-practical foundations of this problem.

The scientific and practical aspects of land reclamation activities were first studied by K. I. Lapkin, who was one of the first in our republic in his scientific works to comprehend and substantiate irrigation and land reclamation as the main factors in the processes of specialization and settlement of agriculture in the regions. . In his opinion, "... irrigation, as the main factor in the intensive development of agriculture, is the basis of its specialization. The fulfillment of plans and tasks in agriculture is directly related to the increase in

production volumes, the improvement of its structural structures, and irrigation and reclamation construction work” [3]. Also, this scientist developed the scientific and theoretical foundations for the formation of the processes “Agriculture” and “Land use” as a system in Uzbekistan and is recognized as the founder of a large scientific school in this direction. Because the scientific and methodological developments aimed at solving the above problems of economists who are representatives of this scientific school have not lost their significance at the present time and are of great scientific and practical importance.

The studies and scientific works of the economist F. Kayumov are aimed at the efficient use of land and water resources, the improvement of the methodological foundations for determining the effectiveness of investments directed to the agricultural sector, and the development of commodity-money relations when using these resources. In his monographic study on improving the efficiency of networks of the agro-industrial complex in the context of the transition to market relations, it was noted that since the 50s and 60s of the last century, extensive factors have been mainly used in use. Land and water resources to improve production performance, which led to the fact that the number of funds spent was higher than production performance. In his opinion, “...in these processes, a “peculiar approach” to the issue of land reclamation was formed” was set, then the processes of managing the network or the system for distributing such funds are too centralized, and the fact that it was carried out on a “top-down” basis indicates that this important issue has not been given the necessary level of attention. For example, 80-85 percent of the funds allocated for these purposes were directed to the development of new lands.” [4] From this point of view, it is necessary to ensure the targeted spending of funds allocated for the improvement of land reclamation, in strict order on the principle of “bottom-up”.

Economist K. Particular attention was paid to this problem in the research works of Charyev, who interpreted hydroreclamation measures as the main factor in the development of agricultural production on an intensive basis. In particular, in his opinion, “... the most important features of hydro melioration as a factor in the intensification of agricultural production: firstly, hydroreclamation measures are not considered as a technological process, its main task is to create conditions for the intensive use of land resources. and expand opportunities for creating qualitatively new land-use systems; secondly, at the moment, the failure to carry out comprehensive irrigation and reclamation measures with full consideration of such aspects as cultural and technical, protection of land resources will not give the expected economic effect; thirdly, irrigation and reclamation measures improve the real results obtained from them while simultaneously strengthening other intensive factors. In turn, the implementation of all the main directions of intensive development of agriculture in interdependence (in acceptable options) is important not only to ensure the high economic efficiency of irrigation and drainage measures, but also to ensure the intensive development of agricultural production” [5]. Scientific research conducted by one of our agrarian economists O'Umurzakov was devoted to solving the problems of rational and efficient use of the existing production potential in the agricultural sector of the economy, its methodological foundations were systematically studied.

Assessment methods have been improved to take into account changes in the quantity and quality of land and water resources, which are the main elements of this potential. In his opinion, “... one of the priority areas for developing the production potential in the agricultural sector is to improve the quality indicators of land plots, which are the main means of production in the industry. At the same time, the main attention is paid to increasing the technical potential of the irrigation and drainage system, which is considered one of the important tasks awaiting a solution. ...because a large number of funds spent for these purposes should ensure an increase in productivity and income per unit of land by increasing the productive potential of the land” [6].

The scientist-economist V.Ch-S.Kim also conducted research on the problems of improving the theoretical and methodological base for increasing the efficiency of irrigated land use in a market economy, economic evaluation of land, paid use of water resources, evaluation of the effectiveness of capital investments in agriculture, partially studied and the question of the effectiveness of land reclamation measures. In this, he supports the idea of the expediency of determining the effectiveness of land reclamation measures based on the capital investments spent for these purposes and cadastral data on land and water resources. In particular, in his opinion, “the effectiveness of the use of reclaimed lands is assessed based on the number of capital investments spent on the implementation of these activities, and the data of the land and water cadastre. During the development of capital investments over the years, the increase in crop yields should correspond to the standard payback periods for these investments” [7].

In addition, the development of irrigated agriculture in conditions of limited water resources, which is one of the urgent problems today, is recognized as one of the serious problems not only in Uzbekistan, but also in many countries of the world, and many studies are being carried out in this regard. In our republic, research on these issues was carried out by the agronomist S. Dzhahalov. The scientist's doctoral dissertation focuses on theoretical and practical solutions to the problem, regional aspects of improving the efficiency of water resources use, developing infrastructures (IIS) in the water management system of the republic, and improving the efficiency of water management by the state. According to studies, the improvement of the technology of melioration and the production of agricultural products, their specialization has an effective impact on the efficiency of the use of available natural and industrial resources. He also stated that “as a means of intensive development of reclamation agriculture, it is important to increase the volume and productivity of cultivated products, taking into account the specifics of the regions. ... The basic principles of a rational economy increase soil fertility by improving the structure of agricultural enterprises, depending on natural conditions” [8].

The agricultural economist N. Khushmatov noted that the efficient use of land resources is important in the context of the introduction of a socially oriented market economy in the agricultural sector of our republic. In this regard, today more than half of the irrigated lands in our republic are in need of repair and improvement. According to N. Khushmatov, according to the results of his research, “the reason for the secondary salinization of soils is the proximity of mineralized seepage waters to the surface of

the earth. The large-scale use of irrigation water causes an increase in the level of seepage water. Salinization of newly irrigated lands occurs with the formation of difficult reclamation soils. ... in most regions, new lands are being developed with low efficiency without taking measures to improve reclamation conditions. In addition, due to the unsatisfactory condition of collector-drainage networks and the lack of irrigation water, crops are not planted on irrigated arable lands" [9].

Such unpleasant situations occurring on a global scale, especially in the early years of the 21st century, are somewhat exacerbated by new methodological approaches in this direction, the creation of methods for the rational use of natural resources, the improvement of research methods in the areas of resource and energy conservation, and the increase in soil productivity, which plays a key role in increasing the efficiency of land use, raised the issue of ensuring sustainable environmental and economic development.

As a result, by the 70s and 80s of the last century, the concepts of "alternative land use" or "adaptive landscape agriculture" were formed in the world agrosystem. According to the scientist A.L. Ivanov, who conducted scientific research in this direction, the "adaptive-landscape system of agriculture" is part of separate agroecological groups for growing economically and environmentally sound qualitative and quantitative products by restoring the stability of agro landscapes and soil fertility based on the demands of society and the market is the system of land use [10]. The main goals of this system are:

- environmentally and biologically the development of a modern system of agriculture in order to provide consumers with environmentally friendly products that are harmless to the environment;
- application of environmentally friendly agricultural production technologies based on the principles of energy and resource saving and environmental sustainability (introduction of promising irrigation methods, soil protection from water and wind erosion, etc.);
- selection and implementation of optimal ratios of interactions of structural structures in the agrosystem through the integrated use of natural, man-made, biological, and labor resources.

In general, agro landscape agriculture provides for the creation of a single agroecosystem in the organization of production based on the natural, climatic, economic, and social aspects of the intensive development of agriculture, taking into account natural resources and technogenic factors.

The current state of reclamation of irrigated agriculture shows that the adaptive landscape farming system is somewhat promising compared to other methods of eliminating the negative consequences and aspects associated with this factor. Because this method is based on ensuring a balance between the laws of the development of nature and the interests of society. On the other hand, according to V. N. Krasnoshchekov, "the main task aimed at developing an adaptive landscape system of agriculture is not to develop the degree of dependence of the agro-ecological requirements of agricultural crops on environmental factors (they have been sufficiently studied), but to connect the requirements of the natural environment, which fully ensures the sustainability of natural landscapes, with the development of methods of economic activity" [11]. N. Krasnoshchekov, "the main task aimed at developing an adaptive landscape system

of agriculture is not to develop the degree of dependence of the agro-ecological requirements of agricultural crops on environmental factors (they have been sufficiently studied), but to connect the requirements of the natural environment, which fully ensures the sustainability of natural landscapes, with the development of methods of economic activity" [11].

Therefore, taking into account this interdependence, it is desirable to develop a strategy of economic, environmental, and social tasks that fully covers these connections. Such thoughts and ideas were also recognized by scientists such as K. G. Gofman, and M. Ya. Lemeshev. In particular, according to M.Ya. Lemeshev, "ecological, economic-social, technological and biological processes are closely related to each other to such an extent that modern production processes require to be considered as the activity of a complex ecological-economic system. In this case, economic and natural systems cannot be opposed to each other" [12]. In our opinion, it is appropriate to form a strategy for the development of land reclamation based on these ideas and requirements.

It should be said that under the influence of technogenic factors (new technologies, increased use of mineral fertilizers and pesticides, etc.), the yield level can be maintained for several years, and in some cases even increase. However, as a result of severe degradation of the non-reclamation areas used in this way, there is a high probability that their productivity will drop sharply and they will be out of the system of agricultural use for a long time. We believe that special attention should be paid to the opinion expressed by Academician A. N. Kostyakov. In his opinion, "reclamation is not a quick-acting tool in its content and essence, but it is not advisable to apply it late, that is after the crisis situation has begun". Because land reclamation cannot cure the natural crisis in agriculture. It protects the economy from such risks, preventing the occurrence of crises. Land reclamation not only increases productivity and income in agriculture but also smooths out fluctuations in the level of profitability... Land reclamation governs the regulation of the sustainability of agricultural activity" [13].

It is impossible to think about the methodological aspects of the development of agricultural land reclamation without strict control of degradation processes at the economic, regional, national and global levels. The determination of the need for land reclamation is based on factors such as climatic and soil conditions of the area. regions based on the need for agricultural products. One of the main measures to improve its economic efficiency is the resource approach, which involves an analysis of the number of regulatory resources required for the production of agricultural products, as well as the factors necessary to achieve a given yield and economic efficiency, namely water, electricity, mineral fertilizers, pesticides and a minimum amount of resources such as pesticides and seeds.

The transition to low-cost, resource-saving methods of agricultural production and their implementation is one of the most difficult tasks from an economic point of view. To improve the efficiency of land use, it is necessary to reduce the cost of machinery and equipment, material and energy costs, and minimize the impact on the natural environment.

The study and analysis of modern theoretical, conceptual and methodological foundations for the development of agricultural melioration allows us to draw

the following conclusions:

- despite the wide and complete coverage of the problems of using the natural resource potential of scientific research conducted in world practice, they do not fully cover the environmental, economic, and social efficiency of land reclamation;

- the lack of scientific and methodological research on environmental and economic problems adversely affects the sufficient validity of proposals and recommendations for the elimination of degradation processes, methods of reclamation, and integrated reclamation;

- it is possible to create an environmentally sustainable, economically efficient, and socially necessary system of land reclamation in this industry only with an integrated approach to the implementation of land reclamation measures in agriculture;

- a lot of information and facts are given that the world economy is gradually collapsing in several directions. Therefore, in order to maintain and develop economic development, it is necessary to gradually carry out targeted structural reforms that ensure environmental stability.

It should be noted that significant and significant progress has been made in recent years in the areas of resource development, nature protection, and land reclamation using an adaptive-landscape strategy. Such

research work should be carried out with a further in-depth study, taking into account the principles of mutual unity and the relationship between natural and anthropogenic factors. Among the problems that have not been fully resolved so far, it is also necessary to include the issues of improving scientific and methodological approaches to assessing and increasing the effectiveness of land reclamation measures.

Conclusion. In this regard, in the conditions of modern intensive agriculture, it is advisable to pay attention to the improvement of the theoretical and methodological foundations for the integrated development of land reclamation activities and all its types. Because under the influence of land reclamation measures, along with the improvement of land area, profound positive changes in the composition and regime of soils are observed on a landscape scale. At the same time, the main task is not only to identify changes in these areas but also to identify and predict their negative and positive consequences. That is, the main goal and core of the modern concept of land reclamation should be a system of innovative measures implemented on the basis of an integrated approach.

The main differences between landscape reclamation are that it is aimed at improving the ecological state (ensuring the cleanliness and cleanliness of the environment), the

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