

INNOVATIVE WAYS FOR INCREASING EFFICIENCY OF MELIORATIVE MEASURES IN AGRICULTURE

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Annotation. *The article developed a methodological approach to determining the causal relationship between land reclamation and land productivity in the Central Asian region, in particular in Uzbekistan, and the amount of damage caused by land reclamation, taking into account the market value of agricultural products. At the same time, in the course of the study, indicators were developed to assess the reclamation state of the land, taking into account the risk values of indicators such as “land use coefficient”, “salinity level”, “groundwater level”, “soil humus content” that affect the state reclamation system. It is also based on the optimal allocation of funds for reclamation measures, which provides a balance of the existing reclamation status of the region and environmental protection based on the efficient use of limited resources.*

Keywords: *Agriculture, land reclamation, land resources, water resources, soil fertility, hydraulics, agricultural technology, chemical land reclamation*

Introduction. Global population growth and deepening globalization processes make it necessary to proportionally increase the production of food and other material goods for human consumption and improve their quality from an environmental point of view. Indeed, according to estimates by the United Nations Department of Economic and Social Affairs, “the world's population will reach 10.9 billion by 2100” [1], an increase of almost 40% compared to 2019. The analysis shows that in world practice this problem is often solved with the help of extensive factors, that is, mainly due to the expansion of sown areas. At the same time, it is predicted that a limited number of available arable land is estimated at 1,500 million hectares. Therefore, we can say that almost all arable land reserves were used by mankind. Therefore, the development of additional land and resulting from this the prevention of the possible ecological crisis, and on this basis the efficient use of arable land, in turn, necessitates the reproduction of natural resources on the basis of innovative solutions and ensuring a balance between human economic activity.

Global climate change has a negative impact on the common good, and in some cases even leads to socio-economic tension. In particular, a rise in temperature on the planet by 0.7 degrees from the middle of the 19th century to the first years of the 20th century [2] has a negative impact on productivity, limiting food security, especially in economically slow developing countries. Naturally, these problems, unlike other sectors of the real economy, have a significant impact on the sustainable development of the agricultural sector, which is exposed to natural factors and is based on land and water resources, especially on its central sector. Overcoming these problems on a global scale requires, first of all, the organization of agricultural production adapted to climate change based on intensive factors and innovative developments.

Land reclamation plays an important role in the intensification of agricultural production and plays a paramount and key role in ensuring the efficiency of the sector, because, firstly, the lack of land reclamation limits the potential efficiency of the sector, and secondly, it does not meet the requirements of quantity and quality. leads to the cultivation of the product. Therefore, large-scale measures are being taken in the country to improve land reclamation. However, the current land reclamation status of the lands, the imperfect legal and regulatory framework for improving the effectiveness of land reclamation measures and the imperfect relations between the entities impede the creation of adequate conditions for fulfilling the tasks set forth in the Strategy for Sustainable Development of Agriculture until

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2030. Therefore, scientific and practical proposals and methodological recommendations for improving methods for assessing and calculating the economic efficiency of land reclamation measures and the financial resources allocated to them, their impact on increasing the income of agricultural enterprises, sources of financing for land reclamation measures, strategic directions for its development in the near future is one of the urgent issues.

Scientific research on improving land reclamation in the global agricultural economy and assessing their effectiveness is currently being conducted at leading world research institutes, universities and research centers. IAMO - Institute for Agricultural Development in Transition Economies (Germany), Institute for Agricultural Economics and Scientific and Technical Information (China), Food and Agriculture Organization (FAO), International Center for Agricultural Research in the Dry Areas (ICARDA), United Nations Development Program (UNDP) (UNDP), United States Agency for International Development (USAID), International Water Management Institute (IWMI), Russian Research Institute for Melioration, All-Russian Research Institute of Agricultural Water Supply and Irrigation Systems (Russia), Research Institute of Irrigation and Water Problems (Uzbekistan) are one of them.

Based on world studies to assess and improve the effectiveness of land reclamation measures in agriculture, the United Nations Development Program (UNDP) developed methods to reduce the pressure on pasture use, evaluated pasture biodiversity and the effectiveness of land reclamation measures, and the International Center for Agricultural Research on Drylands (ICARDA) tested application and effectiveness of innovative solutions and resource-saving technologies suitable for different regions of our country; The All-Russian Research Institute of Agricultural Water Supply and Irrigation Systems (Russia) has developed a methodology for assessing the economic, environmental and social effectiveness of land reclamation measures on agricultural lands.

Currently, studies are being carried out all over the world to improve the effectiveness of land reclamation measures in the following areas: sustainable development of the agrolandscape based on comprehensive reclamation works; the influence of qualitative factors on improving the efficiency of land and water resources; adaptation of agricultural production to global climate change, a comprehensive assessment of the effectiveness of reclamation systems, improving the structure of agricultural production on reclamation lands using optimizing economic and mathematical models, etc.

The depth of the study of the problem. The problem of assessing and improving the effectiveness of land reclamation measures in agriculture is complex and multifaceted. Therefore, in the context of this problem, large-scale studies were conducted by scientists from foreign countries. In particular, the scientific results of V.S. Dmitrieva [3], E.V. Kuznetsova, A.E. Hajidi [4] and similar scientists deserve attention on the scientific, theoretical and methodological solutions to this problem.

Large scientific schools in this direction were also created in our country, and it would be advisable to conditionally divide them into three groups. The scientific work carried out by the first group of scientists is mainly focused on the efficient use of the potential of agricultural resources and, in particular, on the issues of efficient use of land and water resources. In particular, these studies are reflected in the works of Yu.P. Umurzakova [5], K.A. Chariev [6], the second group of scientists who focused on the issues of effective management and use of land and water resources can include scientists on the agricultural economy R. Abdullaev [7], N. Atakhanov [8], D. Akhmedov [9], Ch. Dzhahalov [10], R. Ismoilov [11], A. Mamatkulov [12], E. Trushin [13], B. Hasanov [14], U. Sangirova [15], S. Umarova [16]. The third group of scientists is focused on increasing production capacities and the use of fixed assets in agriculture, as well as on the economic efficiency of capital investments in irrigation and land reclamation systems. Such scientists in the agricultural economy include such scientists as F. Kayumov [17], I. Akhmetshina [18], O. Berdiev [19], Z. Kuchkarov [20], V. Mikhailov [21], M. Kholmiraev [22] and Chan Hong Quang [23]. However, most of the above works are scientific studies conducted before the independence of our country and the transition to market relations, which do not pay enough attention to the problems of improving land reclamation efficiency and comprehensive study of this problem. Therefore, the problems of improving the effectiveness of land reclamation in the context of modernization and innovative development of the economy necessitated the choice of this study as the subject.

The purpose of the study is to develop proposals and practical recommendations aimed at improving the scientific and methodological framework for assessing and improving the effectiveness of land reclamation measures in agriculture.

Study objectives:

assessment of the role of the reclamation factor in the sustainable development of agricultural production based on the study of the economic nature of reclamation and the scientific, theoretical and practical foundations of its development;

generalization of the experience of foreign countries in improving the effectiveness of land reclamation measures and the development of practical proposals for its use in the economy of the republic;

preparation of proposals for improving the methodological framework for the use of reclamation systems and assessing the effectiveness of measures;

development of proposals for improving the scientific and methodological basis for assessing the impact of land reclamation on yield and product quality;

assessment of the trends in the indicators of structural-quantitative and efficient use of land and water resources;

development of scientific proposals and practical recommendations on the classification, systematization and classification of measures to improve land reclamation;

assessment of the current state of the existing irrigation and reclamation potential based on the identification of trends and dynamics of its use;

development of guidelines for identifying areas of interaction between land reclamation and the environment and improving the scientific and practical basis for balance;

Development of an economic and mathematical model to justify and ensure the relationship between the efficiency of agricultural production and the quantity and quality of land and water resources;

substantiation of the priorities of preferential financial support of the state and innovative management of land reclamation in a market economy.

The objects of the study were selected agricultural enterprises, farmers and dehkan farms, water user associations (WUAs) and organizations working in the field of water resources management, which use land and water resources in the agricultural production of the republic.

The subject of the study is the conditions and factors affecting the effectiveness of land reclamation measures in agriculture, as well as organizational and economic relations arising in the process of their interaction.

Study Methods. In the research process, methods of statistical analysis, monographic observation, induction and deduction, abstract thinking, economic and mathematical modeling, expert and rating assessment were widely used.

The scientific novelty of the study:

improving the methodological approach aimed at determining the causal relationship between land reclamation and land productivity and the amount of damage caused by land reclamation, taking into account the market value of agricultural products;

Indicators have been developed to assess the reclamation state of the district, taking into account the risk values of indicators affecting the state of the reclamation system, such as “land use coefficient”, “salinity”, “groundwater level”, “humus content in soil”;

based on the algorithm for the optimal distribution of financial resources spent on land reclamation measures aimed at balancing the existing land reclamation condition of the territory and environmental protection based on the effective use of limited funds;

based on the system of optimal placement of crops based on the development of the “Field Passport” according to the individual contours of the fields, their location, water level, rockiness, beam, slope, salinity, soil mechanical structure and other environmental conditions;

Based on the creation of the "Analytical Center for Integrated Land Reclamation", a proposal was developed to create a system for monitoring land reclamation.

The practical results of the study are as follows:

the author’s definition of the term “land reclamation”, based on the principles of comprehensiveness, ecology and resource conservation;

Significant experience of foreign countries in improving the effectiveness of land reclamation activities has been generalized and practical proposals have been developed for its use in the agricultural sector and industries of the republic;

proposals were developed to improve the methodological base for the use of reclamation systems and evaluate the effectiveness of measures;

directions and aspects of the effectiveness of land reclamation measures related to natural and climatic factors, including bioclimatic potential, phytoactive radiation (PAR), the processes of formation of plant biomass and productivity under the influence of photosynthesis, are justified from a scientific and practical point of view;

practical proposals have been developed to strengthen the regulatory framework for the effective organization of land reclamation activities;

proposals were prepared on improving the mechanisms of economic incentives for the efficient use of land and water resources in agriculture.

The main content of the study. Agriculture as a sector of material production differs from all other sectors in that land is the main and irreplaceable means of production. In this regard, the sustainable development of the country's economy will depend, first of all, on the correct decision on the attitude to land, in particular, on improving the quality of the soil. Improving the natural quality of the soil is carried out primarily by agrotechnical methods. However, agronomic methods alone are not enough to care for the plants and exploit their potential crops. Although the soil has the ability to control the air-water regime, standardize adaptive directions and increase productivity in the long term, it differs from agricultural methods and, most importantly, serves to create a solid foundation for their economical and efficient use. This is an objective need to increase crop yields and apply reclamation factors and measures that directly affect product quality.

The study of factors affecting soil fertility shows the importance of recognizing the principles of land reclamation measures, such as interdependence, impact, complementarity from a dialectical point of view, and the study of their scientific and practical basis. It should be noted that land development is directly related to climatic conditions and has a direct and indirect effect on the level of use of all major factors. Indeed, the implementation or non-implementation of land reclamation measures on agricultural lands requires consideration of the influence of climatic factors. Although the soil and its fertile soil layer play an important role as the basis for the placement of crops, the bioclimatic potential, radiation levels of phytoactivity and photosynthesis processes that are directly related to each other play a crucial role. Long-term studies have shown that it is in this process that “90-95% of plant biomass is formed” [24].

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Hydrotechnical reclamation measures	Agrotechnical reclamation measures
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<ul style="list-style-type: none"> - irrigation (furrow, by breaking, sprinkling, drip, etc.) - elimination of dampness; - Construction, cleaning and repair of irrigation networks, hydraulic structures, pumping stations, collector-drainage networks; - Flushing saline soils, etc. 	<ul style="list-style-type: none"> - equalization of irrigated land; - deep loosening of the soil; - introduction of a crop rotation system; - selection and placement of the crop on the ground; - tracing of highlands, etc.
Classification of the main land reclamation activities carried out in agriculture	
Forestry Land Reclamation Activities	Cultural and technical reclamation activities
<ul style="list-style-type: none"> - creation of special anti-erosion trees; - biological and chemical treatment against diseases and pests; - Creation of forest reserves on irrigated and rainfed lands; - the alternation of grazing and sowing desert crops from degradation of pastures; - implementation of phyto-reclamation measures and other measures to preserve the diversity of plants on pastures. 	<ul style="list-style-type: none"> - cleaning of land from stones, bushes, etc., and preliminary tillage; - the strengthening of mobile sand, - measures such as laying soil on rocky soils.
	Chemical Remediation Measures
	<ul style="list-style-type: none"> - the use of mineral, organic, polymer and other fertilizers; - the addition of lime, acid and alkali to the soil; - spraying of chemical compounds in order to increase the granularity of compacted soils; - measures such as spraying chemicals to protect the soil from wind erosion.

Figure 1. Classification of the main land reclamation measures in agriculture [25]

The joint balanced movement of society and nature has an undeniable classification, which requires that they be purposeful in all respects and that they know the laws of nature, the principles of their observance and strictly adhere to them. Failure to comply with such principles, which are the basic condition and the requirement for joint action, will naturally lead to the worst and most dangerous consequences. For this reason, representatives of the classical economy also paid special attention to this issue.

The study and analysis of the existing theoretical, conceptual and methodological foundations for the development of land reclamation of agricultural lands allows us to draw the following conclusions:

- despite the fact that scientific research in world practice covers a wide range of problems of using natural resources, they do not fully cover the ecological, economic and social effectiveness of land reclamation;
- the lack of scientific research on environmental and economic problems negatively affects the adequacy of proposals and recommendations for eliminating degradation processes, reclamation methods and integrated reclamation works;
- only a comprehensive approach to the implementation of land reclamation in agriculture can create an environmentally sustainable, cost-effective and socially necessary land reclamation system in this sector;
- there is a lot of information and facts 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 sustainability.

The results of the study show that from the experience of foreign countries in improving land reclamation of agricultural land, we consider it appropriate to bring the following important aspects and significant aspects to the economy of Uzbekistan:

1. In the area of providing regulatory documents on land reclamation and assessing their effectiveness:

Law "On Land Reclamation" (Russia, Ukraine)

Methods for assessing the economic, environmental and social effectiveness of land reclamation measures (Russia)

Methods for determining the amount and extent of damage in the use of natural resources (Russia)

2. In the area of organizational measures aimed at improving land reclamation:

Development and implementation of environmental programs (USA)
inventory of natural (water / land) and other resources (reclamation equipment, irrigation systems) (USA)
Alternative use of reclamation lands (USA)
Extension service, i.e. organization of Information and Consulting Services (USA)
Establishment of relations with international organizations and countries in the field of land reclamation (China)
Biofarm Creation (China)

3. In the area of promotion the efficient use of natural resources:

If consumers use water more than the limit, a penalty of 10 times that for excessively used water will be levied (Israel).

A consumer who takes water for irrigation will pay a fine of \$ 0.50 per cubic meter of discharged water (Israel).

There are various opinions, suggestions and recommendations in the scientific and specialized literature on the criteria and indicators for determining the economic efficiency of the use of land and water resources, as well as on the use of land reclamation measures to increase soil fertility [26]. In support of these views, we consider it appropriate to take into account methods that allow us to compare the quality indicators of a particular land plot and even field contours when determining the effectiveness of land valuation and use, as well as economic efficiency. As a criterion for assessing land, it is advisable to take into account, first of all, its reclamation status, which determines its production capacity, in particular, the biological, mechanical and agrochemical composition of the soil.

To determine the level of economic efficiency indicator of land reclamation measures effectiveness (E_{EIRM}), we recommend that, firstly, subtract the costs of remediation from the total costs incurred in one production cycle, and secondly, it is advisable to express the effectiveness of each type of remediation by an indicator calculated in result of addition.

$$E_{EIRM} = I_{PR} - I_{PC} + E_{ARM} + E_{HRM} + E_{FRM} + E_{CRM} + E_{CTRM}$$

E_{EIRM} – Economic efficiency indicator of land reclamation measures, sums;

I_{PR} – production result (in value terms);

I_{PC} – production costs, sums;

E_{ARM} – Economic efficiency indicator of agrotechnical reclamation measures, sums;

E_{HRM} – Economic efficiency indicator of hydraulic engineering reclamation measures, sums;

E_{FRM} – Indicator of economic efficiency of forestry reclamation measures, sums;

E_{CRM} – The economic efficiency indicator of chemical reclamation measures, sums.

E_{CTRM} – The indicator of economic efficiency of cultural and technical reclamation measures, sums;

Therefore, a generalized, i.e., an integrated indicator of economic efficiency from land reclamation should be expressed as follows.

$$E_{gierm} = \frac{E_{EIRM}}{I_{PC} + \sum_{i=1}^n (C + N_c * S_{ci})}$$

E_{gierm} – the only generalized indicator of economic efficiency of land reclamation measures;

n – number of reclamation measures that are expected to be effective;

i – types of reclamation measures;

C – cost of reclamation measures;

N_c – normative coefficient of capital investment efficiency;

S_{ci} – specific capital investment in the implementation of reclamation measures.

As a conclusion, the integrated implementation of land reclamation measures covers all types of economic activity in the agroecological system. Such an approach will allow, firstly, to fulfill the requirements of the laws of development of society and nature, in particular, to provide the population with sustainable domestic agricultural products in exchange for a large-scale increase in agricultural production, and secondly, to ensure agrolandscape safety based on reclamation measures.

It is known that any level of salinization of land causes triple damage to farms that grow agricultural products. Firstly, this leads, first of all, to a decrease in productivity, on the other hand, to a decrease in the quality of products,

and, thirdly, to an increase in material and capital expenditures spent on restoration and improvement of soil fertility. For example, in practice, reclamation measures require leaching of saline from important sowing areas. However, due to lack of water resources, the possibility of implementing these measures in many areas is limited.

According to the analysis, 28.3 thousand sums were spent on agrotechnical measures to flush one hectare of land, 20.9 thousand sums for workers and 452.0 thousand sums per hectare of saline areas. However, due to these costs, an additional cost of gross output in the amount of 1,435.0 thousand sums was created.

The economic significance of irrigated land reclamation, in particular salinity levels, is that “if 15% of the crop is lost on irrigated lands in areas of low salinity, this figure is up to 40% in areas with moderate salinity, up to 60% in areas with strong salinity and up to 70% in areas with strong salinity. [27].

As a result of the study, it was concluded that today there is no single methodology for determining the amount and extent of damage when using natural resources. For this reason, scientists have different approaches to this issue. In particular, the amount of financial losses from under-harvesting of cotton, which arose due to lack of water supply, was calculated using the example of the Syrdarya region, which in 2004 amounted to \$ 1.7 million, and in 2007 was \$ 2.49 million [28]. Also, in the Republic of Karakalpakstan, due to the withdrawal of irrigated land from agricultural circulation, the loss of agricultural products in 1991 was 1 in the amount of \$ 1.5 million, in 1997 by \$ 15.9 million, and in 2001 by \$ 6.1 million [29].

Based on our study, a methodological approach is proposed to determine the causal relationship between land reclamation and land productivity, as well as the amount of damage caused by land reclamation, taking into account the market value of agricultural products.

It is advisable to apply this methodological approach in the following sequence: the result obtained under conditions of good site restoration, i.e. the product obtained as a basis determines the lost product depending on the degree of deterioration of reclamation. Of course, in this process, the main indicators of land reclamation can be selected as “bad” or “good” criteria, such as soil salinity, groundwater depth and salinity.

Accordingly, the amount of lost crop can be determined by subtracting the crop from a crop with poor reclamation conditions from the average crop from a crop with good reclamation conditions. This loss is determined by multiplying the value of the gross product by the average purchase price of the product or the price of the world market.

In general, this sequence can be expressed in the following formula, i.e.

$$Q = (Yg - Yp) * \Omega_{prc} * N_1(N_2)$$

Here

Q is the value of the gross lost crop, thousand sums;

Yg – average yield obtained from a good sown area, centner / hectare;

Yp – average yield from sown area with poor reclamation conditions, centner / hectare

Ω_{prc} – sown area with poor reclamation conditions, thousand ha

N_1 – average purchase price of goods; thousand sums;

N_2 – Average world price of raw cotton, thousand US dollars.

In the Republic of Karakalpakstan, where monographic studies based on this methodological approach were carried out in 2007, 79.9 thousand hectares out of 114.24 thousand hectares of cotton fields or about 70% were not salted, and the remaining 34.272 thousand hectares were salted to varying degrees, therefore 3.3 centners per hectare were lost due to loss of productivity on lands with poor reclamation conditions. As a result of this, farms on average lost 4.1 billion soums, if the average price of 1 ton of cotton fiber in the world market is estimated at \$ 1,500, we can assume that this year the country did not receive an average of \$ 5.6 million worth of products.

Table 1

The value of losses due to salinization of cotton fields in the Republic of Karakalpakstan²

Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
from which:														

² Calculated on the basis of data from the Ministry of Water Resources of the Republic of Karakalpakstan.

		Total unsalted cotton area, thousand ha	Total salted cotton area, thousand ha						
2007	114,24	79,958	34,272	22,5	19,2	3,3	11,3	4,1	5,6
2009	94,7	51,138	43,562	21,6	18,4	3,2	13,9	7,1	7,0
2011	94,7	70,078	24,622	23,9	22,4	1,5	3,7	2,6	1,8
2013	94,7	66,29	28,41	25,6	22,1	3,5	9,9	9,3	5,0
2015	94,7	75,76	18,94	26,7	20,4	6,3	11,9	13,3	6,0
2017	92,1	78,285	13,815	24,1	20,4	3,7	5,1	9,2	2,56

* Note: The average price of 1 ton of cotton fiber in the world market is estimated at \$ 1,500.

The introduction of a methodological approach to determining the amount of these losses, in turn, will provide an economic incentive to improve land reclamation based on clear criteria, otherwise fines can be imposed.

Studies show that during the years of independence in our country, the use of land and water in agriculture:

a) The volume of the land fund has not changed significantly **in terms of structure and quantity**. Over the years, the share of gray lands in the structure of agricultural land has increased by almost 30%, and since 2005 there has been a downward trend:

- In the structure of agricultural crops, the area under crops increased almost 4 times over the years, and the area under crops - 6 times. Accordingly, the area under cotton decreased by 26.4%, and under fodder crops - almost 4 times;

- The source of the formation of water resources used in irrigated agriculture of the republic is located mainly in the border states. Transition to energy resources using water resources in neighboring countries, priority to the intensive development of agricultural production from the point of view of food security, and also as a result of global climate change, there is a tendency to decrease annual water consumption;

- As a result of the fact that the population growth rate exceeds the growth rate of irrigated land, there is a tendency in the country to decrease the share of irrigated land per capita.

b) In the analyzed period the reclamation state of lands tends to improve **in terms of composition and quantity**, mainly as a result of the implementation of the State program. That is, non-saline areas increased by 17.2%, and saline areas decreased by 10.8%. However, the proportion of groundwater up to 0-1 meters increased by 22.8%. In addition, the groundwater level, dangerous for mineralization, decreased by 24.7% to 3-5 g / l:

- in recent years, the assessment of the quality of irrigated cultivated land in the country decreased by 5 points, in particular, the assessment of land in the range of 61-80 points by 6.6 points, and the share of arable land with the highest quality of soil fertility to 81-100 points - by 7.1 points;

- The use of agricultural machinery, in particular, the movement of aggregates in the field, also has an effect on reducing the quality assessment throughout the country. That is, this situation has a direct effect on soil compaction, leading to a decrease in its fertility.

This is due to the prevention of soil compaction, the use of resource-intensive irrigation methods that reduce soil compaction, the transition to technologies that drastically reduce the number of movements of agricultural machinery, and the transition to effective soil treatment technologies to prevent soil compaction. and the use of effective deep plowing methods to prevent soil compaction also contributes to the maintenance and improvement of soil fertility of arable land.

It is known that the effective organization of reclamation measures directly affects the functioning of any reclamation systems. Therefore, although the assessment of the existing potential of reclamation systems is also important, in our opinion, the algorithm for assessing reclamation potential can be formulated as follows (Figure 2).

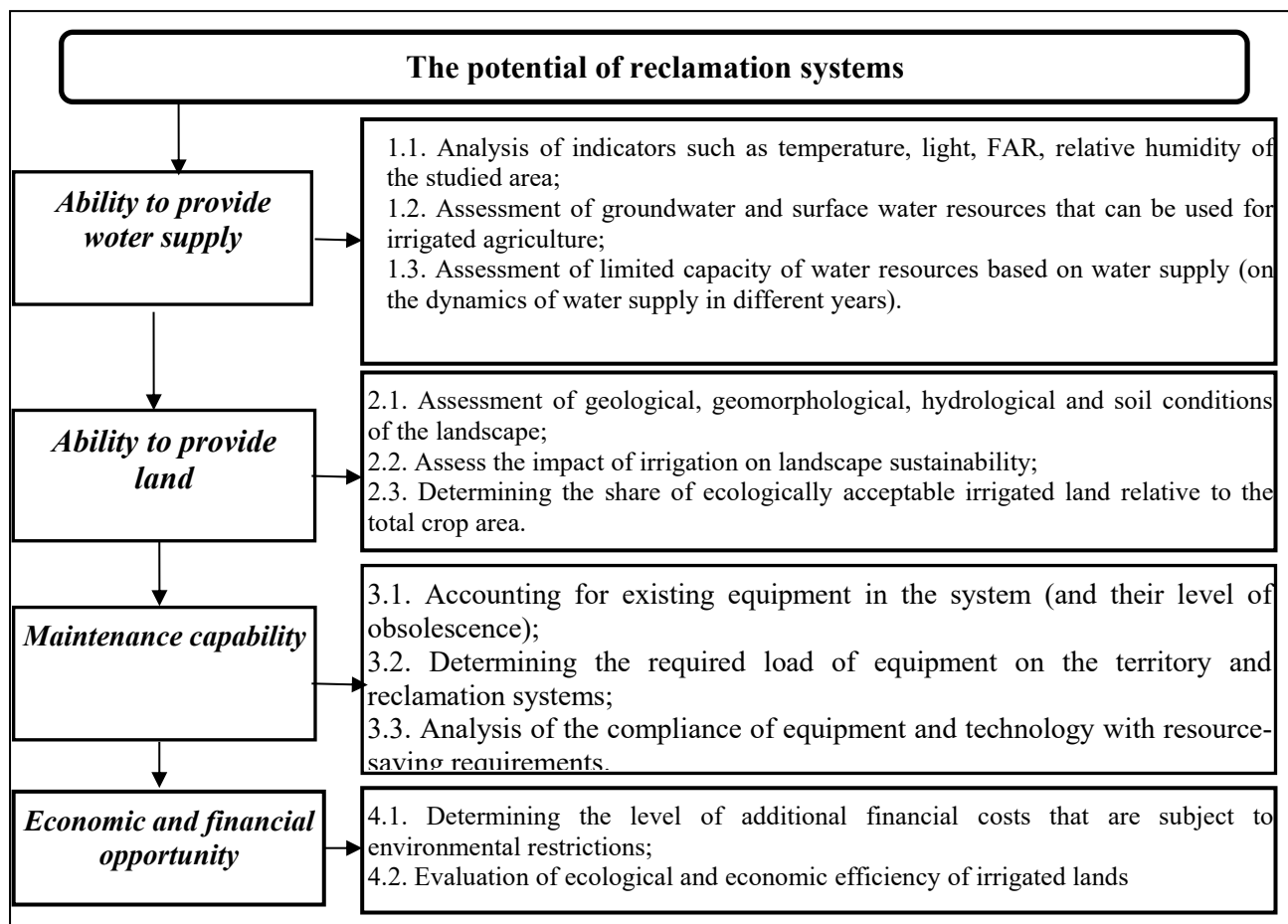


Figure 2. Algorithm for assessing the reclamation potential of the area with environmental constraints [30]

In summary, the potential of reclamation systems should be assessed on the basis of their ability to use the land, water and natural-climatic conditions of the region, taking into account geo-ecological constraints. Therefore, when assessing the potential of existing land reclamation systems in the country, of course, the study of all the above factors in combination will allow to find a scientifically based solution to the problem.

From 1990 to 2007, the financing of maintenance and irrigation and reclamation capacity on a "residual" basis caused problems with the deterioration of the collector-drainage system, canals and hydraulic structures. This in turn has led to a sharp decline in the productivity of irrigated lands. This situation has a negative impact on the potential of existing reclamation systems in the system, because the development of agricultural reclamation depends not only on natural factors, but also on the level of potential of existing reclamation systems. Therefore, the potential of reclamation systems in the country has a number of low indicators compared to the required optimal condition (Table 3).

Table 3. Status and indicators of reclamation potential in the Republic of Uzbekistan

№	Indicators	Current situation	The optimal condition required
1	Land use coefficient (LUC)	0,60-0,80	More than 90 %
2	Irrigation network efficiency	0,60	More than 80 %
3	The percentage of areas with different levels of salinity in relation to the total area, %	More than 45,0 %	0

4	Percentage of area with groundwater level from 1.0 to 3.0 m in relation to the total area, %	8,8	Less than 3
5	Percentage of area with groundwater level 1.0 to 3.0 m relative to the total area, %	78,4	Less than 10
6	Working condition of GTIs, %	40-60	100
7	Water supply during the growing season, %	10-75	100
8	Water metering facilities per 100 hectares, unit	1-2	5-7
9	Level of irrigation system automation and dispatching service, %	Less than 10	80-100

The table shows that increasing the efficiency of land use and the irrigation network requires, first of all, reducing the share of water losses in existing irrigation systems, since the efficiency of the irrigation network is below the optimal demand of 60%. This loss is primarily due to the fact that the canals are drained, and the water resources of the irrigated areas remain unused.

Also, the main reason for such negative situations is the imbalance in prices between agricultural and industrial products and energy. Unbalanced prices and financial instability in farms sharply reduce the flow of investments necessary to maintain and improve the reclamation potential of the country.

In conclusion, it should be noted that the irrational use of funds allocated for the implementation of hydraulic structures, collector-drainage networks and irrigation and land reclamation measures in general also has a negative impact on the occurrence of these negative phenomena. The results of the analysis show that the main reasons for this are:

- insufficient formation of the mechanism of organizational and economic relations between agricultural enterprises and water management organizations carrying out land reclamation measures;
- the inadequacy of the system for the efficient and rational use of material and financial resources for land reclamation measures, i.e., the lack of a methodology for channeling these funds to the implementation of certain types of activities;
- low level of administrative and financial responsibility for negative consequences arising from the use of targeted financial resources for land reclamation activities and interest in positive results, or lack of a regulatory framework for them;
- The lack of a mechanism for allocating funds to improve land reclamation in coordination not only with water authorities, but also with the Ministry of Agriculture and state bodies that monitor and control the use of land resources.

The effectiveness of land reclamation measures largely depends not only on improving the technical condition of land reclamation systems, but also on their proper use, that is, compliance with the technological regime, the ability to manage it in uncertain weather conditions. Because this situation directly affects the maintenance of the balance of the agrolandscape state of the region. For this reason, in our opinion, the effectiveness of reclamation measures requires the improvement of methodological aspects and the fundamentals of environmental risk management in a market economy.

Table 4.
System of indicators for assessing the reclamation status of the area

№	Indicators	Signs of danger	Evaluation criteria	№	Indicators	Signs of danger	Evaluation criteria
1	Land use ratio	>0,90 0,90-0,85 0,85-0,75 <0,75	1 2 3 4	11	The slope of the fields	<0,001 0,001-0,0025 0,0025-0,0075 0,0075-0,025 >0,025	1 2 3 4 5
2	Soil salinity, %	<0,3 0,3-0,5 0,5-1,0 1,0-2,0 >2,0	1 2 3 4 5	12	The average score-quality of the area	81-100 61-80 41-60 21-40 0-20	1 2 3 4 5

3	Groundwater level condition, m	<3 2-3 1,5-2 1-1,5 0-1	1 2 3 4 5	13	Average annual precipitation, mm	700> 551-700 251-550 <250	1 2 3 4
4	Mineralization status of groundwater, g / l	0-1 1-3 3-5 5-10 >10	1 2 3 4 5	14	Effective temperature,%	6,0-8,0 3,5-5,0 1,5-3,0 0,5-1,5	1 2 3 4
5	Amount of humus in the soil,%	6,0-7,0 5,0-6,0 4,0-5,0 <4,0	1 2 3 4	15	Relative humidity,%	60-70 50-60 40-50 <30	1 2 3 4
6	Area where the groundwater level is above the critical depth,%	0 5-10 10-20 <20	1 2 3 4	16	Working condition of GTIs,%	100 95-85 85-80 <80	1 2 3 4
7	Soil moisture level,%	21-22 19-20 16-28 <15	1 2 3 4	17	Logistical support of reclamation expedition departments,%	86-100 71-85 57-70 <56	1 2 3 4
8	Irrigation network efficiency	>0,80 0,75-0,80 0,65-0,75 <0,65	1 2 3 4	18	Staffing in reclamation expedition departments,%	86-100 71-85 57-70 <56	1 2 3 4
9	Efficiency of inter-farm networks	>0,90 0,80-0,90 0,75-0,80 <0,75	1 2 3 4	19	Logistical support of Water Users Association,%	86-100 71-85 57-70 <56	1 2 3 4
10	Water utilization Coefficient	0,9-0,85 0,85-0,80 0,80-0,75 <0,75	1 2 3 4	20	Staffing in Water Users Association,%	86-100 71-85 57-70 <56	1 2 3 4
Integral indicator of risk indicators				<i>min – 20</i> <i>max - 83</i>			

Based on it, the number of indicators evaluating the state of reclamation systems can increase or decrease depending on their priority. When risk signs are formed, basically, from a scientific point of view, indicators are selected that indirectly affect the state of the reclamation system in one way or another, based on the signs that allow for an expert assessment. Risk indicators are mainly assessed using 4 values: 1 - "good", 2 - "satisfactory", 3 - "unsatisfactory", 4 - "the situation in the area is degraded" (Figure 3).

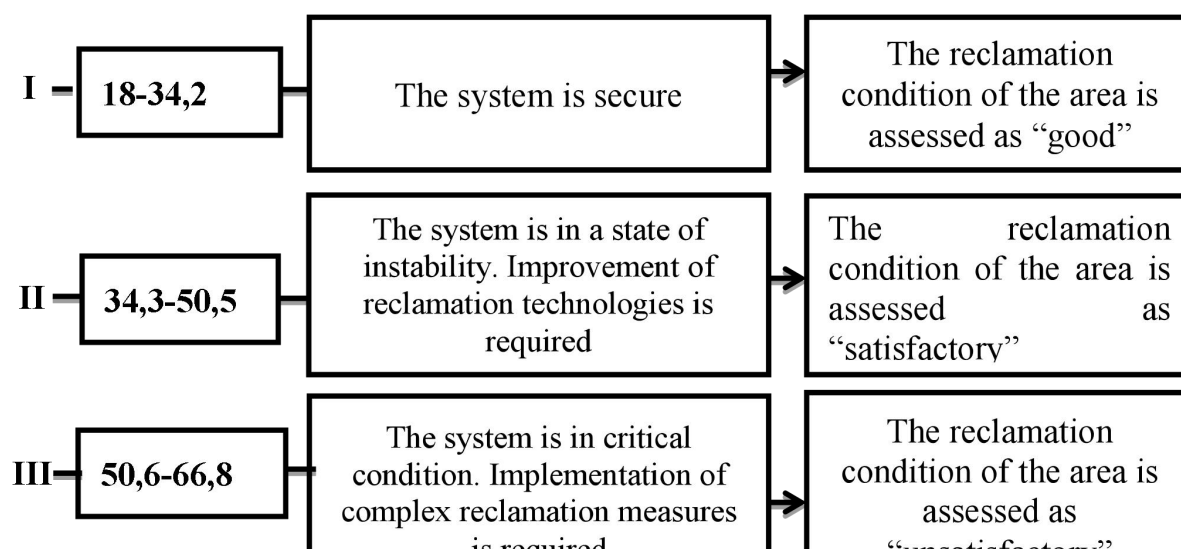


Figure 3. Description of risk scales in the management of reclamation of the area

Lack of financial resources for the comprehensive repair of reclamation systems requires the gradual implementation of these measures. Therefore, in our opinion, based on the nature of the region, we use the above calculation method:

The first stage is the implementation in an area with a risk scale of 4 when managing soil reclamation. These measures will be implemented through domestic and foreign investment. At this stage, this means not only repair, reconstruction of the reclamation system, but also the provision of high technology. Therefore, the need for capital investments at this stage will be significantly higher than at the second and third stages. Therefore, based on foreign experience, this stage requires the development and implementation of conservation programs.

At the second stage - implementation in an area with a risk scale of 3 when managing soil reclamation. The implementation of these measures is associated with the implementation of policies to improve land reclamation by maintaining existing irrigation and drainage systems and partial restoration (reconstruction) of their more modern and cost-effective technical base.

At the third stage - implementation in an area with a risk scale of 2 in the management of soil reclamation. It is advisable to carry out this activity at the expense of landowners, farmers and farms. And, ultimately, it includes the goal of raising the area on a scale of 1, that is, the restoration of the area to "good".

This methodological approach consists, firstly, in developing the characteristics of the general reclamation state of the region based on the assessment of the material and technical condition of the existing reclamation system, the quality of water supply and soil quality;

secondly, to improve the monitoring and control system for land reclamation of irrigated lands and soil fertility; and thirdly, based on the results of this assessment, it will be possible to develop a short-term, medium-term and long-term strategy for improving land reclamation.

According to the results of the analysis, one can observe cases of a unilateral approach to the distribution and use of funds allocated to improve land reclamation over the past period. In particular, the funds are mainly used for land reclamation works. Therefore, in the process of using budget funds and directing and substantiating them to solve existing problems on the basis of the goals and objectives of our study, we consider it appropriate to approach them on the basis of criteria for direct impact on improving land reclamation of irrigated lands in the country and in its territories.

A model developed for this purpose allows you to make optimal land reclamation decisions for all land reclamation activities, of course, taking into account geoecological restrictions, as well as maximize profits based on the existing agroecological potential in the region, environmental protection and limited productivity. (Figure 4).

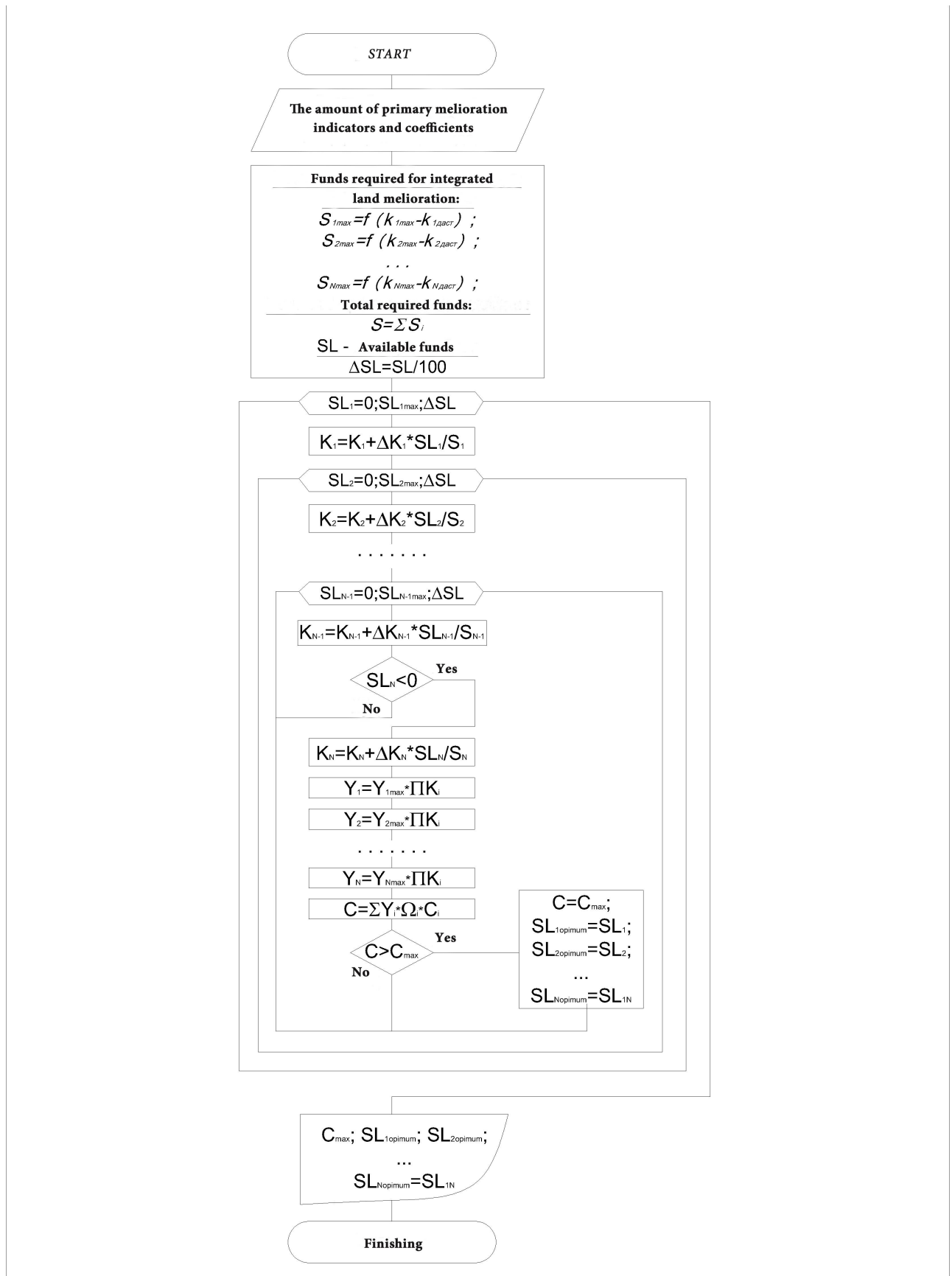


Figure 4. Algorithm for the optimal distribution of financial resources spent on reclamation activities

The development and effective implementation of the conceptual directions of land reclamation measures in agriculture will ensure the sustainable development of the economy, environmental protection and social issues, that is, the balance of the natural environment and the management system. From the point of view of solving these goals and objectives, in our opinion, these conceptual directions should be reflected in the following:

I. In order to improve the regulatory framework of the industry: *one of the important directions for the effective organization of land reclamation measures in agriculture is to strengthen the regulatory framework of this activity, since this process is one of the factors directly affecting management efficiency. Therefore, in our opinion:*

1. It is advisable to adopt the Law "On Land Reclamation" on the basis of foreign experience. This law defines the powers of state bodies, as well as the rights and obligations of all land users in accordance with the relevant standards in the field of land reclamation and environmental protection. This, in turn, lays the foundation for the creation of a regulatory framework for activities related to the control, regulation and use of land reclamation.

The main goal of the development of this document is the creation and implementation of a unified legal framework for management in this direction based on the generalization and improvement of legal norms aimed at improving land reclamation in the Civil Code of the Republic of Uzbekistan, the Land Code, laws on Water and Water Use and regulatory acts.

II. In the area of improving the mechanisms of economic incentives aimed at improving land reclamation in a market economy:

1. It should be noted that at a time when there is a constant shortage of water resources in agriculture, traditional irrigation equipment and technologies, irrigation and land reclamation systems, and, finally, the consciousness of farmers leads to an increase in water consumption by 40-50% compared with optimal standards in agricultural production. Therefore, in our opinion, one of the important solutions to the problem is the introduction of an **"economic mechanism of savings"** when using water in agriculture.

One of the most effective ways of encouraging farmers to reduce water consumption in agricultural production is, in our opinion, the introduction of stimulating (penal) mechanisms for water consumption using the payment system for water received for irrigation.

Today it is necessary to apply a system of payments for water use for one purpose, that is, "with the aim of developing water conservation skills on farms and dekhkan farms and introducing organizational and economic incentives".

1. Responsibility for violation of land use rules in practice is regulated by the "Land Code" of the Republic of Uzbekistan, Decree of the President of the Republic of Uzbekistan No. PF-5065 dated May 31, 2017 "On measures to strengthen control over the rational use and protection of land, improve geodetic and cartographic activities, streamlining the maintenance of state cadastres", as well as the Decree "On the further improvement of the activities of the State Committee of the Republic of Uzbekistan on land resources, geodesy, cartography and state cadastre".

According to these rules, liability for violation of land use rules is determined by 4 criteria, namely:

- design, construction and operation of facilities outside the scope of economic land management projects;
- inept management or inefficient use of land;
- land use for other purposes;
- concealment or distortion of information in the report.

However, this criterion does not allow land users to bear economic fines and / or vice versa, which are applied in the process of reducing or increasing soil fertility. This is due to the fact that the inefficient use of land and water resources causes not only economic, but also environmental and social damage of varying degrees. However, in our country there is no ideal procedure and methodology for calculating the amount and scale of damage in this case. That is why this leads to different approaches at different levels. Therefore, in our opinion, it is advisable to develop a "Methodology for determining the size and scale of damage when using natural resources."

III. In the direction of economic stimulation of increasing soil fertility:

1. The development of the economic basis of land reclamation measures of farms and dekhkan farms, which today are the main subjects of land use, also requires the widespread use of economic incentives. Indeed, the introduction of financial incentives (motivation) through the provision of financial and tax incentives to agricultural enterprises that have implemented effective and resource-saving agricultural technologies and land reclamation measures will have a significant impact.

Therefore, when implementing this measure, firstly, for land users, it is necessary to develop and implement land stratification ("field passport") from the point of view of natural conditions, soil mechanical composition, quality and topography assessment in separate contours of each region, and secondly, and the need to calculate the amount of required costs (in the development of business plans) based on accurate field passports and control their costs for the period to compile statistical reports.

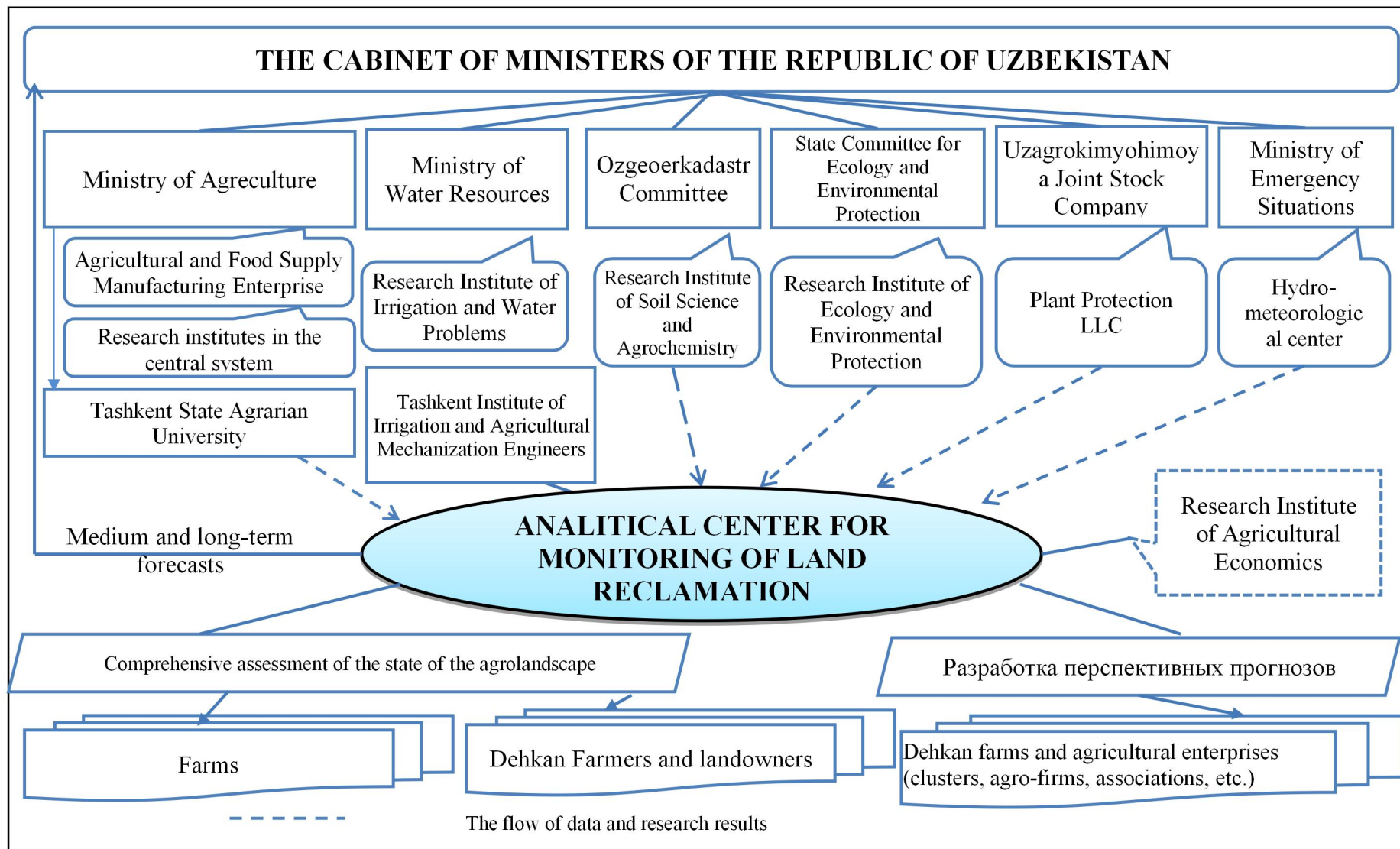
Corresponding conditions will be created for the development and implementation of geographic information systems in the field, in particular, elements of the digital economy in land use, as well as for agricultural producers, who will use the scientific base for the distribution of land based on the creation of a database of land conditions. In addition, the development and implementation of a field passport will create the first basic information system that can be used in the process of economic incentives to increase the fertility of soil resources, as well as the extent and extent of damage when using natural resources.

IV. In order to improve the monitoring system for land reclamation, it is important to consider the following issues:

First of all, in the process of monitoring soil fertility on the basis of the above field certification, it is necessary to determine the mechanical properties of the soil in each contour field, the amount of humus, phosphorus and potassium and its requirements, soil quality, level and salinity of groundwater, salinity temperature, relative humidity, effective temperature and monitoring over the years.

However, firstly, due to the physical and moral aging of the material and technical base of organizations and enterprises directly involved in improving land reclamation, additional investments are needed to modernize their activities, and secondly, these services are provided in a scattered form by research institutions of various administrative and managerial systems, design bureaus, projects of international organizations and centers, as well as some innovative and practical projects .

For this reason, in our opinion, it is advisable to create an “Analytical Center for Integrated Land Reclamation” for the effective management of land reclamation services (Figure 5).



This center should be responsible for the formation of the “Smart Zone” through regular monitoring of the state of agrolandscapes based on research and development on the mechanical composition of the soil, weather and climate changes, their impact on soil fertility. The center will also create an electronic database on land reclamation and provide remote management of land reclamation in the system.

The main tasks of the "Analytical Center for Integrated Land Reclamation" should be:

- collection and continuous analysis of information on the reclamation state, composition, dynamics of land;
- the formation and constant updating of the database of new methodological approaches to improving the effectiveness of land reclamation measures, the foreign experience of its organization based on innovation;
- Improvement of land reclamation and, on this basis, the development of multidimensional medium and long-term forecast indicators of the volume and structure of agricultural production.
- regular assessment of the agrolandscape of the region, analysis of factors influencing it;
- development of a GIS system (geographic information systems) aimed at the implementation of reclamation measures, mathematical modeling of the design, construction and operation of reclamation systems and structures, the creation and management of their software;
- Creation of IT laboratories for the study of land reclamation, the functioning of reclamation systems and the creation of 3D projections of agricultural land, etc.

CONCLUSION

1. Enhanced reproduction in agriculture requires constant accounting and maintenance of healthy soil layers and relevant climatic factors and conditions for the efficient use of arable land. However, based on an analysis of the scientific literature and studies on these issues, it should be noted, for example, that the effectiveness of land reclamation measures to increase the natural and economic fertility of agricultural land depends on the bioclimatic potential, including phytoactive radiation (FFR-FAR), photosynthesis, and vice versa, the degree of relationship the influence of the following factors with the effectiveness of reclamation activities has not been thoroughly studied and substantiated from a scientific and theoretical point of view. This task is an objective necessity when caring for plants and using agrotechnical methods, as well as reclamation factors and measures that directly affect the quality of products, along with agrotechnical methods when realizing their potential crops.

2. Recognizing the need and importance of considering land reclamation as a single complex, we believe that land reclamation should provide enhanced field reproduction based on increased soil fertility, and it is also advisable to define it as agrolandscape rehabilitation, which allows efficient and economical use as extensive and intensive factors based on scientific justification and interdependence.

The study and analysis of the existing theoretical, conceptual and methodological foundations for the development of land reclamation of agricultural land allows us to draw the following conclusions:

- despite the fact that scientific research in the world practice covers the problems of using the natural resource potential, they do not fully cover the ecological, economic and social effectiveness of land reclamation;
- The lack of methodological studies on environmental and economic problems negatively affects the adequacy of proposals and recommendations for eliminating land degradation, reclamation methods and integrated reclamation works;
- Only an integrated approach to the implementation of measures for land reclamation can create an environmentally sustainable, cost-effective and socially necessary land reclamation system in this sector.

3. The study and analysis of the existing theoretical, conceptual and methodological foundations for the development of land reclamation of agricultural land allows us to draw the following conclusions:

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- Only an integrated approach to the implementation of measures for land reclamation can create an environmentally sustainable, cost-effective and socially necessary land reclamation system in this sector.

4. Based on the positive results achieved in the efficient use of reclaimed land in foreign countries, it is advisable to recognize the following:

- According to the experience of developed countries, the priority of public administration in improving the efficiency of developed lands is of particular importance;
- the introduction of alternative or “organic” agriculture is one of the most important factors in increasing soil productivity and fertility, and the efficient use of reclaimed land;

- One of the main factors in increasing the efficiency of the developed lands is the development of a system of training and retraining of personnel with relevant knowledge and skills in this area.

Therefore, it is advisable to use the Russian experience in the provision of regulatory documents on land reclamation and assess their effectiveness, the United States and China in the field of organizational measures, as well as Israel, China [31] in promoting the rational use of natural resources.

5. Based on the results of our study of the criteria and indicators for determining the economic efficiency of the use of land and water resources, in our opinion, based on the tasks of modern land reclamation, to develop a system of indicators for each type of land reclamation measures. allows a clearer and wider coverage of the issue. Also, in assessing the effectiveness of the use of financial resources for land reclamation, in our opinion, indicators that determine the effectiveness of the use of financial resources spent on land reclamation should fully reflect economic, social and environmental efficiency. In addition, it is important to determine the result achieved in a good reclamation state, that is, the amount of product lost due to the deterioration of the reclamation state, for example, taking as a basis the crop, as well as the scale and degree of losses.

Therefore, in our opinion, in order to solve the environmental problems of agricultural production in the country, along with radical changes and the introduction of scientifically-based crop rotation, it is advisable to give priority to the maximum increase in the use of organic substances and biological resources instead of mineral fertilizers and plant protection products.

6. Over the years of independence in the use of land and water resources in agriculture, the following cases have been observed: **Structurally and quantitatively:** without significant changes in the size of the land fund, the share of gray land in agricultural arable land increased by almost 30%;

- In the structure of crops in the period after independence, sown grain areas increased by almost 4 times, and sown ears of crops increased by 6 times. Accordingly, the area under cotton decreased by 26.4%, and the area under fodder crops decreased by almost 4 times;

- The source of the formation of water resources used in irrigated agriculture of the republic is located mainly in the border states. Transition to energy resources when using water resources in neighboring countries, giving priority to the intensive development of agricultural production in terms of food security, as well as global climate change, there is a tendency to decrease annual water consumption;

- As a result of the fact that the population growth rate exceeds the growth rate of irrigated land, the share of irrigated land per capita in the country is reduced.

Structurally and quantitatively: land reclamation in the republic tends to improve, mainly as a result of the implementation of the State Program;

- the assessment of irrigated arable land in the country during the years of independence decreased by 5 points, in particular, the assessment of land in the range of 61-80 points by 6.6 points, and the share of arable land with the highest quality of soil fertility 81-100 points by 7.1 points ;

- The use of agricultural machinery, in particular, the process of multiple movement of aggregates in the field, also has an impact on reducing soil quality in the country. That is, this situation has a direct effect on soil compaction, leading to a decrease in its fertility.

7. The analysis shows that the potential of existing reclamation systems is low compared with the optimal situation, the main reasons for which are directly related to the irrational use of funds allocated for reclamation activities. This situation, in our opinion:

- insufficient formation of the mechanism of organizational and economic relations between agricultural enterprises and water management organizations carrying out land reclamation measures;

- the inadequacy of the system of effective and rational use of material and financial resources for land reclamation measures, i.e., the lack of a methodology for channeling these funds to the implementation of certain types of activities;

- low level of administrative and financial responsibility and interest in positive results, which are negative consequences of the use of financial resources for land reclamation measures, or their regulatory framework is not developed at the required level;

- The lack of a mechanism for channeling funds to improve land reclamation, not only in coordination with water authorities, but also in coordination with the Ministry of Agriculture and state bodies that control and monitor the use of land resources.

8. In order to ensure optimal financing of the land reclamation system and to ensure expanded reproduction in the agricultural sector:

- improving the mechanisms of economic incentives for entities with ownership of agricultural land to improve land reclamation;

- The risk of "land grabbing" during the term of the lease with farmers is one of the risks that will cool the hands of well-functioning farmers and slow down the process of investing in land reclamation. For this reason, it is necessary to improve relations and mechanisms of land ownership;

- development and implementation of a system and legal framework for the transfer of land allocated to farmers and private landowners, subject to inheritance to other legal entities or individuals, for sublease or temporary use in case of lack of capacity and capacity;

- Improving the regulatory framework for assessing the effectiveness of land reclamation measures and investments in them;

- development and implementation of a methodology for a comprehensive assessment of the level of land reclamation in order to improve the quality and effectiveness of land reclamation measures;

- improvement of the monitoring system for the implementation of land reclamation measures;

- Study of trends in soil fertility, changes in the state of natural (land and water) and other resources (reclamation equipment, irrigation system) every five years in order to obtain all the necessary statistics for an inventory of aspects;

- Formation of sources of investment for the development and implementation of measures to improve land reclamation, increase soil fertility and the practical application of factors that positively affect its quality, innovative development and wider and more sustainable introduction of products.

9. Conducting comprehensive land reclamation measures in agriculture and developing conceptual directions for increasing their effectiveness, their targeted and targeted implementation will ensure sustainable economic development, environmental protection and social problems, that is, a balanced environment and management system. Therefore, in our opinion, these conceptual directions should be reflected in the following:

In the direction of improving the mechanisms of economic incentives aimed at improving land reclamation in a market economy:

- As one of the most effective ways of encouraging farmers to reduce water consumption in agricultural production, we consider it appropriate to introduce stimulating (penal) mechanisms for water consumption using the payment system for water received for irrigation. Collected fines should be fully aimed at the development of regional WUAs and the installation of water meters.

- The criteria set forth in the current regulatory acts on liability for violations of land use rules, economic fines or, conversely, incentives for land users to reduce or increase soil fertility do not meet the requirements of a market economy. However, our country has not developed a procedure and methods for calculating the amount and scale of losses incurred or incentive payments in this case. Therefore, in our opinion, it is advisable to develop and implement the "Methodology for determining the size and scale of losses in the use of natural resources", as well as the Regulation on the procedure for economic incentives for enterprises that increase soil fertility, land reclamation and soil protection systems.

- For effective monitoring of land reclamation, it is advisable to create, on the basis of a public-private partnership, an "Analytical Center for Integrated Land Reclamation", which will manage irrigation and land reclamation services. The main task of this center should be the formation of an electronic database related to land reclamation and its effective management, as well as the assessment of agrolandscapes through an in-depth analysis of these data.

Coordinating the results of studies related to the monitoring of land reclamation by research institutes, the center develops and submits proposals to land users on the rational use of natural resources, the optimal allocation of arable land based on a comprehensive assessment of the agrolandscape.

REFERENCE

[1] World Population Prospects 2019. United Nations New York, 2019. – P.3-4.

[2] <http://www.unitar.org/newsletter>

[3] Dmitriev V.S. Economics of land reclamation. - M.: Economics, 1984. - 180 p. (in Russian)

[4] Kuznetsov E.V., Hadzhidi A.E. Agricultural reclamation complex for the sustainable development of agrolandscapes: monograph / E.V. Kuznetsov, A.E. Khadzidi. - Krasnodar: Publishing House EDVI, 2014. -- 200 p. (in Russian)

[5] Chariev K.A. The problems of the aral resource potential in the conditions of transition to the market. T. : Publishing house "Fan" 1992. - C 48. (in Russian)

[6] Umurzakov U. P. Ways to increase the efficiency of using the resource potential of the agricultural sector of the economy. Abstract of diss. PhD in Economics T. : 2003. - S-12. (in Russian)

- [7] Abdullaev R. Water management complex in Uzbekistan and its problems. Monograph. - T .: - 2002. - 144 p. (in Uzbek)
- [8] Atakhanov N. Improving the efficiency of irrigated agriculture in the conditions of improving the cost-accounting mechanism: dis. PhD in Economics - T., 1989 (in Russian)
- [9] Axmedov D. Improving the efficiency of land and water resources in cotton farms (on the example of Bukhara region): dis. PhD in Economics - T., 1993. (in Uzbek)
- [10] Jalalov S.Ch. Irrigated agriculture in conditions of water scarcity. - T .: “Chinor ENK”, 2000. - p. 160. (in Russian)
- [11] R. Ismailov. Improving the economic efficiency of land use (based on materials from agricultural enterprises of the Northern Fergana Canal zone): dis. PhD in Economics - T., 1991. (in Russian)
- [12] Mamatkulov A. Effective use of irrigated saline soils in agriculture: dis. PhD in Economics - T., 2005. (in Uzbek)
- [13] E. Trushin. Reforming land-water relations as a condition for economic growth. dis. PhD in Economics - T., 1998. (in Russian)
- [14] B.Hasanov. Organizational and economic mechanism for improving the water management system of Uzbekistan and increasing its efficiency / Author's ref. diss PhD in Economics - T., 2005. - 30 p. (in Uzbek)
- [15] Sangirova U.R. Improving economic relations between water consumer associations and farms. T .: TIQXMMI, 2018. - 143 p. (in Uzbek)
- [16] Umarov S.R. Improving the economic basis of innovative development of water management: dis. PhD in Economics - T., 2017. (in Uzbek)
- [17] Kayumov F.K. The effectiveness of the agro-industrial complex in the conditions of transition to the market. - M .: Polygrim, 1992 .-- 72 p. (in Russian)
- [18] Akhmetshina I. Efficiency of agricultural production and capital investment: dis. PhD in Economics - T., 1978 (in Russian)
- [19] Berdiev O. The main directions of capital investments and improving the efficiency of using fixed assets: dis. PhD in Economics - T., 1992 (in Russian)
- [20] Kuchkorov Z. Economic efficiency of capital investments and the use of fixed assets in sovino grad state farms of the Uz SSR: dis. PhD in Economics - T., 1981 (in Russian)
- [21] Mikhailov V. Economic efficiency of investments in irrigation-reclamation systems (methodological issues): dis. PhD in Economics - T., 1994 (in Russian)
- [22] Kholmiraev M. Economic efficiency of capital investments and fixed assets in cotton-growing state farms: dis. PhD in Economics - T., 1990 (in Russian)
- [23] Chan Hong Quang. The effectiveness of capital investments in agriculture (on the example of collective farms in Tashkent region): dis. PhD in Economics - T., 1990 (in Russian)
- [24] Kayumov M.K. Programming crop yields. - M .: Agroproizdat, 1989 .-- p. 14. (in Russian)
- [25] Sultanov B.F. Economic Essence of Agricultural Melioration and Scientific-Methodologic Aspects of Its Development. European Scientific Journal February 2018 edition Vol.14, №6.
- [26] Abdunazarov O.A., Kholmiraeva Z.A. The state of land and water use in the world and ways to use it more efficiently. №1 (85) -2015. <http://biznes-daily.uz/ru/birjaexpert/28514-dunyoda-yr-suv-rsurslardan-foydalanish-cholati> (in Uzbek)
- [27] Shirokova Yu.I., Chernyshev AK, Sharafutdinova N.Sh. Experience, tasks and prospects for improving reclamation control of irrigated lands. Reclamation: stages and development prospects. Materials of the international scientific and industrial conference. - Moscow., 2006. - C.35. (in Russian)
- [28] Yakubov M.A., Yakubov H.E. Yakubov Sh.Kh. Collector-drainage runoff of Central Asia and assessment of its use for irrigation. T .: - C.67. (in Russian)
- [29] Chen Shi, Jilili Abuvaili, Rakhimov Sh. Kh., Makhmudov E.Zh. Water resources and water use in Uzbekistan. T .: 2013 - C.181. (in Russian)
- [30] Sultanov B.F. Features of water resources of the Republic of Uzbekistan. “Water management – state and prospects of development” collected articles of young scientists – Rivne: 2010. Ukraina, 114-115 p.
- [31] Muminov N.G. Land reforms in the People's Republic of China - as a basis for the formation of a new type of economic system // Economy and Finance, №1, 2016. pp. 53-61. (in Uzbek)