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IMPROVING THE SCIENTIFIC AND METHODOLOGICAL FRAMEWORK FOR IMPROVING THE EFFECTIVENESS OF RECLAMATION MEASURES IN AGRICULTURE

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***ABSTRACT**--The article evaluates the role of land reclamation in the sustainable development of agricultural production on the basis of proposals and practical recommendations for improving the scientific and methodological framework for assessing and increasing the effectiveness of land reclamation in agriculture and the study of the economic nature of land reclamation and its scientific and practical basis. ; generalization of experience of foreign countries on increase of efficiency of ameliorative measures and development of practical offers on its application in economy of the republic, preparation of offers on improvement of methodical bases of use of ameliorative systems and an estimation of efficiency of actions, scientific assessment of impact of land reclamation on crop yield and product quality development of proposals to improve the methodological framework, structural and quantitative use of land and water resources and their benefits assessment of trends in changes in field efficiency, development of scientific proposals and practical recommendations on the classification, systematization and classification of measures to improve the reclamation of agricultural lands, the dynamics of the use of existing irrigation and land reclamation potential, assessment of its current state; Methodological recommendations for improving the scientific and practical basis for identifying areas of interaction between land reclamation and the environment and ensuring balance If the development explained.Substantiation of the priorities of preferential financial support of the state and innovative management of agricultural land reclamation in a market economy. Development of additional lands and prevention of the possible ecological crisis and effective use of arable lands. there is a need to ensure a balance between reproduction and economic activity of people on the basis of innovative solutions . The role of land reclamation as one of the factors of intensification of agricultural production is high and plays a primary and basic role in ensuring the efficiency of the sector, because, firstly, the lack of land reclamation limits the potential efficiency of the sector, and secondly, quantitatively and qualitatively leads to the cultivation of non-responsive products. development of proposals and practical recommendations to improve the scientific and methodological framework for assessing and increasing the effectiveness of reclamation*

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measures in agriculture, which does not pay enough attention to the problems of improving the effectiveness of reclamation measures and a comprehensive study of this problem.

Keywords--*agriculture, intensification, reclamation, land and water resources, land reclamation, reclamation factor.*

I. INTRODUCTION

Global population growth and deepening globalization processes necessitate a proportional increase in the production of food and other material goods for human consumption in accordance with the requirements of ecology and environmental protection. According to the United Nations Department of Economic and Social Affairs, "the world's population is projected to reach 10.9 billion by 2100, an increase of nearly 40 percent from 2019." The analysis shows that in world practice, this problem is often solved by extensive factors, ie, mainly by expanding the area under agricultural crops. However, the limited amount of available arable land is estimated at Rs 1,500 crore. hectares. In this regard, it can be said that humanity has used almost all the reserves of arable land. Therefore, the development of additional lands and 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 is having a negative impact on the common good and in some cases even leading to economic and social tensions. In particular, the 0.7 degree increase in temperature on the planet from the middle of the XIX century to the first years of the XX century has a negative impact on crop yields, limiting food security, especially in economically slow developing countries. It is natural that these problems, unlike in other sectors of the real economy, have a significant impact on the sustainable development of the agricultural sector, which is prone to natural factors and is based on land and water resources, especially its central sector. Overcoming these problems on a global scale requires, first of all, the organization of agricultural production adapted to climate change on the basis of intensive factors and innovative developments.

Land reclamation plays an important role in intensifying agricultural production and plays a primary 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 quantitative and qualitative standards. leads to the cultivation of the product. Therefore, large-scale measures are being taken in the country to improve the reclamation of lands. However, the current reclamation status of lands, the imperfect legal and regulatory framework for improving the effectiveness of reclamation measures and the imperfect relationship between the entities hinder the creation of adequate conditions for the implementation of the tasks set out in the Strategy for Sustainable Agriculture 2030. Therefore, scientifically-practical proposals to improve the methods of assessing and calculating the cost-effectiveness of reclamation activities and financial resources allocated to them, the impact of these funds on increasing the income of agricultural enterprises, sources of funding for reclamation activities, strategic directions for its development in the near future and the development of methodological recommendations is one of the current issues.

II. LITERATURE REVIEW

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Scientific research on improving the reclamation of lands and assessing the effectiveness of reclamation measures is currently being conducted in the world's leading research institutes, universities and research centers. IAMO - Leibniz Institute of Agricultural Development in Transition Economies (Germany), Institute of 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 of Land Reclamation, "Raduga" Agricultural Water Supply and Irrigation Systems Research Institute (Russia), Research Institute of Irrigation and Water Problems (Uzbekistan).

The United Nations Development Program (UNDP) has developed methods to reduce the pressure on pasture use, assessed the biodiversity of pastures and the effectiveness of phytomelioration measures, based on international research to assess and increase the effectiveness of reclamation measures in agriculture. The Center (ICARDA) has tested the use of innovative solutions and resource-saving technologies in different regions of the country. assessed the aradority; 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 reclamation measures on agricultural land.

Currently, research is being conducted around the world to increase the effectiveness of reclamation measures in the following areas: sustainable development of agro-landscape on the basis of complex reclamation; the impact of quality factors on improving the efficiency of land and water resources use; adaptation of agricultural production to global climate change, 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 degree to which the problem has been studied. The problem of assessing and increasing the effectiveness of reclamation measures in agriculture is complex and multifaceted. Therefore, in the context of this problem, large-scale research has been conducted by scientists from foreign countries. In particular, the scientific results of VS Dmitriev, EV Kuznetsov, AE Hadjidi [1-2] and similar scientists on scientific-theoretical and methodological solutions to this problem are noteworthy.

In our country, too, large scientific schools have been formed in this direction, and it would be expedient to conditionally divide them into three groups. The scientific work carried out by the first group of scientists is mainly focused on the effective use of the potential of agricultural resources, and in part on the issues of efficient use of land and water resources. In particular, these studies are reflected in the works of UP Umurzakov, KA Chariev [3-4], the second group of scientists R.Abdullahanov, S.Avezbaev, who focused on the issues of effective management and use of land and water resources as the object of study. N.Ataxanov, D.Axmedov, C.Djalolov, R.Ismoi-lov, A.Mamatkulov, U.Sangirova, S.Umarov, E.Trushin, B.Hasanov, Sh.Hasanov, A.S.Chertovitskiy [5-17] can include agrarian economists-scientists. The research of the third group of scientists is aimed at increasing the production efficiency and use of fixed assets in agriculture, as well as the economic efficiency of capital investments in irrigation and land reclamation systems. Such agrarian economists include I.Akhmetshina, O.Berdiev, V.Mikhailov, F.Kayumov, Z.Kuchkarov, M.Kholmirzaev and Chan Hong Kuang [18-24]. However, most of the above work is scientific research conducted before the independence of our country and the transition

to market relations, which does not pay enough attention to the problems of improving the effectiveness of land reclamation and a comprehensive study of this problem. Therefore, the problems of increasing the effectiveness of reclamation measures in the context of modernization and innovative development of the economy have led to the need to choose as the subject of this study.

III. ANALYSIS AND RESULTS

It is known that one of the main goals of economic reforms since independence is to increase the country's prestige and competitiveness in the world economic system, modernize agriculture, which is one of its main real sectors, and meet the needs of the population in food and industrial raw materials. aimed at creating a new lifestyle that meets the requirements of the time in terms of quality.

For this reason, “agriculture today is not only a sector that produces material value, but also a single, large and independently connected with the use of nature, to achieve specific goals at the national and regional levels (low-cost agricultural production and maximizing the quality) should be considered in society as a field that studies the general principles of rational use of natural resources (land, water) by man ”[25], because agriculture is a material activity. Production in all sectors of the network as it differs from the basic and irreplaceable production tool. In this regard, the sustainable development of the country's economy will depend, first of all, on the correct solution of the attitude to land.

However, land is a key integral and integral part of the environment, characterized by its natural latitude, topography, flora, fertile soil layer, water and climatic factors - heat, light levels, and their category, quality and natural conditions vary. therefore, it cannot always contain the appropriate factors necessary for the growth and development of the plant. For this reason, the efficient use of agricultural lands requires, first of all, the provision of healthy soil layers and appropriate climatic conditions with sufficient mineral and organic fertilizers for the plant, as well as micro- and bioelements.

Improving the natural quality of the soil is done primarily through agrotechnical methods, but agrotechnical methods alone are not sufficient in the care of plants and the utilization of their potential yields. As mentioned above, in this case, the soil has the ability to manage its water-air regime, normalize the direction of adaptation and increase productivity over the long term, but to create a solid foundation that differs from agro-technical methods and, most importantly, their economical and efficient use. It is an objective necessity to apply land reclamation factors and measures that serve to increase crop yields and directly affect product quality.

The issues of agricultural development, efficient use of land and water resources, improvement of the structural and quantitative quality of lands play a key role in the ongoing systemic reforms in our country.

It is known that improving the efficiency of land use depends in many respects on the correct and rational distribution of land resources within the land fund among land users, regions, tenants of land plots and owners.

According to the nature of use in the production process, it is important to study the land fund as a group of lands used as the main means of production and all other sectors and industries of the economy. However, such grouping of the composition of the land fund does not allow to fully address the practical tasks related to the rational use of land and the legal regulation of land relations. Therefore, the study of land resources in terms of targeted use is of practical importance.

As of January 1, 2017, the land of enterprises, organizations and institutions of the Republic of Uzbekistan, as well as the population, is 44896.9 thousand hectares. The total land area in 2017 decreased by 394.7 thousand hectares compared to 1990. This is mainly explained by the return of land taken from other countries for long-term use.

The categories of land resources are determined by the composition of the main sectors of the economy in terms of distribution. Therefore, they are not considered immutable and can move from one category to another. As a result of the transfer of lands from one category to another, there are structural changes in the land fund.

Therefore, during the years of reform, the volume of agricultural land has been declining, from 90,080.4 thousand hectares in 1990 to 25,601.0 thousand hectares in 2018, a decrease of 8.8%. The main reason for this is that part of the land used in agriculture is allocated for the construction of professional colleges and industrial enterprises, the expansion of forest lands, the expansion of nature protection and historical and cultural lands, and housing to meet the housing needs of the population.

As noted, the state of distribution of agricultural land in 1990-2018 also confirms this view. In particular, in 1990, 14.9% of the total agricultural land was arable land, 1.3% was perennial forests, 0.2% was gray land, 83.6% was pastures and hayfields. , Perennials increased by 8.5 percent, while pastures and hayfields decreased by 8.1 percent, and pastures and hayfields by 8.1 percent (Table 1).

Table 1: Distribution of agricultural lands of the republic according to the purpose of use (thousand hectares)

Land types	**1990**	**2000**	**2018**	**Percentage of total agricultural land,%**		**In 2018 Compared to 1990, %**
				1990	**2018**	
Cultivated lands	**4176,5**	**4058,4**	**4019,8**	**14,9**	**15,7**	**96,2**
including: irrigated	3407,3	3308,1	3262,2	12,1	12,7	95,7
lalmikor erlar	769,2	750,3	757,6	2,7	3,0	98,6
Perennial trees	**366,8**	**346,9**	**398,0**	**1,3**	**1,5**	**108,5**
including: irrigated	354,5	332,3	376,3	1,2	1,5	106,1
Gray lands	**62,1**	**82,8**	**80,7**	**0,2**	**0,3**	**130**
including: irrigated	25,9	48,4	47,7	0,09	0,2	184
Pastures and hayfields	**23475**	**22246,4**	**21102,5**	**83,6**	**82,4**	**89,9**
including: irrigated	37,3	44,3	43,0	0,1	0,17	115
Total agricultural land	**28080,4**	**26734,5**	**25601,0**	**100**	**100**	**91,2**

The increase in the area of perennial plantations is explained by the fact that in accordance with the decisions of the Government of the Republic, a number of measures are being taken to deepen structural and economic reforms in the fruit and vegetable and viticulture sectors.

Gray lands, on the other hand, increased by 30 percent in 2018 compared to 2010. Given that the inefficient use of gray lands results in the formation of irrigated and non-irrigated lands, which are out of agricultural

production (turnover) due to violations of irrigation rules and deterioration of soil and reclamation, erosion, strong salinity, gypsum and deterioration of newly developed lands this situation cannot be assessed positively. This negative situation was observed mainly in 1990-2005, and since 2005 there has been a downward trend in this situation.

In our opinion, due to the fact that the gray lands in the irrigated area are located in small plots within the boundaries of irrigated arable lands, the implementation of appropriate reclamation measures to provide them with irrigation and collector outlets will help to restore the condition of these lands and agricultural turnover. allows it to be returned.

From the point of view of increasing the efficiency of land use in agriculture, it is important to study the composition of agricultural land in terms of economic use, in which irrigated lands have a special place, because the bulk of agricultural production falls on these lands. In particular, in the analyzed years, the share of irrigated land in the category of arable land in 2018 decreased by 4.3% compared to 1990.

The results of the analysis of the above table data show that the main part of agricultural lands in the republic falls on the share of pastures and hayfields. This is primarily due to the geographical location and territorial characteristics of the regions. Already, the main part of the territory of the republic consists of mountain and foothill zones, as well as deserts and semi-deserts. The share of this type of land in total agricultural land in 1990 was 83.6%, and in 2018 this figure was 82.4%.

The arable lands of the republic are of special importance, and their share in the total agricultural lands in 2018 was 15.7%. In 1990, 87.9 percent of arable land and in 2018, 87.3 percent accounted for irrigated land. Dry lands are also important in agricultural production, accounting for an average of 14.3% of total agricultural arable land.

After gaining independence, the structure of agricultural crops has undergone significant changes. In particular, the area under cereals accounted for 12.4% of the total sown area in 1990, while in 2018 it was 50.5%, which means that in these years the area under cereals increased by 3.9 times, and the area under cereals - by 6.1 times. .Such changes in the structure of agricultural lands are, first of all, the result of the economic policy of the Government of the Republic since the first days of independence, aimed at providing the population with basic foodstuffs, strengthening food security. Of course, as a result of these structural changes, the level of self-sufficiency of the population in agricultural products has increased, the volume of imported grain products has decreased significantly.

During the analyzed period, the area under industrial crops in the country, in particular cotton, decreased by 491.1 thousand hectares, or 26.4%.

Table 2: Dynamics of changes in the composition of agricultural crops in irrigated areas (1990-2018)

Crop types	**Years**			**2018 compared to 1990,%**
	1990	**2000**	**2018**	
Total crop area	**3407,3**	**3308,3**	**3279,4**	**96,2**
1. Cereals, total	**423,6**	**1087,2**	1655,4	**3,9 once**
In relation to the total, %	*12,4*	*32,9*	*50,5*	*x*

Including:				
- Grain	183,9	1031,6	1126,2	6,1 once
In relation to the total, %	*5,4*	*31,2*	*34,3*	*x*
- A grain of corn	90,7	36,9	21,1	23,3
In relation to the total, %	*2,7*	*1,1*	*0,6*	*x*
- "Rice."	143,5	110,6	61,6	43
In relation to the total, %	*4,2*	*3,3*	*42,9*	*x*
2. Technical crops, total	**1863,0**	**1477,4**	1371,9	**73,6**
In relation to the total, %	*54,7*	*44,6*	*41,8*	*x*
Including:				
- Cotton	1827,9	1492,7	1190,8	65,1
In relation to the total, %	*54*	*45,1*	*3,6*	*x*
3. Forage crops, total	**976,8**	**338,5**	**246,8**	**25,2**
In relation to the total, %	*28,7*	*10,2*	*7,5*	*x*
Including:				
- Маккажўхори силос учун	165,0	176,1	150,3	91
In relation to the total, %	*4,8*	*5,3*	*4,6*	*x*
- Беда	616,9	82,7	220	35,7
In relation to the total, %	*18,1*	*2,3*	*13,3*	*x*

In addition, the area under rice was reduced by 81.9 thousand hectares, and the area under fodder crops - by almost 4 times, ie in 1990, 28.7% (976.8 thousand hectares) of the total crop area was occupied by fodder crops, in 2000 its share was 5.3. percent, and by 2018 it will be 7.5 percent (246.8 thousand hectares). This situation has had a negative impact on the development of livestock in the country, which has led to a certain decrease in soil fertility of existing irrigated lands.

In the context of Uzbekistan, land use in agriculture is also directly related to water use, and the efficiency of water use cannot be ensured without efficient use of land. That is why today in our country land and water resources are used as public property without privatization.

In this regard, the process of providing water resources, which are important in agricultural production, is much more complicated, which can be explained as follows:

First, it is directly related to the transboundary nature of water resources. In particular, the source of formation of large amounts of water resources used in irrigated agriculture of the republic is mainly in the border states. As a result of the transition to an energy resource regime in the use of water resources in neighboring countries and the priority given to the intensive development of agricultural production in terms of food security, the annual volume of water intake is declining. In particular, the total volume of water intake in the country in 2011-2015 increased from 60.4 km to 52.8 km (12.6%) compared to 1980-1985, and the water intake for irrigation increased from 51.9 km to 43.7 km. . decreased by 15.8%.

Second, as a result of the fact that the rate of population growth is higher than the rate of growth of irrigated land, the share of irrigated land per capita in the country is declining. That is, the specific water intake per 1 hectare of land in 1980 was 18.1 thousand m3 / ha, the specific water intake per 1 person was 4.4 thousand m3 / ha, in 2015 these figures were 11.7 m3 / ha, respectively. 1.7 thousand m3 / person. If we follow the laws of population growth in our republic, it is inevitable that this trend will continue in the next 15-20 years.

Thirdly, since agricultural production in our country is mainly based on irrigated agriculture, about 90% of the total volume of water is spent on agricultural production. For this reason, the ongoing comprehensive economic reforms in the country make it necessary to use domestic resources wisely in addressing strategic tasks such as improving the supply of quality food products to the population, increasing the export potential of agricultural products. Taking full advantage of these opportunities will ultimately lead to a reduction in water consumption for agricultural production.

It is known that in the sustainable development of agriculture it is not enough to take into account only the level of quantitative availability of land and water resources. This requires taking into account its quality indicators. Indeed, the quality of land not only provides a great opportunity to increase crop yields and product quality, but also to increase the income of economic entities, is an important factor in improving the welfare of the rural population. At the same time, the assessment of land quality is characterized by its complexity.

Accounting for the quality of land is based on the characteristics that determine its value as a natural resource, means of production and the object of labor. These include the description of the soil by soil type, vegetation and relief structure, information on soil water and wind erosion, swamping, salinity, nutrient availability, and more.

Soil quality reflects its fertility in relation to other natural factors that affect productivity. The fact is that the level of fertility of soils with the same type and composition also differs from each other. Due to the fact that the natural properties of soils vary according to their economic importance and have different effects on productivity, there is a need for their comparative evaluation. This function is performed by soil grading.

Determination of soil quality is a qualitative assessment of soils in terms of their natural fertility, which is based on the natural properties of the soil, that is, the properties necessary for the growth and development of agricultural crops. The essence of determining soil quality is that it allows to determine the level of productivity obtained from different quality soils when applying the same agronomic measures.

Bonitet is used in the comparative assessment of the natural properties of soils, as well as in the relative assssment of their potential productivity relative to certain agricultural crops at a certain level of intensification. It also allows to determine the level of suitability of different soils for the cultivation of this or that type of crop, the supply of fertilizers, the highest yielding soils, the sequence and scope of major reclamation and other measures to increase soil fertility and is carried out on a 100-point scale. .

Economic evaluation of land as a means of production in agriculture lies in the profitability of different quality lands, which is determined by taking into account the quality of soils and the location of land plots, reflecting its production (productivity) capacity. The economic assessment of the land is carried out in a balanced manner with an intensification level and allows to determine the degree of influence of only natural conditions on the results of agricultural management.

The method of economic evaluation of lands is based on at least five-year data on crop yields and expenditures. Valuation indicators are calculated separately for agro-industrial groups of soils, irrigated and non-

irrigated lands under equal production conditions, as well as comparative prices, current prices for production costs are used to determine the value of gross output.

Indicators of land quantity and quality play an important role in the analysis of the level of agricultural development and land use efficiency.

In our opinion, land quality indicators allow to express the economic fertility of the soil in relation to the general and specific crop type. In both cases, soil fertility is calculated in points. In the first case, gross income can be used as an indicator of economic productivity of land, in the second case, the indicator of productivity by type of the main crop can be used. Gross income is calculated at both current and comparable prices. The main type of crop in the country is based on the recalculated amount of cotton yield in the first industrial navigation and production costs set in accordance with the norms for the cotton field. This information is reflected in the technological map.

In general, the soil quality of irrigated lands in the country has different levels of assessment by region, which depends on their geographical location, level of water supply, the state of organization of agricultural production and a number of other factors. Soil quality plays an important role in terms of crop placement and the development of measures to obtain high yields from them.

The analysis shows that during the years of reform, there is a downward trend in soil fertility of irrigated lands in all regions, except for Khorezm and Syrdarya (Table 3.5).

In particular, the quality of irrigated crops decreased significantly in Fergana (10 points), Surkhandarya (8 points), Samarkand (7.7 points), Tashkent (7 points), Bukhara (7 points), Namangan (6 points). In the country, the productivity of irrigated lands during this period decreased from 59 to 54 points, or 5 points.

Table 3: Dynamics of changes in soil fertility of irrigated lands (1990-2018)

Republic, provinces	**Scores of crop areas**		**Changes in 2018 compared to 1990, +, -**
	1990	**2018**	
The Republic of Karakalpakstan	44	41,3	-2,7
Andijon	60	57,5	-2,5
Buxoro	58	51	-7
Jizzax	53	51	-2
Kashkadarya	54	52,5	-1,5
Namangan	66	60	-6
Navoi	59	53,2	-5,8
Samarkand	67	60,3	-6,7
Surxondaryo	68	56	-8
Sirdaryo	53	53	-
Tashkent	66	59,9	-6,1
Fergana	66	56	-10
Khorezm	54	54	-

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Across the country	**59**	**54**	**-5**

It is known that in our country the soil fertility is assessed qualitatively divided into 5 categories. Grouping analysis on the basis of these categories shows that if in 1990, 33.6% of the total irrigated land (114962.1 ha) was soil fertility up to 61-80 points, 9.1% (309705 ha) of high quality land, ie up to 80-100 points By 2018, the share of lands up to 61-80 points in the total crop area was 27.0 percent (991272 ha), and the share of lands up to 81-100 points was 2% (73091 ha) (Table 4).

Table 4: Irrigated lands group soil fertility Changes in (1990-2018)

Groups	**1990**		**2018**		**In 2018 compared to 1990 (+, -)**	
	The area that corresponds to the group	**Percentage of total crop area,%**	**The area corresponding to the group, e**	**Percentage of total crop area,%**	**The area corresponding to the group, e**	**The difference in the share of total crop area**
Total crop area	**3709407**	**100**	**3669568**	**100**	**- 39839**	**-**
I-group 0-20 ball	6859	0,2	526	0,014	- 6333	- 0,19
Group II 21-40 balls	659868	19,3	657056	17,9	- 2812	- 1,4
Group III 41-60 balls	1291072	37,8	1947625	53,0	656553	15,2
Group IV 61-80 ball	1149621	33,6	991272	27,0	- 158349	-6,6
V-group 81-100 ball	309705	9,1	73091	2,0	- 236614	- 7,1

Of course, the reduction of crop areas of groups I and II, ie 0-40 points, to 6333 and 2812 hectares, respectively, during the analyzed years is a positive result of the ongoing reforms in agriculture. However, in 2018, the soil fertility of the 4th group, ie in the range of 61-80 points, decreased by 6.6 points in 2018 compared to 1990, and the soil fertility of the best quality arable lands in the 5th group - 81-100 points decreased by 7.1 points. indicates that sufficient measures have not been taken to increase

It is known that in practice, the reclamation of lands in irrigated agricultural areas is assessed on the basis of indicators such as salinity, gypsum and swampiness, depth of groundwater and salinity. Thus, one of the main indicators that characterizes the quality of land is its salinity, a process that causes bilateral damage to agricultural

enterprises. First, they significantly reduce the productivity of agricultural crops, and on the other hand, they dramatically increase the amount of expenditure required for measures to restore and increase soil fertility. Indeed, measures to restore and increase soil fertility are a guarantee of efficient use of reclaimed land.

Analysis of the salinity of irrigated lands in the country shows that the amount of non-saline lands in 2018 increased by 16.4% compared to 1990, and the share of saline lands decreased by 10.1%. At the same time, the decrease in low-salinity lands by 28.9 thousand hectares, medium salinity lands by 93.0 thousand hectares and high salinity areas by 94.9 thousand hectares is the result of large-scale reforms in this area (Table 3.7).

However, the fact that more than half of the total irrigated land is saline to some extent indicates the breadth of work that needs to be done in this regard.

The study of the location and level of exposure to groundwater is of particular importance in assessing the reclamation of arable land and developing measures to further improve it. Indeed, practice shows that non-compliance with the irrigation regime, lack of accurate calculation of water consumption, non-compliance with the established procedure for saline washing, unsatisfactory technical condition of collector-drainage networks lead to the rise of groundwater**.**

Analysis of the dynamics of changes in the location of groundwater levels in agricultural lands shows that in the pre-independence period, ie in 1990, 2.0% of irrigated lands had groundwater up to 0-1 m, 14% up to 1-1.5 m, 21.6% 1 , Up to 5–2 m, in 29.4% up to 2–3 m, and in 33% below 3 m. At the same time, in 2018, compared to 1990, the share of groundwater with a level of 1-1.5 meters decreased by 53.6%, and those with a level of 1.5-2 meters decreased by 89.2%, and the share of groundwater with a level of 0-1 meters increased by 27.2%. , Up to 2-3 meters - by 33.5 percent, and those below 3 meters - by 4 percent.

Also, one of the main indicators of land reclamation is the level of mineralization of groundwater, which occupies a special place as one of the main important indicators to be considered in the assessment and improvement of land reclamation. Practice has shown that the greatest damage to agricultural production is based on the fact that the mineralization of groundwater in irrigated lands is 5-10 g / l and above.

The analysis of this indicator for 1990-2018 shows that in 1990, the level of mineralization of groundwater in the total irrigated land was 1355.1 thousand hectares (32.4%), while in the range of 0-1 g / l, 1748.2 thousand hectares (41.8%) 1-3 g / l, and 1079.1 thousand hectares (25.8%) in the range of 3-5 g / l. In 2018, 36.8% (1582.8 thousand ha) of irrigated land will be 0-1 g / l, 41.3% (1776.3 thousand ha) 1-3 g / l, 19.7% (847.3 thousand ha) e) in the range of 3-5 g / l

The mineralized level of groundwater, which poses a great risk in irrigated agriculture, is in the range of 5-10 g / l, accounting for 2.6% of total irrigated land. Irrigated areas with a mineralization limit of 10 g / l were mainly observed in 2000, accounting for 1.1 percent of total irrigated land. However, as a result of wide-ranging reforms in the system, this negative situation has been eliminated.

In general, the level of mineralization of groundwater in irrigated lands in 2018 compared to 1990 increased from 0.1 g / l limit by 16.8%, 1-3 g / l limit by 1.6%, the area of 3-5 g / l The volume of areas with a hazard limit of 5-10 g / l decreased by 21.5% and 77.4%.

In short, the large-scale reforms carried out during the years of independence to improve the reclamation of lands have yielded positive results, leading to a relative improvement in the quality of lands.

It is known that the main source of the emergence and intensification of the salinization process on irrigated lands is mineralized groundwater located close to the surface of the crop area. It is therefore necessary to determine their optimal depth in order to reduce or completely eliminate soil salinity by saline washing. This, in turn, is important in the development of a plan for the implementation of reclamation measures, such as the design and construction of ditches in saline and saline soils. Hence, the groundwater level and its mineralization level are directly related, and if the groundwater is above the critical depth, the salinity of the soil will increase due to the increase of salts from the lower layers, otherwise the salts will not rise from the bottom to the top.

Hence, in this case, in practice, reclamation measures are required to wash the crop areas, which are considered important. However, due to the scarcity of water resources, the ability to implement these measures in many areas is limited. Especially in the conditions of the Republic of Karakalpakstan, sowing crops without washing the soil salinity - this dramatically reduces the chances of yield. In particular, the Roman Boshliq farm in Kegeyli district, where the monographic study was conducted, planted cotton on a total area of 40 hectares in 2018, of which 32 hectares were washed with salt, ie after the necessary agro-technical measures and the remaining area without water due to water shortage. . As a result, a total of 65.28 tons of cotton was harvested from 20.4 quintals per hectare of saline-washed area, and 12.88 tons from 16.1 quintals of cotton per hectare of non-saline area (Table 5).

Table 5: Economic and ecological efficiency achieved in the fields of washed and unwashed cotton fields in the fields of the farm "Roman Boshlik" of the Republic of Karakalpakstan (2018)

№	Indicators	In the area where the salt is not washed	In the area where the salt is washed	The difference + more than; - kam
1	Productivity	16,1	20,4	+4,3
2	Gross product, tons	1,61	2,04	+0,43
3	All expenses for salt washing, thousand soums	0	49,2	+49,2
4	costs of mechanization and electricity in salt washing, thousand soums	0	28,3	+28,3
5	salaries of workers involved in salt wash-ing (including deductions), thousand soums	0	20,9	+20,9
6	The cost per hectare, mingsom	5727,0	6179,0	+452,0
7	Gross product value, thousand soums	4991,0	6426,0	+1435,0
8	Profit +, loss -, thousand soums	-736	247	x
9	Profitability,%	-12,8	4,8	x

According to the analysis, 28,320,000 soums were spent on agro-technical measures to wash one hectare of land, and 20,933,000 soums were spent on wages, for a total of 49,233,000 soums.

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This means that 49,233,000 soums were spent on each hectare of salt-washed areas. However, at the end of the year the income amounted to 6426 thousand soums per hectare of saline area, 4991 thousand soums per hectare of non-saline area, due to saline washing the yield of cotton per hectare increased by 4.3 quintals and income by 1435 thousand soums.

The importance of improving the reclamation of lands in agriculture is explained, first of all, by the high efficiency of the use of irrigated lands over dry lands. Indeed, the fact that the cultivation of grain crops on dry lands yields 5-6 times less than on irrigated lands has a negative impact on increasing production efficiency in the field. This indicates that irrigation in arid and semi-arid regions is a key factor in increasing the productivity of reclaimed lands and the sustainable development of agriculture.

Analyzes show that during the years of independence, grain production on dry lands has decreased by 56 percent. That is, in 1990, 549.2 thousand hectares were planted with cereals, and by 2018 this figure decreased to 239.0 thousand hectares. The total yield of cereals has increased up to 4 times in recent years, and on irrigated lands - up to 2.4 times, with an average yield of 7-8 centners per hectare on dry lands (Table 6).

Table 6: Dynamics of changes in grain yield in the country in 1990-2018

Years	Crop area			Productivity		
	Total husbands	Including		in total lands	Including	
		irrigated lands	in dry lands		on irrigated lands	in dry lands
1990	775,2	226,0	549,2	11,4	21,7	7,4
1995	1280,1	793,6	486,5	18,6	26,1	5,3
2000	1389,2	1066,0	323,2	26,6	30,0	3,5
2005	1336,1	1086,8	249,3	33,3	46,4	7,6
2010	1559,9	1314,0	245,9	44,7	50,1	7,8
2015	1539,1	1313,0	226,1	46,9	52,7	7,7
2018	1549,2	1310,2	239,0	46,5	53,0	7,9
In 2018, compared to 1990,%	2 times	5.8 times	44	4 times	2,4 times	

Based on the above analysis, it can be said that along with the positive changes in soil quality indicators, the use of agricultural machinery, in particular the movement of aggregates in the field, also affects the decline in scores in the country, ie the use of agricultural machinery. , i.e., the movement of aggregates in the crop area has a direct impact on soil fertility and its compaction. This is because an important factor in maintaining the mechanical composition of the soil, especially the amount of humus in the soil, is the normal tillage of the soil.

It is known that in order to ensure the comprehensive implementation of agro-technical measures during the cultivation of the main agricultural crops grown in our country, it is necessary to move tractors and agricultural machinery to the fields at least 5-10 times a year. The special literature is based on the loss of 20 percent of plowed

area as a result of a single movement of a wheeled tractor with a front wheel width of 0.6 meters and a working coverage width of 3 meters in a single field. If 6 agro-technical measures are carried out with the help of this tractor (plowing, double tillage, application of mineral fertilizers, sowing, cultivating, etc.), 74% of the area will be compacted. This fact was confirmed by the results of a monographic survey conducted at the farm "Ilhomjon Eshondadaevich" in Mingbulak district of Namangan region.

In 2018, the farm will use 79.6 hectares of land in the traditional way, ie all agro-technical measures (plowing, harrowing, mulching, leveling, plowing, etc.) with the help of SZ 3.6 seeders and 5 hectares of resource-saving technology. sowed cereal seeds with a seeder capable of carrying out five types of agro-technical measures at once (leveling, harrowing, mulching, plowing, chiseling) (Table 7).

Table 7: Economic and environmental efficiency of the use of traditional and resource-saving mechanisms in the cultivation of cereals on irrigated lands (2018)

№	Indicators	According to the traditional technological card	On resource-intensive technology	The difference + , -
1	Productivity	54,0	61,2	+7,2
2	Gross product, tons	5,4	6,12	+0,72
3	Number of movements of equip-ment in the field, times	18	13	-5
4	Change in soil density due to the number of movements in the crop area (average value), g / cm3	1,45	1,31	-0,14
5	Increase in yield due to decrease in soil density, ts / ha	-	7,2	+7,2
6	Cost per hectare, thousand soums	4679	4408	-271
7	Income received, thousand soums	6089	6879	+790
8	Profit received, thousand soums	1410	2471	+1061
9	Profitability,%	30,1	56,0	+25,9

As a result of the measures taken, the cost of equipment for the preparation of one hectare of land before planting is 587,000 soums in the traditional way, 484,000 soums in the resource-saving method, fuel consumption is 70 liters in the traditional method, 30 liters in the resource-saving method, 125-150 kg instead of 250 kg. As a result, 103,000 soums were saved from the cost of equipment, an average of 41 liters or 189,000 soums from fuel, and 250,000 soums from the cost of seeds. Most importantly, due to the 5-fold reduction in the number of high-weight techniques entering the field, soil compaction averaged 1.45 g / cm3, and in the resource-efficient method, the figure was 1.31 g / cm3. Due to the decrease in soil density, the yield per hectare was 61.2 quintals instead of 54 quintals. During the year, 4,679,000 soums were spent to grow 54 ts / ha of crops per hectare using the traditional

method, the profit was 1,140,000 soums, and the yield was 30.1%. 4408 thousand soums were spent to produce 61.1 ts / ha in a resource-efficient way. The net profit was 2471 thousand soums, the profitability was 56.0%

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 in the fields, as well as the effective use of plowing to prevent soil compaction. The transition to abrupt reduction technologies, as well as effective tillage in order to prevent soil compaction, ie deep tillage method The use of beeswax also serves to maintain and increase the soil fertility of arable land.

IV. CONCLUSION/RECOMMENDATIONS

In summary, according to the results of the study of the processes of qualitative change of water resources in the years of independence, the following trends can be observed:

- In the analyzed years, the reclamation of lands has a tendency to improve, mainly as a result of the implementation of the State Program. That is, non-saline areas increased by 16.4%, while saline areas decreased by 10.1%. However, the part of the groundwater level from 0-1 meters increased by 27.2%. Also, the level of groundwater, which is dangerous in terms of mineralization, was reduced by 21.5% to 3-5 g / l;

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

- The use of agricultural machinery, in particular, the movement of aggregates in the field, also affects the decline in the quality of soil in the country, that is, it directly affects the compaction of the soil, which leads to a decrease in its fertility.

In our country, as well as in the world, the peak of land reclamation and development of water management is in the 60s and 70s of the twentieth century. In particular, in the early 60s of the last century, large-scale development of new irrigated lands was carried out in order to increase crop yields and maximize profits per unit area based on the use of new technologies (chemicals, mineral fertilizers, pesticides, etc.).

However, by the mid-1980s, the imperfection of irrigation and land reclamation systems in the sector had negative consequences, such as swamping, salinization, and soil erosion, to some extent limiting the country’s ability to implement food security plans. An analysis of the history of land reclamation systems has shown that the development of land reclamation should focus not only on achieving high economic efficiency, but also on ensuring environmental security in the future.

Also, 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.

The results of the analysis show that the main reasons for this are:

- Insufficient mechanism of organizational and economic relations between agricultural enterprises and water management organizations carrying out reclamation activities;

- Inadequacy of the system of efficient and rational use of material and financial resources for reclamation activities, ie the lack of a methodology for directing these funds to the implementation of certain activities;

- low level of administrative and financial responsibility for negative consequences resulting from the use of directed financial resources for reclamation activities and interest in positive results, or lack of regulatory framework for them;

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

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