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DIVISION OF MIRZACHUL OASIS LANDSCAPES INTO NATURAL RECLAMATION ZONES

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ABOUT ARTICLE

Key words: reclamation conditions, intensive drainage, lalmikor pastures, cone spreads, irrigation waters, saline zone, risk of field erosion.

Abstract: The study and assessment of land reclamation is of great importance today, and this article deals with the division of the developed areas of Mirzachul oasis into natural reclamation zones.

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MIRZACHO'L VOHASI LANDSHAFTLARINING TABIIY MELIORATIV ZONALARGA BO'LINISHI

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MAQOLA HAQIDA

Kalit so‘zlar: meliorativ sharoit, intensiv drenaj, lalmikor yaylovlari, konus yoyilishi, sug'orish suvlari, sho'rlangan zona, dala eroziyasi xavfi.

Annotatsiya: Yerlarning meliorativ holatini o‘rganish va baholash bugungi kunda katta ahamiyatga ega bo‘lib, ushbu maqolada Mirzacho‘l vohasining o‘zlashtirilgan hududlarini tabiiy meliorativ zonalarga bo‘lish haqida so‘z boradi.

РАЗДЕЛЕНИЕ ЛАНДШАФТОВ МИРЗАЧУЛЬСКОГО ОАЗИСА НА ПРИРОДНО-МЕЛИОРАТИВНЫЕ ЗОНЫ

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О СТАТЬЕ

Ключевые слова: мелиоративные условия, интенсивный дренаж, лалмикорские пастбища, конусообразные разбросы, оросительные воды, засоленная зона, риск эрозии полей.

Аннотация: Изучение и оценка мелиорации земель сегодня имеет большое значение, и в данной статье речь идет о разделении освоенных территорий Мирзачульского оазиса на природно-мелиоративные зоны.

INTRODUCTION

A number of measures are being taken in the country to use the natural resource potential of the regions on a scientific basis, use modern scientific and technological achievements in their assessment, improve land reclamation, maintain their cadastre, and combat salinization and desertification. The Action Strategy for the Further Development of the Republic of Uzbekistan for 2017-2021 sets important tasks for "further improvement of reclamation of irrigated lands, development of reclamation and irrigation facilities". In this regard, purposeful studies on the assessment and mapping of the reclamation state of the landscapes of the Mirzachul oasis are of great importance.

Research on landscape reclamation of the Mirzachul oasis, including land reclamation in the period before its development, is reflected in the works of N.A. Dimo (1910-1930), M. Reshetkin (1932), D.V. Nalivkin (1928), E. P. Korovin (1935), (1961), I. P. Gerasimov (1937), N. A. Kenesarin (1959), B. A. Fedorovich (1946), (1952), A. A. Yurev (1960) , V.M. Sinitsyn (1962, 1965), G.A. Belenko and S.Kh. Mirkamolov (1965).), G.F. Tetyukhin (1966), A.A. Kurkov (1967, 1968), D.M. Kats (1976), L.N. Babushkin (1964), N.A. Kogai (1964), P .N.Gulomov (1966), A.S.Saidov (1972), P.Baratov (1977), A.A.Rafikov (1976), M.Mamatkulov (1979), S.A.Nishonov (1978), L .A.Alibekov (1982), Yu.B.Rakhmatov (1984), A.A.Abulkosimov (1990, 2006), I.K. Nazarov (1992) and other researchers. However, it should be noted that in most of the above studies, insufficient attention is paid to the formation of oasis landscapes in the region, their morphological structure and mapping, and the assessment of the ameliorative state of oasis landscapes.

THE MAIN RESULTS AND FINDINGS

Based on the typification of territories according to the degree of their complexity, a natural-reclamation zoning of the oasis landscapes of Mirzachul was carried out. The purpose of such zoning is to divide Mirzachul into relatively large areas with similar sets of natural factors that affect the reclamation state of the land and determine the complexity of development and types of drainage. The plain part of Mirzachul, as part of the large foothill Tashkent-Mirzachul depression, is considered by us as a proluvial-alluvial Mirzachul natural-reclamation province, which is characterized by combinations of various types of proluvial-alluvial and alluvial landscapes with secured or very difficult underground outflow of groundwater, a combination of sierozem and

hydromorphic processes. soil formation, poor drainage of the territory, proluvial type of salt accumulation. The province is characterized by a stable arid development of landscapes during the pre-Alpine orogeny, as well as in the Cenozoic, when the main features of modern landscapes were formed. In terms of general reclamation, the province is characterized by complexes of reclamation similar events, due to the similarity of natural conditions.

The division next to the province - the natural and reclamation region itself - is the main specific unit of zoning. With in this section, all the main tasks of the theoretical and practical plan are solved. When singling out areas, the most complete use is made of asya information that can be obtained from the characterization of the natural and economic qualities of the territory. The main data of the forecast of the ameliorative state of lands after the start of irrigation should also be reflected here. For the region, therefore, the whole probable complex of necessary and preventive measures is planned in order to ensure the success of irrigation (Egorov, 1972). The main criterion for identifying natural reclamation areas was the lithological and geomorphological state of the territory, the composition and natural drainage of soils, which determine the secondary salinization of soils. At the same time, the influence of all other natural factors was taken into account.

The areas of the region with the active development of natural processes of agricultural importance were considered as plots.

Thus, the main taxonomic units of zoning were taken as the district and the site, reflecting the current reclamation state of the lands.

I. The area of simple territories (100%) within the foothill and foothill sloping dissected pebble-sandy-loam intensively drained plain, with non-saline typical gray soils and stable deep-lying groundwater. Piedmont and foothill sloping dissected proluvial plains are characterized by intense natural drained areas.

In hydrogeological terms, the area of the district corresponds to the area of supply (piedmont plumes of the Turkestan Range, the mountains of Koitash, Balyklitau, etc.) and transit (head parts of alluvial cones) of groundwater, and in soil-reclamation - to the area of salt leaching. These natural reclamation conditions are favorable for irrigation. However, the lack of local water resources still affects the development of these potentially fertile lands. In the literature, these virgin lands are known as the Jizzakh steppe, 183 thousand hectares of land are suitable for irrigation here. At present, in addition to the Jizzakh oasis (with an area of more than 15 thousand hectares), the main area of the steppe is represented by rainfed pasture lands, where, after irrigation, state farms will be created mainly for cotton-growing specialization.

Due to the high hypsometric position of the territory, irrigation water will be supplied by powerful alluvial installations from the South Mirzachul Canal near the town of Yangiyer.

A cascade of pumping stations and the construction of machine channels DM-3 and DM-4 are being designed. However, when organizing irrigation, one should take into account some natural conditions of the Jizzakh steppe, the underestimation of which over time can lead to serious consequences, both on the territory itself and on the peripheral irrigation arrays. Due to the fact that the surface of the steppe is composed of coarse clastic deposits and is covered with thin loamy-sandy material, it is extremely difficult to carry out irrigation canals without anti-filtration coatings, since on canals with ordinary earth channels, where highly permeable soils are closely located, intensive infiltration of irrigation water is observed, exceeding more than 30% of water intake. According to H.T. Tulyaganov (1971), from 55.5 m^3/sec. Irrigation water will annually lose 16.7% m^3/s to feed groundwater. It should be pointed out that the seepage waters, due to the high inclination of the relief of the Jizzakh steppe, will flow in a northerly direction, i.e. to the saz-saline zone, where a flattening of the relief is observed. This circumstance sharply increases the incoming part of the groundwater balance, which leads to active salt accumulation in the soils of the peripheral strip of alluvial fans.

When irrigating, the erosion hazard of fields should be taken into account, where the surface slope exceeds 0.008 in a large part of the steppe. This contributes to irrigation erosion on the furrows and can lead to the washout of the soil cover, the thickness of which is mainly 0.5-0.7 m, and the exposure of bedrock. In the first years of development along canals and distributors, the development of suffusion-karst processes and subsidence of soils is inevitable. On irrigated plots, it will be possible to develop areal subsidence processes and suffusion phenomena that contribute to the formation of relief microroughnesses on planned fields.

Considering these natural conditions of the area, when designing irrigation systems, attention should be paid to minimizing water infiltration into the ground. In irrigated fields, in order to prevent irrigation erosion, it is necessary to regulate the supply of water to the furrows by improving and mechanizing irrigation techniques. In the reclamation period of the development of the massif, an obligatory part of the reclamation is the leveling of the unevenness of the relief.

II. The area of combination of territories of varying degrees of complexity within a flat intermountain and intercone and undulating sandy-loamy sandy-loamy insufficiently drained plain, with weakly and moderately saline light gray soils and unstable shallow groundwater. The area occupies the middle parts of the alluvial cones of the Zaaminsay, Khodzhamushkentsay, Khavastsay rivers, the ancient alluvial fan of the Sanzar river, the Lomakino plateau, the Koitash-Balyklytau intermountain plain and intercone depressions. These territories are composed of thick strata of loams and sandy loams with a low filtration coefficient, underlain by coarse clastic deposits at a depth of 15–20 m or more. In connection with this, the underground runoff of groundwater is difficult, and evaporation processes begin to prevail over the process of infiltration

and contribute to the accumulation of salt in the soil and groundwater horizons of the aeration zone.

Soils are weakly and moderately saline, and on intercone depressions they are strongly saline. Their salinization is associated with the proximity of groundwater in the past and their relatively shallow occurrence (3-5 m) at the present time. The strong salinization of the soils of the intercone depressions is explained by the intensive accumulation of salts during the period of accumulation of loose sediments in the Quaternary and the modern shallow occurrence of mineralized groundwater (from 1 to 5 m).

At present, due to the lack of local water resources, these territories have not yet been developed for irrigation and are used mainly in rainfed agriculture and pasture animal husbandry. In the future, the virgin lands of the region should be developed under irrigation with the waters of the machine canals DM-2 and DM-3. However, the development of the territory of the region is possible only if additional reclamation measures are applied, since the lack of preliminary preparation of these lands for irrigation will lead to undesirable consequences that will contribute to the loss of lands from economic circulation.

In order to prevent these phenomena and obtain annually guaranteed high yields of agricultural products, depending on the specific consideration of the natural and reclamation conditions of the territories, it is necessary to apply a set of preventive measures. It should be taken into account that during the development of the above-characterized area (I), the inflow of underground runoff of groundwater, located south of this area, increases sharply due to infiltration through irrigation canals and irrigated fields. This circumstance, as well as an increase in infiltration on the territory itself, contribute to a significant redistribution of areas with different depths of the groundwater level. Currently, in the main part of the district, groundwater is below 3 m, and with the development of irrigation, a gradual rise in the level of groundwater in all massifs will begin. As a result, groundwater on these lands will occur at depths of 2-3 m below the surface, which will lead to salt accumulation in soils and groundwater.

There fore, in order to prevent adverse natural processes that occur when the natural-historical conditions of the territories are not taken into account, it is necessary to design hydro-reclamation structures and other preventive measures during the reclamation period of the development of the area. Depending on the hydrogeological conditions of the massifs, vertical drainage and horizontal reclamation canals are built. Thus, the alluvial cones of the Sanzar and Zaaminsu rivers (where there are interlayers of sand and pebbles in the sandy-loamy strata) are favorable for vertical wells, the Koitash-Balyklytau intermountain plain, the Lomakinskoye plateau and the intercone depression between the Dzhizak and Zaaminsu cones are favorable for

horizontal drains. It is advisable to build intercepting vertical wells and deep main collectors in order to intercept seepage water flows.

The complex of preventive measures should also include other measures aimed at weakening the development of unfavorable natural processes; in particular, land leveling, lining of canal beds, the use of new improved types of irrigation technology, saline areas flushing, new methods of soil cultivation, etc. districts.

III. The region of very complex territories (90%) within a flat, weakly dissected clayey-loamy, very poorly drained plain, with desalinating light gray soils, solonchaks, and unstable shallow groundwater, is located in a zone of naturally unsecured groundwater outflow and potential soil salinization. In connection with groundwater wedging out due to backwater by clay-loamy poorly permeable deposits, intensive evaporation of the groundwater surface is observed here, more than 90% of their volume is spent in the central part of the Hungry Steppe. Groundwater and subpressure water are hydraulically interconnected. Soils and soils contain large reserves of easily soluble salts, exceeding more than 100 t/ha in the 0-5 m layer, and 3700 t/ha in the 0-20 m layer, which exceeds the permissible norm by several times. The natural reclamation state of the lands is unsatisfactory.

At present, most of the saz-saline zone has been developed for cotton. The main water source is the South Mirzachul canal with a water flow rate of 300 m3/sec in the head part, the route of which runs through the middle part of the region. Due to the naturally poor reclamation conditions of the territories, drainage networks with a specific length of more than 50 linear meters have been built on irrigated lands. m / ha, and in some places 70-80 linear meters. m/ha. Due to the increase in soil drainage and capital leaching, desalinization of the soils of the root layer is observed. However, despite the artificial state of the land (associated with the insecurity of underground outflow of groundwater and the content of large reserves of salts in the soil), it still remains extremely difficult. Secondary soil salinization and waterlogging are often observed. In irrigated fields, the yield of cotton is still low and averages 18-23 c/ha.

A radical improvement in the reclamation state of lands is achieved as a result of the behavior of the specific length of the collector-drainage network to the design values, i.e. the length of the drains must be brought everywhere to 70-80 linear meters. m / ha, and on highly saline and solonchak massifs more than 100 linear meters. m / ha, with a depth of 4-5 m. In the southwestern (non-irrigated) part of the region, where there are favorable conditions for the machine method of pumping water, it is advisable to combine the construction of horizontal closed drains with vertical wells. In addition, soil desalinization is achieved as a result of washing the fields with large loads of water exceeding 10-25 thousand m3/ha or more.

The application of all these measures and a set of agro-reclamation measures will affect the maintenance of the deep occurrence of saline groundwater, raising salts to the surface of the earth, and will ensure the desalinization of the soil profile.

IV. The area is predominantly very complex territories (85%) of a flat sandy-loamy undrained plain with solonchak light gray soils and unstable deep-lying groundwater. The territory of the district corresponds to the central part of the Mirzachul, where there is a very difficult underground outflow of groundwater. The nature of water exchange is predominantly vertical. The depth of groundwater is 10-20 m, the waters are chloride-sulfate. Soils are characterized by a desalinated surface profile of 1-2, and sometimes 4-5 m, where the amount of dense residue does not exceed 0.1-0.2% by weight of dry soil; soils have increased salinity (more than 1.5%) deeper than this desalinated horizon. The reserves of salts in soils, according to Z.P. Pushkareva (1969), for a 3-meter thickness are 445-577 t / ha, 20 meters - 2750-4118 t / ha. Therefore, during irrigation, it is necessary to maintain a natural desalinated soil layer for normal cotton vegetation. The irrational use of irrigation water against the background of underdeveloped drainage contributes to an intensive rise in the level of mineralized groundwater. As a result, groundwater, dissolving deep-lying salt horizons of loamy-argillaceous strata, leads to the accumulation of easily soluble salts in the root-inhabited horizon of the soil and the formation of solonchaks. In order to prevent these phenomena, at present, an extensive network of collector-drainage systems has been built in the irrigated part of the region, and vertical wells are operating. However, in the developed part of the region, it cannot be said that the entire territory, depending on the specific natural and reclamation conditions, is equally provided with drainage networks and other preventive measures aimed at soil desalinization will be carried out.

The optimal specific length of the drainage network, according to L.A.Skorobogatova (1971), is 60-105 running m/ha, and the western and northern parts of the region (where there are sufficient conditions for pumping groundwater by machine) are favorable for vertical drainage. The service area of one well ranges from 110 to 259 ha. The main task of reclamation of these lands is to maintain the natural automorphic regime of soil formation, which is to maintain the groundwater level in the range of 9-10 m and deeper. Under the sierozem-meadow reclamation regime, progressive salt accumulation is observed in soil horizons, which is not favorable for irrigated agriculture. In this regard, bringing the length of the collector-drainage network to the design values and creating conditions for the trouble-free operation of vertical wells contribute to maintaining and further increasing the desalinated surface profile. The success of these works is strengthened by the use of the most advanced irrigation technology, which ensures a minimum of filtration losses.

V. The area is predominantly very complex territories (85-90%) with a wide development of weakly and medium-dissected drainless channel-like gypsum-loamy-clay depressions with saline solonchak gray soils and solonchaks and stable shallow groundwater. The territory of the region is characterized by two types of modern salt accumulation: a) deep progressive salinization for areas of depressions with deep groundwater and salt accumulation in the lower soil horizons and b) surface salinization in areas of depressions with shallow groundwater.

The slopes of depressions with a slight outflow of groundwater and solonchak light gray soils containing up to 900 t/ha of salts at depths of 0-3 m are most suitable for development (Pushkareva, 1966). Currently, only 17% of the district's territory has been developed. The ameliorative state of irrigated lands is predominantly unstable and extremely unstable, and the yield of cotton is 12-19 q/ha. In the future, about 25 thousand hectares of land suitable for irrigation (primary solonchaks with large salt reserves) can be developed within the region.

VI. Area of complex (60%) and very complex territories of predominantly weakly dissected drainless channel-like gypsum-loamy depressions with desalinating meadow-serozem soils and solonchaks and steadily shallow groundwater. The area occupies the Shuruzyak depression. The outflow of groundwater is carried out with the help of a dense network of collectors and vertical wells. The artificial outflow of groundwater has drastically changed the former water-salt regime of the territory. Progressive salt accumulation has now been replaced by progressive deep desalination and the improvement of the ameliorative state of lands is still unstable, as evidenced by insufficient desalinization of soils, their salinization in local areas, as well as low yields of cotton (17-22 centners / ha).

With in the district there are about 11 thousand hectares of land suitable for development, but 80% of them are highly saline. The involvement of these lands in economic circulation is possible only after high-quality land planning, vertical drainage and preliminary washing of soils with large water rates.

VII. An area with a predominance of complex territories (80%) within a flat, sometimes dissected, loamy-sandy loamy and gypsum-clayey very poorly drained plain with variously saline light gray soils in combination with secondary solonchaks and steadily shallow groundwater. The territory of the district occupies the old irrigated parts of the third terrace of the river. Syrdarya. Due to the weak, in some places extremely difficult outflow of groundwater, this area is characterized by a water-salt regime of periodic salinization during the growing season and desalinization; preventive measures are needed: horizontal drainage of considerable length, vertical wells, annual winter leaching of saline soils, grass-cotton crop rotations. Here, the specific length of the drainage network for 1/1 1970 was more than 26 linear meters. m/ha. But it should be borne in mind that the ameliorative state of lands improves slowly, often the desalinization of

soils in some areas causes secondary salinization of others. The yield of cotton ranges from 15 to 26 q/ha. The complexity of improving the reclamation state of lands lies in the significant salinity of soils in the thickness of 0-5 m, where salt reserves are 750-800 t/ha (Pushkareva, 1966).

At present, in the old irrigated part of the district there are about 15 thousand hectares of shifted virgin lands, 85% of which are suitable for irrigation, they are represented by highly saline soils and solonchaks of secondary origin. The development of these lands is possible by increasing the drainage of the territory with hydroreclamation facilities and preliminary capital flushing with large volumes of water.

VIII. The area of combination of territories of varying degrees of complexity within the flat and wavy loamy-sandy loamy, less often sandy, insufficiently drained plains with drying oxbow lakes and swamps, slightly saline meadow-serozem and meadow soils. The lands adjacent to the cliffs of low terraces naturally drain and, with proper irrigation, are desalinated. The yield of cotton in the system of grass-field crop rotation is high - 25-30 q/ha. The rear parts of the terraces are poorly drained with a water-salt regime of periodic salinization during the growing season and desalinization during the non-vegetation time. Here, additional drainage of a relatively small length is needed. Deep drainage in these areas is irrational, as it can cause the soil to dry out, which will increase water consumption for irrigation.

Ridges, hills and other fairly oshushenny massifs are favorable for cotton crops, leveled areas and depressions are favorable for alfalfa and corn, relief elevations are favorable for fruit plantations, drained oxbow bogs and lakes, coastal tugai lands are favorable for rice planting.

Within the district, more than 20 thousand hectares of land are suitable for regular irrigation, of which 34% of the area is occupied by highly saline soils and solonchaks of secondary origin with groundwater at a depth of mainly 1-2 m from the surface. All currently drained lakes and swamps are promising for rice cultivation, and the collector-drainage network under construction is for muskrat breeding.

CONCLUSION

The selected areas cannot be considered as isolated units, since they are genetically related to each other. Therefore, any change and non-compliance with the planned complex of melioration in one area will require their revision as a whole throughout the entire Mirzachul. For example, the development of rice cultivation on newly irrigated areas or excessive water consumption on the flat part of the terraces will cause a deterioration in the reclamation state of lands in the neighboring area of channel-like depressions. Consequently, the planned complex of differentiated reclamation measures should be carried out simultaneously throughout the entire territory of the Mirzachul oasis.

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