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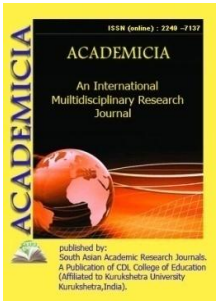

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SOME ISSUES OF IMPROVING THE HYDRO GEOLOGICAL CONDITIONS OF THE SOILS OF KARAKALPAKSTAN

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ABSTRACT

The article deals with lithological, geomorphological and hydrogeological conditions of the soils of the Republic of Karakalpakstan. According to the topography of groundwater, the causes of changes in their location and the laws of formation are studied. In protected areas located in irrigated areas, groundwater averages 1-2.5 m. around, their highest stay corresponds to the period of saline washing and vegetative irrigation.In Chimbay, Bozatov, Kungrad, Takhtakor, Shumanay and Karaozak districts, the average groundwater level is 2.5 m. stands at. In the former coastal areas of the dried bottom of the Aral Sea, the average groundwater level was 1.5-2.0 m.

KEYWORDS: *Delta-Alluvial Plains, Groundwater, Hydrogeological Conditions, Chemistry And Type Of Salinity, Relief*

INTRODUCTION

The Republic of Karakalpakstan occupies the Amu Darya delta, the southern part of the Aral Sea and the adjacent regions of Ustyurt and Kyzylkum. Karakalpakstan is a country of large and far from fully utilized opportunities for the development of diversified agriculture. It is based on oasis, irrigated agriculture. But due to the presence of vast pastures, reed thickets and numerous reservoirs, agriculture here is uniquely combined with semi-stale animal husbandry, as well as fishing, hunting and fur farming [1; 2].

The object of research and their methods of implementation

According to climatic conditions, the territory of the Aral Sea is located in the northern part of the subtropical and in the southern part of the subboreal subzone of the desert zone of Central Asia. The average annual air temperature in July reaches 25.8-28.1 °C, with an absolute maximum of 41-42 °C. The wide annual range of temperature fluctuations from absolute maximums to minimums indicates a sharp continental climate.

The territory of the Aral water area is located on ancient, old and partly on relatively young surfaces of the Amu Darya delta. Ancient and old surfaces long ago emerged from the influence of flood floods and at a certain stage of their development - even before their irrigation development - went through the stages of drying and desertification. This area, like the entire former “living delta”, has dried up and is now undergoing intense desertification.

The research is based on the comparative-geographical method, taking into account the conditions of soil formation, which will make it possible to study the genesis of soils in the main directions of the soil-forming process. In the field studies, morphological methods were used to ensure the reliability of field diagnostics of soils and their main morphogenetic properties. Laboratory and analytical studies on selected soil samples were carried out at the analytical center of the Research Institute of Soil Science and Agrochemistry according to generally accepted methods [3; 4; 5].

Results of the study

The hydrogeological and meliorative conditions of the region are unfavorable, which is caused by the extremely difficult general groundwater runoff. This is facilitated by the weak slopes of the delta, the composition of the soil-forming rocks, characterized by high dustiness, and the structure of the soil-soil strata, characterized by the absence of continuous drainage layers. Therefore, the depth of occurrence and the regime of the groundwater level here are determined by the ratios of their arrival and discharge.

The groundwater level in different parts of the Amu Darya delta is different and depends on the degree of development, watering and drainage of the territory. On irrigated areas and virgin-fallow lands located among them, it fluctuates within 1-2.5 m. Their highest standing falls on the periods of leaching and vegetation irrigation. On the periphery of the oases in Chimbay, Bozatau, Kungrad, Takhtakupyr, Shumanay and Karauzyak districts, groundwater occurs at a depth of 2.5-4 m.

The almost stagnant nature of groundwater, when its consumption is mainly for evaporation and transpiration by vegetation, determines their variegation in terms of the degree of mineralization,

which ranges from slightly saline to brines (on virgin lands), especially this phenomenon is observed on the old coast of the Aral Sea (depth of ground water 1, 5-2.0m).

Over the past 30-35 years, studying and comparing soil maps and other materials, it can be established that automorphic - takyr and semi-hydromorphic - takyr-meadow soils, which dominated in the Aral regions and occupied significant areas in other regions, over the past decades have largely evolved into meadow soils are typical representatives of the hydromorphic series [6; 7; 8]. After a sharp decrease in the water content of the Amu Darya and the global drying out of the floodplain-alluvial plains, meadow and bog-meadow soils, drying and desertification, evolved into meadow-takyr (kinky residual-meadow and residual-boggy) soils.Here, slightly saline and non-saline (washed) soils occupy more than 27.3% of the area, but the prevailing area of land is saline in an average (37.4%) and strong (35.3%) degree. Particularly unfavorable land reclamation is observed in Muynak, Karauzyak, Kegeili, Bozataus, Kungrad and Takhtakupyr districts, where the share of highly saline soils reaches 43-86%, and slightly saline and washed soils - 12-23%. The reason for this situation was, first of all, the poor condition of the collector-drainage network, as well as under-washing and under-watering caused by a shortage of irrigation water.

The Amu Darya delta is characterized by a relatively homogeneous leveled surface with a general slight slope (0.00010-0.00020) from the top to the mouth. The flatness of the relief is only slightly complicated by elevated stripes along the numerous active and dead channels and extensive inter-channel depressions. The height of the riverbed shafts depends on the size of the channel and the position in the delta. In the upper reaches, they have a height of up to 4-6 m, and in the lower reaches, where the river-side banks are located, in the stage of formation, their height rarely exceeds, 1-2 m.The width of the riverbed shafts also depends on the above reasons and ranges from hundreds of meters to several kilometers. In the areas of the modern delta of the Amu Darya, the riverbed swells of dead channels are natural dams that determine the spread of flood floods. In river valleys, the farther the terraces are from the channels, the higher and older they are. In the delta, however, all the difference in relief is associated with the uneven accumulation of alluvium. In the immediate vicinity of the channel during flood floods, the maximum amount of material suspended in the water is deposited, and in the distance it is minimal, but both the riverbed swells and the inter-channel depressions are of the same age. To the south of Nukus, the current bed of the Amu Darya is cut into the alluvium. There are no near-river banks along the river in this area, and even a floodplain terrace stands out. There are areas of hilly and ridge sands scattered throughout the delta, rising above the plain from 2-3 to 6 m and more.

By genesis and relief, two types of sands are distinguished: hilly and cumulus gray mica sands formed by crumbling alluvial deposits, ridge-hilly reddish sands of bedrocks carried by the wind from the Kyzylkum plateau [9]. Reddish sands are distributed mainly on the alluvial plains adjacent to the Kyzyl Kum. In areas of intensive farming, the delta-alluvial relief is significantly transformed. As a result of the field leveling, the unevenness of the relief is leveled, and with prolonged cultivation due to agro-irrigation sediments, the surface of the inter-channel depressions slightly increases.

The high turbidity of the Amudarya water contributes to the rapid siltation of the canals. Therefore, in irrigated areas, there are often accumulations of irrigated sediments, thrown out

during cleaning. The complexity of the geological and geomorphological structure of the territory of Karakalpakstan has also caused an extraordinary variety of its hydrogeological conditions. Ground waters of different age and structure areas have different feeding areas, depth of occurrence, chemistry, salinity, etc. Delta-alluvial plains, composed of loose sandy-clayey strata, for example, have a single hydraulically connected groundwater table.The sources of groundwater supply here are the waters of the Amu Darya, which come in the form of a ground flow from the channel, as well as from flood floods and irrigation canals. Therefore, remote feeding in the form of groundwater transit prevails.

The formation and regime of groundwater in the area under consideration is largely determined by its lithological and geomorphological features, climate and groundwater regime. Due to the small slopes of the terrain, high dustiness and sharp stratification of soils, showing to some extent the properties of a "layered screen", there is an extreme difficulty in the total underground runoff. The speed of movement of the soil flow is measured in tens of centimeters per year.The formation and regime of groundwater in the area under consideration is largely determined by its lithological and geomorphological features, climate and groundwater regime. Due to the small slopes of the terrain, high dustiness and sharp stratification of soils, showing to some extent the properties of a "layered screen", there is an extreme difficulty in the total underground runoff. The speed of movement of the soil flow is measured in tens of centimeters per year.

Studies have shown that the complexity of the geological and lithological-geomorphological structure of the territory of Karakalpakstan has led to the extraordinary diversity of its hydrogeological conditions. Ground waters of different age of development and structure of soils have different sources of nutrition, depth of occurrence, mineralization, salinity chemistry, etc. The main source of groundwater supply is the water of the Amu Darya, coming in the form of a ground flow from hypsometric, higher located territories, as well as filtration water from irrigation canals, irrigation networks and irrigated areas [10].

The hydrogeological conditions of the territories of the Republic of Karakalpakstan contributed to the fact that the formed groundwater, as well as a large amount of surface irrigation water, do not have sufficient runoff and are spent mainly on evaporation and transpiration. Infiltration waters, superimposed on the groundwater, raise the groundwater level. The conditions of the local outflow of groundwater, provided by the outflow, determine the different rate of this rise. The depth of the groundwater level in the main part of the irrigated area, at the end of the growing season of agricultural plants, is above the critical2.5-3.0 meters, during vegetation irrigation this figure is 1-2 meters.

The ground waters of the delta-alluvial plains have different mineralization. There are both fresh, containing less than 1 g / l of salts, and brines with a salt concentration of more than 110-120 g / l. In general, groundwater salinity increases with distance from food sources. In March-April, when there are massive leaching of lands before sowing, the water table rises throughout the oasis. Further, with an increase in temperature in the month of May, evaporation increases, and from the second half of June - and transpiration, as a result of which the groundwater level gradually decreases. In autumn, starting from the month of October and in winter, groundwater is the lowest.

Periodic studies of the soil cover indicate a deterioration in the subsequent years of the qualitative state of lands in all territories of the Aral Sea. This is due to the increasing processes

of soil salinization, an increase in groundwater, the development of wind erosion and desertification, which together leads to soil degradation.

In this regard, it is necessary to develop agricultural measures for the conservation and protection of soils. The main measures for soil protection are: A set of agrotechnical measures, a set of reclamation measures and a set of anti-erosion measures.

CONCLUSION

Unfavorable hydrogeological conditions, despite artificial drainage, create preconditions for a rise in the level of saline groundwater and the appearance of secondary soil salinization in irrigated areas. To maintain the groundwater level below the critical depth, annual cleaning, if necessary, and the installation of new additional drainage is necessary. To remove toxic salts from the root layer, high-quality flushing is also necessary.

When installing the irrigation regime, it is necessary to be guided by the hydromodular zoning, which gives the calculated irrigation rates, irrigation schemes and irrigation rates, the use of which, against the background of an efficiently working collector-drainage network, will allow the groundwater to be kept below the critical level. The widespread introduction of crop rotations as a powerful means of improving the reclamation state of soils and increasing their fertility. To carry out a complex of anti-deflationary measures on sandy-sandy soils and sands.

Thermal resources will make it possible to grow here under irrigation conditions medium-fiber varieties of cotton, as well as grain, vegetables, melons, fruit, fodder and other agricultural crops; even in these territories, gardens, vineyards and others can be created.

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