Climate conditions, hydrogeology and meliorative conditions of serozem -grass soils of mirzaabad district, sirdaryo region

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Abstract. This in the article Mirzaabad district of Sirdarya region serozem - meadow determining the current state of soil fertility and land reclamation, as well as their effective use events about data given.

1 Introduction

Planned measures are being taken in Uzbekistan to protect the environment, rational use of various natural lands, etc. These measures reflect the desire to harmonize human economic activity with the laws of nature.

Such important measures include the rational use and protection of land, protection from water and air pollution, rational use and reproduction of natural resources.

In modern science, in order to solve the most important problems of agriculture, and fertility in particular, it is necessary to deeply know all the factors acting on the soil, their interaction with each other and with environmental factors. By identifying positive relationships, it is possible to directly influence them in order to increase soil fertility. In solving this general problem, an important place is occupied by the study of the biological properties of soils [3,5,7].

According to the International Institute for Environment and Development and the World Resources Institute, about 10% of the surface of the continents is occupied by saline soils, which are mainly distributed in arid regions. A serious problem of salinization is manifested in 75 countries of the world. Of the total area of irrigated land in the world, more than 25% (according to some data, about 40% are saline). The problem of salinization is also relevant for our country, where 49% of irrigated land is subject to salinization. In the Syrdarya region, about 60% of the lands are salinized to varying degrees and are subject to degradation [2,3,7].

It can be seen that the issue of effective use of irrigated land in agriculture is urgent, and it is important to determine its productivity and production capacity, and to develop measures for effective use of soil [8].

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2 Research object and methods

The object of the study is the irrigated degraded sierozem-meadow soils of the Syrdarya region. In the soil sections of the irrigated land areas of Mirzaabad district, their morphological structure and other special features were recorded in the field notebook, and soil samples were taken from some sections for chemical analysis in order to study the land areas of farms. the mechanical composition of the soil, humus (humus), the amount of mobile phosphorus, potassium and water-soluble salts, the types and levels of salinity, the depth of placement of gypsum and stone-gravel layers, their quantitative indicators, leaching, density levels and other data were analyzed [1,4,6].

In research genetic-geographic, profile-geochemical, stationary - field and chemical - analytical of methods is used. The research was carried out in field, laboratory and chamber conditions according to the standard methods generally accepted in soil science, and chemical analyzes were carried out in a laboratory with an international ISO certificate in the field of soil science, including taking soil samples, storing them, conducting laboratory experiments GOST:17.4 .3.01–83 Interstate standard, study of soil properties with disturbed fertile layer GOST:17.4.2.02–83 Interstate standard, chemical analysis of the soil was carried out using YV Arinushkina's guide called "Chemical composition of the soil": calcium, magnesium content in soils GOST 26428-85, gypsum content express method, water absorption, pH -environment GOST 26423-85, soil density GOST 5180-84, the amount of humus was determined by the Tyurin method based on the international standard GOST 26213-91, the mechanical and granulometric composition of the soil was determined by the Kachinsky method based on the state standard O'zDSt 817-97. Statistics processing was performed using the Microsoft Excel program based on the BADospekhov method .

3 Results and discussion

Mirzaabad district is geographically located in the southeast of the Republic of Uzbekistan, in the beginning of the Mirzachol plain and in the foothills, with an average height of 250-350 метрabove sea level. Administratively, Mirzaabad district borders Khavos district to the south, Gulistan and Boyavut districts to the east, Aq Otylin and Sardoba districts to the west, and Sirdarya districts to the north.

Mirzaabad district is zonally and climatically located in the serozem soil region of the semi-desert zone of Central Asia. Agro-climatic indicators of Mirzaabad district are presented in the average annual indicators of the following meteorological stations.

Climatic indicators indicate that the region has hot and dry summers, moderate winters, and large daily and annual temperature fluctuations. The average annual air temperature of the district is around +12.9-14.9°. The highest temperature is in June-July, it is +25.4-29.5°C, and the coldest temperature is in December-January, around 1.8-0.1°C. The decrease in temperature in winter is due to the influx of cold air currents from the Fergana Valley and the north. The soil temperature (in the driving layer) is -2.0-0.2°C in January, on average, the soil surface freezes, which causes difficulties in plowing and washing the soil. The duration of frost-free days is 200-236 days. The first frost occurs in November, and the last frost occurs in February.

Mirzaabad district is located in the zone where strong wind movements intersect, and the area is strongly influenced by the eastern (Bekabad wind) winds. The main part of the wind blows more from the east and is most common in May-June. The wind speed is 3.2 per second 5,0 м. reaches.

The average height of Mirzachol 300 мis 250 above sea level, and the highest part is in the southeast, that is, near the beginning of the irrigation canals, and its height 350 мis in the north-west, that is, in Mirzachol, the lowest land of the depressions (Sardoba) and

shohoks is above sea level 230 м. The Mirzachol plain decreases to the north and northwest.

The relative humidity is not high, the air has the lowest humidity in June-August, and the annual average humidity is around 31-48%. The increase in air temperature during the summer months leads to more evaporation of moisture, which in turn is much more than the annual average of atmospheric precipitation. This phenomenon of nature leads to salinization of the soil and increased demand of crops for water. Despite such negative aspects of the weather, the agrolandscape of the Mirzaabad district is favorable for the cultivation of almost all agricultural crops. The first frost falls on October 20-28. The sum of useful temperatures in April-October is equal to 4600-4800° (Gulistan).

Most of the precipitation falls in the winter-spring months, the least amount of precipitation falls in the summer-autumn months. Relative air humidity in summer reaches from 26-27% to 46-47%. Therefore, water retention from the soil surface 460 ммreaches 450, and evaporation is several times more than the amount of annual precipitation. In the foothills close to the surface, the ground water is strongly connected and the soil is attracted to salinity. The soil temperature up to a depth of one meter has been warmed throughout the year at different levels.

In summer (VI-VIII), the soil surface is 29-36° (monthly average), but in some years its temperature 30^0 rais hot. In winter, in November-January, the soil freezes to a depth of 40 cm in some years. The natural and climatic conditions of the sub-mountain plains of the district are favorable for the development of cotton and other irrigated farming industries.

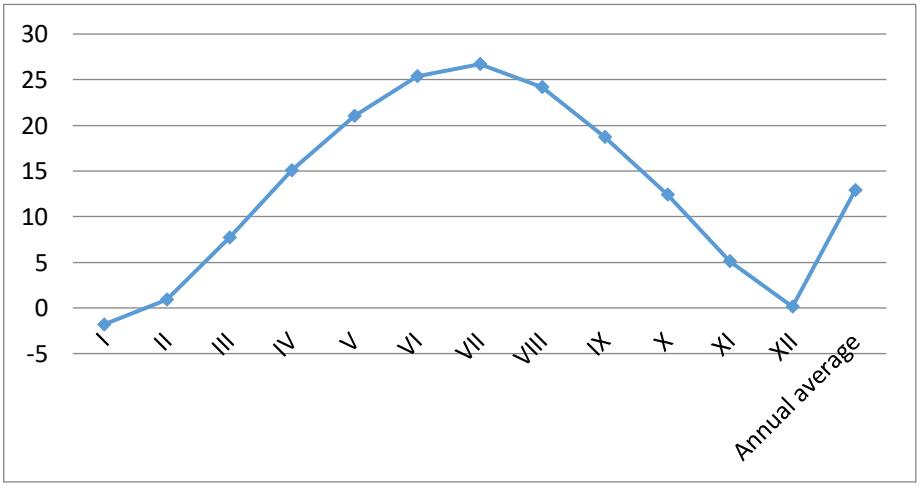

Fig. 1. Air temperature , ° S

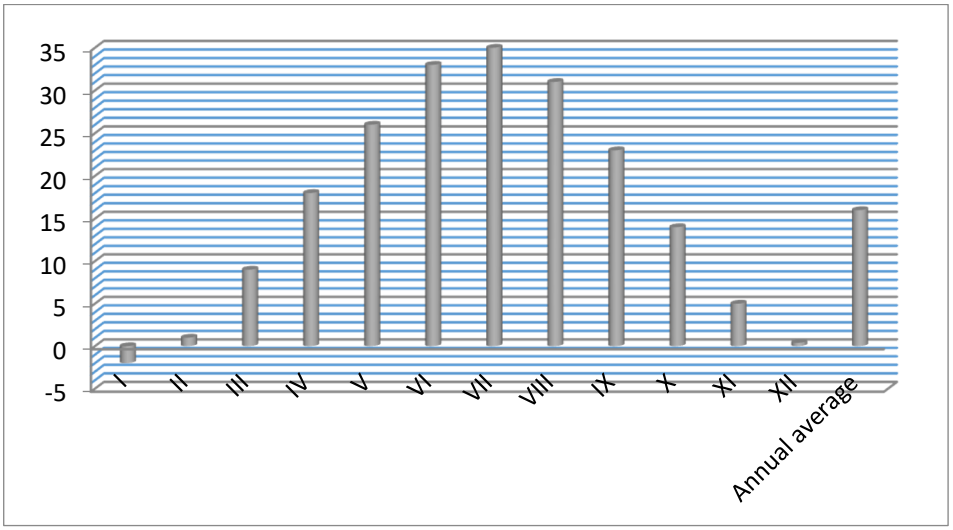

Fig. 2. Soil temperature , ° C

Hydrogeological conditions are one of the factors of the modern soil formation process. The main source of groundwater in the district is surface, underground and atmospheric precipitation. All underground waters in the territory of Syrdarya region move slowly from the south-east to the north-west under the overall very small slope (0.006°). As a result of very slow natural movement of underground water in the region of the district, there is a process of water exchange or evaporation, which may have resulted in secondary salinization of the soil. The rocks of Mirzachol underground water are crushed (Quaternary) deposits, 300 мreaching its thickness, it consists of sands, clays, loams, sands, sometimes stones and gravels. (11111). This was also caused by the poor functioning of the ditch system. The district has a lot of land with varying degrees of salinity, so the land reserves used for agricultural purposes can be reached only through the continuous use of modern reclamation measures, mainly salt washing and cleaning of the drainage system.

Groundwater level in Mirzaabad district varies according to water availability, water carrying capacity and geomorphological conditions at the present farming stage. The level of underground water is 1- 2.5 m, in the central parts it is 2-2.7 m, and it is a little higher in depressions and depressions. Mineralization of groundwater in irrigated areas ranges from 3.90 to 20.34 g/per liter. The most /mineralized underground water is found around 5.3-9.7 g per liter.

The main sources of groundwater are surface water, seepage from irrigation systems, and irrigation water from fields. The period of the highest level of underground water corresponds to the periods of salt washing and vegetation irrigation. The level of mineralization of underground water during this period is at the lowest level, and currently it is affecting the areas of the southeastern part of the district with grassy soils.

Thus, the order and mineralization of underground water in the territory of the district is primarily influenced by irrigation and human factors. For example, according to our research, the process of secondary salinization is increasing as a result of inadequate management of groundwater as it seeps into the upper layers of the soil. Hydromorphic (moist) soil is being formed in the current stage of agriculture in the district. It is also related to the rise of underground water in many areas of the region.

The main source of groundwater saturation is groundwater flowing from the foothills and surrounding mountains, as well as water seeping into the ground from irrigation networks and irrigated fields. In the main part of the irrigated area, the groundwater level

(regime) and mineralization are closely related to the economic factors of irrigation. When the groundwater is high and the main part of it evaporates, the process of aeration in the soil becomes active.

Irrigated serozem-meadow soils are changing from serozem soils to grasslands by origin. These soils are distributed in all massifs of Mirzaabad district. The region of serozem soils in the sub-mountain plains and sub-mountain plains, the region of light serozem soils, in the Central Mirzachol plain, as a result of disturbance of the balance between the flow and outflow of groundwater and its resurgence, as a result of extensive irrigation constructions, as well as irrigated as a result of the development of protected and abandoned lands serozem-meadow soils are formed. Residual signs of these soils can be seen in the presence of a light-colored humus layer and a weak accumulation of carbonates. Due to the rise of underground water, capillary moistening of the deep layers of the soil occurs. The lower layers of the soil may become serozem, and clay layers with serozem green spots may also appear. A light serozem humus layer can be seen in the upper layers of the soil and the amount of humus is around 0.77-1.09. Mobile phosphorus is 4.54-13.10 mg/kg, potassium is 59-164, sometimes 237-264 mg/kg. Below them lies a carbonate layer and they make up 7-9%. Groundwater 3 мis at a depth of 2.5 and rises up periodically. These soils are prone to rapid salinization and are saline in chloride-sulfate and chloride type.

The irrigated serozem-meadow soils of the submountain plains are sometimes weakly washed, weakly and moderately saline, and weakly, moderately and strongly saline in the Central Mirzachol Plain. Most of them are weakly sometimes moderately plastered.

In the district, 30.9% of weakly saline soils, 40.9% of moderately saline soils, 15.7% of strongly saline soils, and 11.6% of very strongly saline soils.

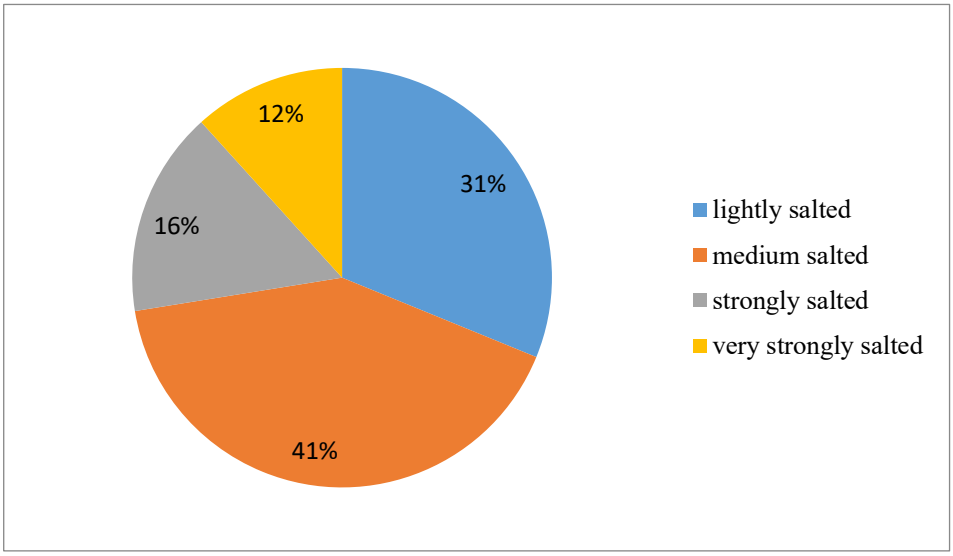

Fig. 3. Salinity level of irrigated soils of Mirzaabad district

4 Conclusion

The irrigated soils of Mirzaabad district are developing in semi-hydromorphic and hydromorphic conditions. The high groundwater level has led to the activation of the salinization process in irrigated soils, causing semi-hydromorphic and hydromorphic conditions. All the irrigated lands of the district currently remain as areas of varying

degrees of salinity. According to the researches and observations of recent years, as a result of insufficient soil irrigation and salt washing, it was found that the underground water mineralization and its level have temporarily increased up to the plant root system. Soil salinity is around 0.4-1.6 and 1.6-1.9%, which fluctuates at different levels during plowing and soil section. Different levels and types of salinity, salt layers can also be seen in irrigated soils.

The physical-water properties of the irrigated soils are different, depending on the lithological-geomorphological conditions and soil genesis of the place, as well as its salinity and mechanical composition.

District irrigated soils are very low in mobile potassium forms and poorly supplied with mobile phosphorus.

The irrigated meadow soils of the district are under-supplied with humus, and the remaining soils (serozem-meadow) are classified as very under-supplied soils due to changes in moisture conditions. Over the years, it was found that the amount of humus fluctuates during periodic observations. It depends on the amount of plant residues on the soil and the quality of agrotechnics, but in most massifs, the soil's demand for local mineral fertilizers remains unsatisfied.

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