

SALINITY LEVEL AND ANALYSIS OF IRRIGATED SOILS OF KHAVOS DISTRICT

Xayitboyeva Nodira Alimkulovna

Yangiyer branch of Tashkent Institute of Chemical Technology

Abstract: The article presents data on the salinity level of irrigated soils of the Khavos district. The weakly saline areas of the region correspond to the “Farkhod” and “Bobur” massifs. Moderately saline areas are most common in the Kh.Norchayev and “O’zbekiston 5 yilligi” massifs, occupying a larger area than weakly saline soils. The main areas of strongly saline lands correspond to the “Pakhtakor” and “Yangiyer” massifs. These massifs are considered the most difficult areas in terms of land reclamation.

Keywords: gray-meadow soil, salinity, highly saline, moderately saline, weakly saline, carbonate, chlorine, sulfate, calcium, sodium.

One of the factors that negatively affects soil fertility and crop yields is soil salinity. There are several factors that cause soil salinity, the most important of which is the increase in the level of mineralized groundwater. In the conditions of Mirzachul, before irrigation, the groundwater level was deep, but the level of mineralization of the groundwater was high.

Many scientists have studied the effects of salinity on plants. The effect of salt on cotton begins with the planting of seeds. Seeds that fall on saline soil do not germinate. Due to salt, the germination capacity of seeds decreases sharply. As a result, in highly saline lands (on poorly washed soils), seedlings become sparse and their thickness decreases. Salinity has a comprehensive effect on the plant, disrupting biochemical and physiological processes in its body. The water and nutrient regime of the plant changes negatively. The processes of photosynthesis and respiration slow down, metabolism slows down, the accumulation of organic matter slows down, and water evaporation from the plant decreases [1,2,3,4,5,6,7,8,9].

Over-irrigation, irregular, and excessive irrigation practices lead to rising groundwater levels and secondary salinization of soils. Toxic salts (mainly sulfates and chlorides) formed in the upper soil layer prevent the normal development of plants and cause their death. All irrigated soils in Central Asia, including Uzbekistan, are actually naturally saline.

Even when the fight against salinity is carried out, these soils remain prone to salinization. Experts have determined the most optimal methods of irrigation. This takes into account the depth of groundwater, the degree of mineralization, and ways to desalinate the soil. As is known, deep open, closed ditches or steep ditches are used to irrigate cultivated areas. The ditches reduce the pressure of groundwater and flush out toxic salts dissolved in water. Timely and high-quality salt leaching also gives positive results in the fight against soil salinity.

As a result of the large-scale development of irrigated agriculture, if reclamation work is not carried out on previously cultivated and newly developed lands, they often deteriorate, and this situation has led to negative ecological processes that did not exist before. These are mainly due to the high salinity of developed lands with low water requirements, and in some cases, due to the increase in toxic salts in

the soil as a result of irrigation of crops with saline water. Therefore, one of the ecological problems of irrigated lands is to improve the reclamation state of the soil and prevent salinization.

In addition to the amount of salts, their composition and ratio also have a strong effect on cotton. For example, chloride salinity has a stronger effect on cotton than sulfate salinity, and can even inhibit plant growth. Low levels of chloride salinity also have a negative effect on cotton.

In saline soils, the amount and ratio of mineral elements in cotton is disturbed. In the cotton body, silicon, chlorine, phosphorus, magnesium, sodium increase, while potassium, sulfur, manganese, and especially calcium decrease, and cotton feels a need for these elements. As a result, the metabolic process worsens. Cotton is one of the calcium-loving plants. It absorbs nitrogen and calcium in equal amounts. However, due to the abundance of calcium in our soils, its deficiency is not noticeable. At the same time, in saline soils, cotton cannot absorb calcium, which is why plant roots are damaged. When there are a lot of toxic salts in the lower layers of the soil, the roots do not develop well.

Soil salinity not only negatively affects cotton yields but also impairs its quality. Cotton fiber grown in saline conditions shortens in length and reduces fiber firmness.

Soil moisture is important for plants to tolerate salt. If there is sufficient moisture in the soil, plants' salt tolerance increases. Of course, soil fertility, organic matter content, and its abundance reduce the negative effects of salt on crops.

The salts contained in the water used for irrigation also play a significant role in soil salinization and salinization. Because as a result of repeated irrigation of the fields, salts accumulate in the cultivated areas. As can be seen from the above considerations, various reasons can affect soil salinization. In this case, climatic conditions, soil type, groundwater recharge, improper use of water, and other factors may be involved. The water-soluble salts in saline soils used in irrigated agriculture mainly consist of 3 cations (Na, Mg, Ca) and 4 anions (Cl, SO₄, CO₃, HCO₃). The most harmful and dangerous salt is Na₂CO₃. Soda forms NaOH in aqueous solution, which is very toxic to plants. Chloride salts, which are in the next place, are also extremely toxic to plants. Sodium and magnesium sulfates are not inferior to them in terms of their toxicity. Gypsum (CaSO₄) and lime (CaSO₃), which are poorly soluble in water, are harmless to plants, even if they are abundant in the soil. Calcium carbonate - Ca(HCO₃)₂ also does not harm plants.

Analysis of the salinity level of the soils of the Khavos district shows that the main area of the territory corresponds to weakly saline areas. 23,370 hectares of land correspond to weakly saline areas. This indicates that 60 percent of the district's land is weakly saline. The weakly saline areas correspond to the "Farkhod" and "Bobur" massifs.

The average saline areas are 13,669 hectares, or 35.5 percent. The average saline areas are most widespread in the Kh. Norchayev and "O'zbekiston 5 yilligi" massifs, occupying a larger area than weakly saline soils.

Strongly saline soils account for 1,313 hectares. Such saline soils are not found in all massifs. The main areas of strongly saline lands fall on the "Pakhtakor" and "Yangiyer" massifs. These massifs are considered the most difficult areas in terms of land reclamation.

Results of water absorption analysis of soils in the Khavos district

Don't cut №	Depth, cm	Dry residue	HCO ₃	Cl	SO ₄	Ca	Mg	Na	Salinity	
									type	level
1	0-18	1,033	0,019	0,011	0,661	0,262	0,017	0,024	s	average
	18-45	0,822	0,024	0,008	0,512	0,174	0,014	0,022	s	weak
	45-68	0,881	0,022	0,008	0,594	0,233	0,011	0,015	s	weak
	68-109	0,925	0,019	0,009	0,615	0,249	0,010	0,008	s	weak
	109-118	0,825	0,022	0,008	0,471	0,212	0,008	0,007	s	weak
2	0-22	0,806	0,024	0,009	0,456	0,179	0,008	0,021	s	weak
	22-46	0,718	0,023	0,007	0,433	0,174	0,007	0,009	s	weak
	46-73	0,691	0,023	0,008	0,431	0,163	0,008	0,012	s	weak
	73-114	0,622	0,022	0,009	0,572	0,211	0,012	0,018	s	weak
	114-121	0,705	0,020	0,006	0,564	0,233	0,007	0,016	s	weak

The dry matter content in the top layer of section 1 is more than 1 percent, the chlorine content is 0.011 percent and belongs to moderately saline soils. The remaining soil in the depths of the sections belongs to weakly saline soils. The salinity type is sulfate.

To summarize, the soils of the Khavas district are located in complex land reclamation conditions. This district also has soils that are difficult to reclaim with strong salinity, which has led to a decrease in humus and other nutrients in the soil.

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