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ASSESSMENT OF LAND RECLAMATION CONDITION OF MIRZACHOL

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Abstract
Based on field soil-ameliorative and laboratory-analytical studies, the main properties and ameliorative state of the soils of the foothill plain of the Mirzachol Steppe have been studied, within the territory of the Djizak steppe. The characteristic of the modern salt accumulation is given in connection with the development of irrigation of the territory, as well as the peculiarities of the manifestation of secondary salinization on irrigated lands.

Keywords: foothill plains, irrigation, mechanical composition, ground water, secondary salinization, ameliorative state of soils, degradation, amelioration.

Introduction

In view of the absence of large water arteries, the need to supply irrigation water here by pumping and the availability of more convenient for irrigated farming in the Mirzachol steppe, the development of irrigated agriculture and irrigational land improvement in the Djizak steppe hampered the soil relief. Here, small-oasis irrigation was developed, based on the use of the constantly operating small mountain rivers Sangzar and Zaaminsuv.

Now, when the soils of the flat areas of the Mirzachol Steppe are almost completely developed, the expansion of irrigated agriculture in this region is possible only at the expense of foothill plains. The current power supply capacity, as well as the accumulated experience of irrigation and ameliorative construction in the Golodnaya Steppe, made it possible to implement a waterfall into the Djizak steppe by pumping stations from the South Mirzachol Canal. In the successful solution of the tasks set by the Government of the Republic for the further development of agriculture and the implementation of the Food Program, development and introduction of a scientifically based farming system is of great importance.

In view of the lack of experience in the widespread development of the foothill plains, the issues of the sequence of land development and the expedient placement of agricultural crops were insufficiently justified. Therefore, only a careful study of lithologic-geomorphological, soil-climatic and hydro-geological conditions of the Djizak steppe, revealing the true amount and

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composition of water-soluble salts in soil of different genesis and lithological composition of the aeration zone will allow us to discover the causes of salinity, establish the patterns of migration and accumulation of salts, in salinization under irrigation and scientifically justified to solve issues of land reclamation.

Objects and methods of the research

The first section of the soil sections covers the territory of the cones of the Lomakin plateau, the second one covers the Zaamin cone, the third one covers the right wing of the Zaamin cone of removal on the line of contact with the Khavast cone of removal. The fourth point characterizes the trail zone of the deluvial-proluvial plain of the Khavast group of rivulets.

The obtained results of field and laboratory studies of the soil of the territory using the materials of engineering-geological and hydro geological studies made it possible to carry out a schematic soil-ameliorative zoning of the territory, which served as a basis for predicting possible changes in the ameliorative state of soils during irrigation and differentiation of the recommended agro-ameliorative measures aimed at their optimization.

Results and discussions

Hydro-geological conditions of the Jizzakh steppe, as well as the entire arid zone many of the important production properties of soils, such as the degree and nature of salinity, humus content, field moisture capacity, water permeability, etc. These properties of the soil in turn determine the nature and extent of the required developmental and ameliorative measures (drainage, washing), as well as irrigation, irrigation and washing norms and irrigation regime. Proceeding from this, the most common basis for dividing the soils of the described territory was the nature of their moistening. On this basis, automorphic, semi-hydromorphic and hydromorphic soils are distinguished here. Automorphic soils are developed in conditions of deep (5-10 m and more) occurrence of groundwater and their moisture is determined solely by atmospheric precipitation. Semihydromorphic soils are developed under conditions of weak ground moistening at a depth of groundwater within 3-5 m. Hydromorphic soils are developed in areas with close (1-2 m) groundwater.

In addition to hydromorphic alkali soil, residual alkali soils are also described in the area under consideration. These are soils in which the alkali soil process has stopped and salt accumulation is relict. The territory of distribution of these soils in the geological past experienced hydromorphic conditions, and then probably, due to tectonic processes, they dropped to a depth of 6-10 m.

Thus, the classification of soil in the territory is presented as follows (Table 1).

A great variety of geomorphologic-lithological, hydrogeological and soil-climatic conditions of the territory caused the variegation and complexity of the soil cover in terms of mechanical composition, agrochemical properties, salinity, gypsumation of alkalinity and others.

The mechanical composition of meadow-gray brownish soils is heterogeneous and differs in each geomorphological region in its own and features. Loess type sediments characterized by uniformity and predominance of dust particles in the mechanical composition are characterized by the Zaamin cone of removal and the Lomakin plateau. The content of fractions of coarse dust (0.05-0.01 mm) is from 26-33% to 56-58% with a very low amount of sand fractions. The silt content (<0.001 mm) varies within a wide range from 9-10% to 18-19% (Table 2).

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Table 1. Hydrogeological conditions of soil formation

Soil	Hydrogeological conditions of soil formation	
	Depth of ground water, m.	Effect of soil moistening on soil formation
I. Automorphic soils:		
1. Typical gray-brownish soil	> 10	No influence
2. Light gray-brownish soils	5-10 и >10	No influence or very weak
II. Semihydromorphic soils:		
1. Meadow-gray brownish soil	3-5	Weak
2. Gray brownish-meadow soils	2-3	Moderate
III. Hydromorphic soil:		
1. Meadow	1-2	Intensive
2. Alkali	1-2	Intensive

Gray brownish-meadow soils formed on deluvial-proluvial layered sediments of very variegated texture. Heavy loams (section 7) alternate with medium and light loams, and in other cases sandy loamy soils in the upper horizons, to the bottom, will be replaced with heavy loams (section 24), the content of the silty fraction of gray brownish-meadow soils varies widely from 0.6-0.9% to 11-13%.

Table 2. Mechanical composition of soils

No. of Section	Depth, cm	Fraction content in % on absolutely dry soil, fraction size in mm							
		Sand			Dust			Silt	Physical clay
		>0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,005	0,005-0,001	<0,001	<0,01
Meadow-gray brownish									
17	0-30	1,0	1,1	13,5	50,2	10,5	13,2	10,5	34,2
	30-50	0,6	0,8	9,3	58,3	8,1	12,3	10,6	31,0
	50-85	0,5	0,8	11,7	56,6	8,4	11,1	11,5	31,0
	85-125	0,9	2,2	25,5	42,5	8,7	9,8	10,4	28,9
	125-170	1,5	1,4	16,4	56,0	6,0	9,7	9,0	24,7
	170-200	0,6	0,6	6,5	56,3	11,2	12,3	12,6	36,0
32	0-30	1,4	0,6	13,0	20,3	17,3	8,7	9,0	35,0
	30-50	2,0	0,6	21,8	26,7	17,8	18,5	13,2	49,5
	50-95	1,9	0,2	19,1	26,3	19,1	13,6	19,8	52,5
	95-130	3,8	0,7	38,7	33,2	4,4	12,5	12,7	29,6
	130-165	1,2	0,4	23,3	31,5	4,3	25,4	13,9	43,6
	165-200	0,7	0,8	17,4	33,0	8,6	25,4	19,8	53,8
Gray brownish-meadow									
7	0-35	0,7	3,1	6,1	39,7	17,7	28,8	3,9	50,4
	35-73	7,6	4,5	6,0	33,5	18,7	29,3	0,6	48,6
	73-105	11,9	9,3	10,2	47,3	12,3	0,7	8,3	21,3
	105-150	0,9	16,0	24,5	29,3	9,2	9,5	11,6	30,3
	150-200	0,2	11,3	16,1	32,2	6,9	8,8	4,7	20,4

28	0-26	3,7	0,7	42,7	36,6	3,9	8,7	3,1	14,7
	26-60	5,3	2,2	38,5	37,2	3,9	5,0	7,9	16,8
	60-96	12,8	1,6	26,3	34,9	13,8	9,7	0,9	24,4
	96-130	7,0	2,2	36,4	18,2	9,3	13,6	13,3	36,2
	130-165	5,1	0,5	27,3	15,7	11,7	28,6	11,6	51,9
	165-200	4,8	0,8	21,5	27,4	14,8	22,6	8,1	45,5
Meadow									
24	0-30	9,8	5,9	22,1	27,8	7,0	19,1	8,3	34,4
	30-48	14,3	4,7	18,4	24,2	9,2	16,0	13,2	38,4
	48-103	13,4	6,4	22,1	34,7	6,1	7,8	9,5	23,4
	103-145	7,8	0,1	22,4	35,0	9,0	15,4	10,3	34,7
	145-175	15,5	1,9	9,1	17,6	23,8	20,0	12,1	55,9
	175-200	9,6	1,5	37,8	36,4	10,8	5,6	7,3	23,7
2	0-25	0,7	0,9	21,8	45,0	8,1	19,5	3,5	31,1
	25-45	2,6	2,7	19,9	47,3	6,5	11,5	7,7	25,7
	45-76	10,5	4,0	18,1	31,5	12,2	13,8	8,1	34,1
	76-115	10,8	3,5	13,9	36,0	9,9	11,2	15,7	36,8
	115-152	15,7	4,4	16,8	34,9	5,1	10,8	10,5	26,4
	152-176	12,1	2,3	16,7	42,3	5,6	7,8	13,2	26,6
	176-200	14,6	2,9	14,3	27,4	7,1	16,2	15,7	39,0
Meadow-alkali									
3	0-27	7,3	6,8	9,5	33,3	13,5	26,8	2,8	43,1
	27-50	7,1	6,6	14,7	32,2	16,7	21,9	0,8	39,4
	50-90	11,9	3,6	11,1	25,5	27,6	20,0	0,4	47,9
	90-120	6,1	1,6	9,3	19,5	37,1	25,4	1,0	63,5
	120-170	0,04	0,2	3,0	30,2	29,7	26,7	10,1	66,5
	170-210	0,07	0,1	2,0	34,6	24,4	28,2	10,8	63,4
22	0-28	4,0	4,8	15,4	33,2	10,5	10,3	21,8	42,6
	28-50	7,8	4,1	22,4	31,0	9,0	15,4	10,3	34,7
	50-80	3,6	0,4	34,6	36,2	9,2	12,7	3,3	25,2
	80-118	3,5	0,3	46,1	27,1	6,1	11,5	5,4	23,0
	118-160	4,0	0,6	44,4	34,0	6,1	6,0	4,9	17,0
	160-200	8,2	0,6	49,8	27,0	3,8	8,2	2,4	14,4

Meadow soils are formed on deluvial-proluvial deposits of very variegated texture. Medium loam alternates with light, heavy, sometimes clay and sands (Table 2, sections 24, 2, 3, 22). The mechanical composition of soils is in most cases represented by medium and light loams. Heavily loamy and sandy loam varieties are very rare.

The predominant fraction of the described hydromorphic meadow soils, as in gray-brownish soils, is large dust (0.05-0.01 mm), the number of which reaches 50%. The silt content in individual horizons reaches 21% (Table 2, Section 22).

SUMMARY

The complex geomorphic structure of the investigated area also determined no less complicated hydrogeological processes, that the ground waters formed, as well as a large number of surface irrigation waters, do not have or have a very weak outflow and are mainly used for evaporation and transpiration, and this leads to intensive salt accumulation on a large part of the area and consequently to the general unfavorable ameliorative state of irrigated soils. The high waterfall for irrigation accelerated the transformation of automorphic soils into semihydromorphic and hydromorphic and soil cover of the territory at present is represented mainly by meadow-gray brownish, gray brownish-meadow, meadow soils and alkali, differing in mechanical composition, the nature of the underlying rocks, salinity, depth of occurrence and mineralization of groundwater eats natural and artificial drainage, agrochemical properties, which indicates the unevenness of the ameliorative state of soils.

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