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Amount of Easily Soluble Salts in Water, Type and Level of Salinity in Irrigated Meadow-Gray Soils of Zomin Cone Spread and Its Effect on Soil Melioration

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Abstract: The article describes the results of scientific research on the effective use of irrigated soils of the Zomin cone spread. The results of statistical analysis on the amount of easily soluble salts in water in the irrigated meadow-grey soils of the Zomin cone spread, the depth of the saline layer, its thickness and the degree of salinity are presented.

Key words: Zomin cone spread, salinity, high salinity, profile salinity, coefficient of variation, toxic salts, total salt reserve, seepage waters

Relevance and necessity of the topic. Today, according to the Ambio magazine, "every year 1/3 of the arable land undergoes various degradation processes and is alienated from production. 2 billion annually. about tons of washed soils are carried to the oceans by river currents, 500 mln. hectares of soils are eroded, about 40-60 percent of irrigated lands are salted to varying degrees, 25 mln. About 100,000 hectares of land are turning into deserts every year." therefore, it is important to develop science-based measures to improve the ecological and melioration status of degraded lands, reduce the area of saline lands, restore and increase their productivity.

The purpose of the study is to determine the main properties, salinity level and types of the irrigated grassland soils of the Zomin cone area, general and toxic salt reserves, and to develop scientific and practical solutions.

The object and subject of the research was selected protected and irrigated meadow-gray soils scattered in the Zomin cone area, and its subject was different degrees of cultivation, salinization, plastering, salinization and reclamation properties of the soil, salt composition, amount andreserves, seepage parameters.

The level of study of the problem.N.A. Dimo [1.5; p. 103], A.N. Rozanov [1.12; p. 460], V.V. Egorov [1.8; p. 11-27], M.A. Pankov [1.11; p. 39-54] and V.A. Kovdalar [1.9; 415-p.] carried out by Fergana Valley, Mirzachol, Bukhara Oasis, Vakhshvalley, Amudarya and lower part of Syrdarya, soils of Murgob and Atrek deltas were thoroughly studied.

I.A.Gafurova, D.Yu.Makhkamova's [1.4; 50–53-p.] in scientific works, the mechanical composition and physical properties of the reserve typical gray, gray-meadow, meadow-saline and irrigated meadow-gray, gray-meadow, meadow, swamp-meadow soils of the Zomin cone spread were studied, the protected and irrigated desert mechanical and physical properties of soils were studied and compared to previous research data. an increase in specific gravity from protected soils to irrigated soils was observed, and the lowest amount was in the upper layers. According to the authors, this is directly related to the amount of hummus.

V.K. Sherimbetov [1.13; pp. 24–30] Zomin studied the soil-ecological condition on the example of the conservation and reclamation of irrigated soils. Proposed important criteria used to evaluate soil-ecological problems.

A. U. Akhmedov [1.2; 24 p.], [1.3; p. 52-54] in the research conducted in the area of the Zomin cone spread, the need to remove salt marshes and plastered salt marshes, which are difficult to meliorate, from the outline (plan) of land to be developed and irrigated first of all, in addition, the expediency of using the land in the highest mountainous part of the desert for other purposes is justified in order to reduce the flow of underground water in these areas, to protect the soil from secondary salinization processes. As the reasons

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for the origin, main properties and characteristics of the saline soils distributed in the Obruchev lowlands of the desert have not been thoroughly studied, special experiments and large-scale soil research should be carried out to develop technologies for melioration of such soilsoffers to transfer.

E.I.Pankova, D.L. Golovanov, D.A. Solovev, I.A. Yamnova [1.7; p. 33-60], A. Akhmedov, Kh. Namozov, B. Kholboev, S. Toshpulatov, A. Korakhonov [1.1; 53-61-6.], B.E. Kholbaev, Kh.K. Namazov [1.14; p. 143-148], by H.Q. Namozov [1.10; p. 24] according to research data, the Zomin-Khovos intercone of the Jizzakh desertit is noted that saline soils have developed in the shallows.the authors explained the genesis of the origin of such meadow-grey soils by the presence of weakly alkalized sulfate-sodium-magnesium syzote waters near the surface of the earth.

The results of the statistical analysis on the salinity of the described irrigated meadow-grey soils differ sharply from each other in different geomorphological and hydrogeological conditions of the region, depending on the depth of the saline layer, its thickness and salinity level. Among newly irrigated meadow-grey soils, there are non-saline (saline horizon below 200 cm), deep saline (at 150-200 cm), deep saline (at 100-150 cm), saline (at 50-100 cm), highly saline (30 - at 50 cm) and salted (at 0-30 cm) types are found. among these types of salinity, high salinity and saline species are especially common (Table 1).Since the lower part of the ground cone area is a lowland, shallow land, easily soluble salts (NaCI, NaSO4, MgCI, MgSO4) are mainly collected in this area. Alkaline soil solution, proximity of seepage water to the earth's surface and its use mainly for evaporation lead to salinization of meadow-gray soils. 0-4, 0-5 meter layers of irrigated meadow-grey soils of the zomin cone spread are mostly moderately and strongly saline, some horizons in the lower layers are weakly saline and non-saline (Table 1).

According to the analytical data of the cross-sections presented in Table 1, the salinity is highly salinized (the maximum amount of salts is mainly in the subsoil layer (30-50-70 cm), the total amount of salts is 1,190-1,540% of the dry residue, sometimes increasing towards the lower layers ,sometimes decreases.sometimes increasing and sometimes decreasing salts in the soil profile toward the lower layers is related to a number of factors, including the mechanical composition of the soil horizons and changes in the level of seepage water. Soil section 4 has several salt layers with different soil profileslocated in its parts, the amount of easily soluble salts in water is observed in indicators ranging from 1.322-1.394% to 1.536-1.660%.

According to the type of salinity, the meadow-gray soils of section 4 are mainly chloride-sulfate, in the middle part of the profile (200-400 cm) sulfate-chloride salinity types, the soils are moderately, strongly saline, some horizons consist of shale.

Section 5 consists of the "Profile salinity" type, the presence of almost the same high amount of salts is observed from the uppermost layers of the soil to a depth of 500 cm (up to seepage waters), the amount of easily soluble salts in water is 1.116 to 1.410% of the dry residue. Chlorine ion content ranges from 0.111 to 0.184%. The type of salinity in all cases is chloride-sulfate, strongly saline (Table 1).

Section 6 consists of highly salinized salinity types, with a salt content of 1.160–1.328%, decreasing to 0.604–0.924% in the middle and lower parts of the soil profile. Chlorine ion content in the whole soil profile fluctuates between 0.107-0.146%. according to salinity chemistry, the soil layers consist of chloride-sulfate salinity types, the soils are moderately and strongly saline.

Three layers of salt maxima are observed in section profile 7. the first maximum salt layer is located at 30-50 cm, the amount of salts is 1.540%, the second salt layer is located at a depth of 50-80 cm, the amount of salts is 1.233%. in the subsequent layers, the amount of salts gradually decreases, it is observed in the 250-300 cm layer at only 0.113%, and finally increases to 1.127% in the third maximum salt layer (300-350 cm). Chlorine ion content in salt layers fluctuates between 0.024-0.052%. salinity types are mainly sulfate and chloride sulfate unlike the previously described sections (1-3). Characterized by degree of salinity, these meadow-grey soils are found in varying degrees from saline-non-saline divides to moderately saline soils (Table 1).

Table 1

Amount, type and degree of salinity of water-soluble salts in irrigated grassland soils

cross section	depth, cm.	dry residual	HCO_3^-	$C1^-$	SO_4^{-2}	Ca^{+2}	Mg^{+2}	Na^+	salinity

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		%							Type	Degree
4	0-30	1.660	0,020	0,194	0,845	0,220	0,033	0,223	x-c	strong
	30-56	1.394	0,021	0,186	0,640	0,150	0,021	0,225	x-c	strong
	56-95	1.336	0,021	0.248	0,552	0,135	0,015	0,250	x-c	strong
	95-135	0.914	0,020	0,097	0,492	0,100	0,012	0,170	x-c	average
	135-160	0,954	0,020	0,194	0,393	0,040	0,019	0,240	x-c	Average
	160-200	1.008	0,021	0,254	0,356	0,025	0,016	0,284	x-c	strong
	200-250	1,536	0,016	0,413	0,500	0,045	0,015	0,433	c-x	Salty
	250-300	1,580	0,016	0,453	0,423	0,045	0,018	0,440	c-x	salty
	300-350	0,914	0,018	0,248	0,304	0,030	0,019	0,243	c-x	strong
4	350-400	1,322	0,021	0,331	0,455	0,055	0,021	0,387	c-x	Salty
	400-450	1,518	0,017	0,137	0,815	0,205	0,021	0.210	x-c	strong
	450-500	1,660	0.015	0,111	0,956	0,275	0,021	0,186	c	Average
5	0-30	0,962	0,023	0,149	0,501	0,201	0,011	0,066	x-c	Average
	30-55	1,274	0,017	0,141	0,674	0,250	0,029	0,061	x-c	Strong
	55-95	1,284	0,018	0,141	0,764	0,156	0,025	0,195	x-c	Strong
	95-125	1,302	0,016	0,114	0,739	0,272	0,017	0,086	x-c	Strong
	125-170	1,312	0,019	0,128	0,784	0,210	0,035	0,096	x-c	Strong
	170-200	1,176	0,016	0,142	0,606	0,144	0,036	0,137	x-c	Strong
	200-250	1,258	0,020	0,139	0,702	0,200	0,034	0,120	x-c	Strong
	250-300	1,222	0,021	0,139	0,663	0,246	0,020	0,075	x-c	Strong
	300-350	1,200	0,021	0,114	0,675	0,292	0,027	0,037	x-c	Strong
	350-400	1,116	0,024	0,166	0,562	0,240	0,018	0,089	x-c	Strong
	400-450	1,410	0,016	0,126	0,782	0,275	0,037	0,057	x-c	Strong
	450-500	1,290	0,018	0,184	0,585	0,230	0,045	0,246	x-c	Strong
	0-32	0,982	0,021	0,107	0,547	0,222	0,018	0,033	x-c	Average

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6	32-73	1,190	0,021	0,108	0,654	0,248	0,043	0,044	x-c	Strong
	73-103	1,266	0,018	0,116	0,647	0,280	0,035	0,037	x-c	Strong
	103-150	1,202	0,024	0,110	0,710	0,270	0,035	0,042	x-c	Strong
	150-200	1,172	0,022	0,108	0,690	0,260	0,026	0,038	x-c	Strong
	200-250	0,604	0,017	0,057	0,360	0,090	0,015	0,082	x-c	Average
	250-300	1,321	0,019	0,138	0,708	0,234	0,042	0,068	x-c	Strong l
	300-350	1,160	0,021	0,146	0,614	0,176	0,036	0,160	x-c	Strong
	350-400	1,328	0,024	0,127	0,691	0,256	0,040	0,038	x-c	Strong
	400-450	1,242	0,020	0,112	0,645	0,252	0,038	0,026	x-c	Strong
	450-500	0,924	0,017	0,112	0,474	0,104	0,032	0,179	x-c	Average
7	0-30	0,807	0,018	0,038	0,506	0,160	0,016	0,060	x-c	Average
	30-50	1,540	0,018	0,052	0,909	0,210	0,043	0,152	c	Average
	50-85	1,233	0,021	0,044	0,785	0,190	0,024	0,149	c	Average
	85-125	0,887	0,015	0,066	0,505	0,125	0,037	0,077	c	weak
	125-170	0,483	0,021	0,041	0,255	0,030	0,015	0,094	x-c	Average
	170-200	0,295	0,037	0,028	0,142	0,010	0,018	0,055	x-c	Weak
	200-250	0,117	0,024	0,005	0,046	0,010	0,012	0,001	c	Unsalted
	250-300	0,113	0,043	0,009	0,032	0,010	0,012	0,004	x-c	Weak
	300-350	1,127	0,037	0,024	0,694	0,240	0,018	0,053	c	Average
	350-400	0,075	0,028	0,007	0,012	0,005	0,003	0,011	x-c	unsalted
average and its error		1.103 ±0.05	0.020 ±0.001	0.135 ±0.01	0.564 ±0.03	0.165 ±0.013	0.025 ±0.002	0.132 ±0.02		

Zomin cone distribution area in the saline-saline meadow-gray semi-hydromorphic soils distributed in the Zomin-Khovos interconical lowlands, high density (1.6-1.7 g/cm3), low porosity (33-39%), heavy mechanical content (heavy sand and clay), high salinity(1.5-4%), low water permeability (6-7 mm/h), high alkalinity (rN up to 9.1-9.3), high absorption capacity (22-27 mg-eq per 100 g. of soil) , a very high amount of Na (48-87%), sulfate-magnesium-sodium salinity was noted in the absorbed cations

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