The Seybold Report

ISSN 1533-9211

DOI 10.17605/OSF.IO/4F9Y2

DESCRIPTION OF CO'X CONE SOILS I

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Annotation

The main stone-gravel part of Sokh Konus spread is covered with man-made calmotage soils. Meadow-swamp-oasis and meadow-oasis soils are developed in the middle and lower parts of the area, which differ in depth and mineralization of the saz-order water level. The morpho-genetic section of the soil, the results of hydromorphism processes, is made up of multi-genous layers. The salinity is weak in the middle part of the spread, and it increases towards the north and flanks of its periphery. According to the amounts of mobile phosphorus and potassium, the soils belong to the groups of moderate and weak supply.

Keywords: cone spread, calmotage, meadow-swamp-oasis and meadow-oasis soils, mechanical composition, salinity, humus, phosphorus, potassium

Sokh river The cone spread is a classic example of mountain river cone spreads with its geomorphological and lithologically perfect symmetrical structure, well-defined hydrogeological regionalization, unique location of vegetation and soils in the vertical section.

The history of irrigated agriculture in the plain area spans a long period. The area of ancient irrigated land is large, fertile, and moderately cultivated. In the alluvial plains of the Syrdarya, adjacent to the cone spread from the north, the area of anciently irrigated soils is relatively small, and the area of newly irrigated soils is large. Newly developed soils are low in fertility, their cross-section contains more salts, and the agro-irrigation layer is not fully formed. They are dominated by natural properties.

Currently, in the upper part of the Sokh cone spread, calmated soils, meadow-oasis and meadow-swamp-oasis soils, in the middle part, meadow-oasis and meadow-swamp-oasis loam soils washed and salted to varying degrees are formed. Studying the properties and characteristics of the soil, their changes under the influence of the human factor, gives the possibility of rational and efficient use of the land of the region.

At the beginning of the 20th century, the study of the nature and natural resources of the Fergana Valley is characterized by its orientation towards economic goals. Special geological, soil-geographical and meteorological-hydrological research V.N. Weber, D.V. Nalivkin, V.G. Mukhin, B.V. Ivanov et al., soil research S.S. Neustruev, N.A. Dimo, G.I. Dolenko, A.Z. Zaychikov, A.P. Livanov, S.N. Pustovoyt and M.I. Parshakov, M.A. Pankov, M.M. Krylov and others. carried out by In these works , the natural conditions of soil formation in the Fergana Valley were described in detail, the classification of soils was developed, the geography of soils was shown, the chemical and physical properties of soils, and reclamation properties were

ISSN 1533-9211

DOI 10.17605/OSF.IO/4F9Y2

studied. The level of suitability for agricultural crops, melioration and ways of effective use have been determined [9, 10, 11, 13].

In the years of independence of the Republic of Uzbekistan, the study of the natural geographical conditions of the Fergana Valley, including the Sokh Konus spread and adjacent areas, as well as the potential opportunities for use in the national economy continued (V. Yu. Isakov [4, 5, 6, 7], G. Yuldashev [17, 18 , 19], A. Ismanov [8] , A. Abdulkasimov, O. Koziboeva [1] and others). In the last ten years, the research of the soils of Ferghana Valley has increased. U.B. Mirzaev et al. [5], V. Yu. Isakov, U. B. Mirzayev [12] and S. Zokirova [3] and M.A. Yusupova [20] on the development and use of sandy valleys, on the issues of development, melioration and productivity of protected lands. Researches led by K.M.Mirzajonov [11] , researches [21] of scientists of the IIT of soil science and agrochemistry were devoted to the problems of evolutionary changes of soil properties and characteristics under the influence of the human factor. FarDU professor of science and technology. Isagaliyev [18], Turdaliev [15, 16, 17], Sotvoldieva [14] and others under the leadership of G. Yuldashev. extensive biogeochemical studies have been carried out. Calmotage soils are divided into old irrigated, newly irrigated and newly developed soils according to the thickness of the calmotage layer and the length of the irrigation period.

The irrigated irrigated soils were formed in places convenient for water extraction, around ancient villages (for example, Sarikorgan, Okchi, etc.). The level of calmness is equal to 1 1,5 м. According to the mechanical composition, it is sandy and light sandy, rarely medium sandy. Sand fractions are absolutely stable in the composition of Sukh river waters. For this reason, a light mechanical composition is described for cone-spreading soils.

The amount of physical content is 10-20% in sandy soils, 22-30% in light sands and 30-40% in medium sands. Large dust and fine sand particles dominate in the mechanical composition.

A. J. Ismanov [2.48, p. 49-51] writes that the surface of the land is leveled and agro-irrigation layers are formed in calmotage soils that have been irrigated for a long time. However, the calming process itself is related to the human factor, water and water supplies. Therefore, the Kalmotage layer can be considered as an agroirrigaion layer in its entirety.

The amount of humus in the tillage layer of Kalmotaj soils is 1.51-1.76%, 1.18-1.66% in newly irrigated soils, and 1.0-1.68% in newly cultivated soils. The amount of total nitrogen in the arable layer of previously irrigated calmotage soils is 0.020%, phosphorus 0.29%, potassium 1.60% and mobile nitrogen 10.5-16.5 mg/kg, phosphorus 13.0-22.0 mg/kg, potassium 132-180 mg/kg. In newly irrigated - total nitrogen 0.019%, phosphorus 0.29% and potassium 2.00%, mobile nitrogen 10.0 mg/kg, phosphorus 6.5-10.0 mg/kg and potassium 88-160 mg/kg, fresh in absorbed - mobile nitrogen is 13.0 mg/kg, phosphorus is 37 mg/kg, potassium is 108.5 mg/kg. The middle part of the cone spread, which is the hydrogeological region of seepage and seepage, is mainly occupied by meadow-swamp-oasis and meadow-oasis marshy soils. In the most shallow places of the region, where springs are common, swamp-oasis saz soils have been formed. Grassland-swamp-oase saz soils are bluish-yellow with dark brown and yellow color,

ISSN 1533-9211

DOI 10.17605/OSF.IO/4F9Y2

granular-small structure, loose joints. From 40-50 60 смbelow, a layer of marly, dense gley with a bluish-tinged flow color begins. Often, this layer is buried under a layer of peat or humus.

For a general description of meadow-oasis soils in the lower part of the range, morphological records of two soil cross-sections that differ in their mechanical composition are presented below. Section 1. The end of the growing season. A field with harvested stalks. On the north, east, and south sides of the field, there are 2-deep 3 мditches, which are covered with reeds, and the edges of the ditches are covered with salt. The cut is placed in the middle of the field.

0- 30 см. It is a bluish-grey medium sandy arable layer, with a lumpy structure, pores, roots, and salt stains. The description of the transition to the next layer is clear.

30- 50 см. The substratum is light-sandy with a reddish-brown color, it has a lumpy structure, there are pieces of weak shale, the density is slightly higher than the upper layer. Plant roots. The description of transition to the next stage is gradual.

50- 88 см. The sand is light blue-yellow in color, not strong, with a vague structure, dense, few roots, sometimes there are spots of salt in the form of dots and veins. The description of transition to the next stage is clear .

88-110 cm. Light brown, light sand with a gray tint, air-colored and water-colored spots, the density is quite high, the roots are almost invisible. The description of the transition to the next layer is clear.

110- 155 см. Gray loam, bluish-air color and rust-colored spots, medium density. It goes to the next layer slowly according to the mechanical composition.

155- 175 см. Blue sand, loosely jointed, saturated with moisture. Water began to leak out from the bottom of the layer.

The above morphological description represents a soil-soil section with a light mechanical composition. Soils with this structure are widely distributed both in the cone plains and alluvial plains.

The upper 50 cm layer can be called an agro-irrigation layer. The 50-88 cm layer differs from the lower layers. It is similar to the upper layer in its color, structure and composition. Therefore, we think that it can also be included in the agro-irrigation layer. The soil section has been completely washed away by the effect of the flushing irrigation system used for many years. Seasonal accumulation of salts is weakly expressed in the form of sparse dots and veins.

Section 2 is composed of different sandstone layers and represents the lower part of the spread and the soils distributed in the depressions of the ancient alluvial plain.

The cut stalk is placed in the middle of the uncut field. The surface is cracked and rough. There is a thin film or dust of salts on the solid pieces.

0- 35 см. Kokimtir-sur is a medium-sized sandblaster. A little structured. Average density. There are vertical cracks. There are salt stains on the walls of the structural parts. There are many small roots. The transition to the next stage is abrupt.

ISSN 1533-9211

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35- 53 см. Driving under the category. Medium-sandy, slightly structured, densely compacted clay. Accumulations of salts in the form of white dots and veins. There are roots, but less. It is certain that he will pass to the next stage.

53- 90 см. Heavy sand of bluish-yellow color with flowing spots, fine-grained structure, densely compacted. Small salt deposits. Sometimes small and amorphous crystals of gypsum. Roots are rare. Stones of the same diameter have been added. 2 смThere are shiny spots caused by the addition of carbonates. It is certain that he will pass to the next stage.

90- 110 см. There are light yellow spots, bruises and yellow spots. Dense. When digging, it moves in pieces. Roots are almost never found. At the expense of no salt. Definitely going to the next level.

110- 130 см. Medium brown with light brown color, many dark and light colored spots. The density is very high. No root. There are salt deposits. There are many small 1-2 mm crystals of gypsum. Gypsum crystals are abundant in structural cracks. It moves to the next layer slowly.

130- 170 см. Curd-like heavy cream, yellowish-brown in color. There are also many blue spots. The density is high. Gypsum crystals up to 3-4 mm in size are common. All cracks and holes are filled with plaster. There are small carbonate concretions.

170 смIn depth, seepage water begins to leak from the bottom of the incision. In the section, the agro-irrigation layer is clearly distinguished. Salts and gypsum crystals are clearly represented. Accumulation of gypsum crystals in the layers increases the density of the layer and complicates the reclamation situation.

As meadow-oasis soils are formed as a result of the moderate influence of seepage waters, the layers below the agro-irrigation layer, i.e. the lower part of the soil section, are distinguished by a wide range of colors - blue-green, brown, dark colors and reddish-brown, yellow rust spots. At the bottom of the agroirrigated layer lies a marl layer, typical for hydromorphic soils. Soil sections are usually characterized by an abundance of carbonates, the amount of which increases from top to bottom.

Swamp-meadow-oasis soils are formed in excessively humid conditions, under the strong influence of seepage waters. Anaerobic processes dominate in this section of soils, but from time to time it alternates with aerobic processes. In the lower part of the section, there are signs of wetlands, and in the upper part there are signs of grassland. The results of the formation of oasis soils are laid on top of these processes. The mechanical composition of the soils fluctuates in a very wide range. According to the mechanical composition, the soil fractions separated within the research area are mainly medium and light sandy. Sandy and heavy sandy soils are distributed in relatively small areas. Sandy soils and sands are also quite common. Multi-layering is characteristic of all separated soil fractions. The lithological structure of the soil section includes sand, loam, light, medium and heavy sands and loams.

The mechanical composition of the arable layer of meadow-oasis soils in the lower part of the Sokh river cone spread is medium sandy. Also, light sandy, loamy and sandy soils are common (Table 1). According to the data of the table, 0,01 ммthe amount of small particles in medium

The Seybold Report
ISSN 1533-9211
DOI 10.17605/OSF.IO/4F9Y2

sand varies from 33.45 to 37.65% in the arable layer, and from 8.5% to 47.72% in the soil section. Large dust particles (0.05- 0,01 мм) take the first place (33, 45-40%) among the particles of the layer with medium mechanical composition. The second place is 0,05 ммoccupied by fine sand particles (0.1-) (22-27%). The medium dust fraction (0.01- 0,005 мм) ranks third (12.5-23.6%). In layers with a heavy mechanical content, the amount of turbid (less than 0.001 mm) fraction increases significantly (15% and more). The amount of fine particles gradually decreases as they become larger. In layers with medium and heavy mechanical composition, the smallest amount is typical for large and medium sand particles, their amount reaches 10-15% in layers with sand and loam mechanical composition and increases. As the mechanical composition of the soil becomes heavier or the amount of physical content increases, the amount of large fractions decreases and the amount of small fractions increases.

Table 1: Mechanical composition of meadow-oasis soils in the lower part of the Sukh cone area

Kes-ma t.r.	Depth, cm	Amount of particles of different sizes (mm), %							<0.01mm	Mechanical composition
		1.00-0.25	0.25-0.10	0.10-0.05	0.05-0.01	0.01-0.005	0.005-0.001	< 0.001		
1	0-30	2,56	6,58	25,81	31,60	12,51	11,56	9,38	33,45	
	30-50	4,68	11,47	24,48	31,79	12,70	8,33	6,55	27,58	average
	50-88	14,75	20,18	18,25	31,02	7,70	3,44	4,66	15,80	light sand
	88-110	8,81	18,15	20,57	27,81	13,34	5,17	6,15	24,66	light sand
	110-155	15,86	21,66	25,28	22,34	9,86	2,73	2,26	14,85	sand
	155-175	20,17	22,18	28,19	20,96	6,03	1,87	0,60	8.50	average
2	0-35	1,56	9,64	22,27	28,88	18,11	12,38	7,16	37.65	average
	35-53	1,17	7,69	22,50	29,49	18,17	12,17	8,81	39.15	hard
	53-90	0,60	3,58	17,48	31,07	13,68	18,08	15,51	47.27	light
	90-110	5,66	12,75	30,85	22,46	19,31	4,50	4,47	28,28	average
	110-130	2,38	7,48	27,18	24,71	23,63	6,94	7,68	38.25	hard
	130-170	1,11	5,94	15,77	29,46	14,25	21,82	11,65	47.72	

Soils of the study area have varying degrees of salinity. Soil salinity is associated with the lack of natural drainage, the composition of soil-ground sections from rocks with different mechanical composition, multiple layers, and insufficient water and physical properties. A lot of salts accumulated in the cross-section of the soil in places where the amount of fertilizers was insufficient and their work was disturbed.

Salt leaching is active in sandy, loamy and light loamy soils with a light mechanical composition common in the study area, and especially in soils with a light mechanical composition throughout the soil-soil section. Most of the soils with this composition now belong to the saline and non-saline categories. Soils with a relatively heavy mechanical composition, especially soils with a multi-rock and multi-layered soil-soil section, are poorly washed by salt, and large reserves of salts are preserved.

In the lower part of the Sokh River cone spread, there are many non-saline or salt-washed soils, weakly saline soils are relatively few, and the area of moderately saline soils is the least. Salt marshes and highly saline soils occur as islands within irrigated areas.

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ISSN 1533-9211
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Table 2: A meadow-oasis formed in the lower part of the Sukh cone amount of easily soluble salts, gypsum and carbonates in soils, %

Don't cut	Depth, cm	Dry residue	Poison-li	HCO_3^-	Cl^-	SO_4^{--}	Ca^{++}	Mg^{++}	Na^+	Plaster	CO_2 Carb.
Tuzlary yuvilgan utlaky-voha tuprokhlar											
1	0-30	0.325	0.09	0,015	0,008	0,225	0,076	0,010	0.012	1.70	14.75
	30-50	0.370	0.08	0,012	0,007	0,247	0,086	0,008	0.013	2.68	13,16
	50-88	0.293	0.06	0,012	0,005	0,185	0,067	0,005	0.010	2.42	11.35
	88-110	0.252	0,06	0,015	0,007	0,150	0,053	0,005	0.012	3.22	14.41
	110-155	0.240	0,06	0,010	0,007	0,145	0,051	0,004	0.012	3.76	11.69
	155-175	0.202	0,05	0,012	0,005	0,120	0,041	0.004	0.010	2.06	11.57
Weakly saline swamp-oasis soils											
2	0-35	0.852	0,19	0,022	0,020	0,535	0,186	0.018	0.030	0.62	17.20
	35-53	0.768	0,17	0,018	0,022	0,480	0,169	0.017	0.025	1.56	20.08
	53-90	0.553	0,10	0,020	0,015	0,345	0,129	0.012	0.011	8.86	25,24
	90-110	0,419	0,09	0,025	0,012	0,248	0,090	0.009	0.015	4.47	19,29
	110-130	0,215	0,08	0,018	0,010	0,118	0,037	0.008	0.012	15.84	21.72
	130-170	0,259	0,06	0,018	0,010	0,151	0.056	0.006	0.010	21.74	30.53
Medium salinity meadow-oasis soils											
3	0-35	1,180	0,36	0,028	0,043	0,738	0,233	0,036	0,056	1,35	15,30
	35-55	1,032	0,28	0,020	0,025	0,656	0,210	0,027	0,045	3,01	17,10
	55-80	0,910	0,22	0,022	0,017	0,585	0,193	0,022	0,036	3,45	18,10
	80-115	0,980	0,18	0,027	0,027	0,648	0,240	0,018	0,028	4,25	18,10
	115-145	0,516	0,15	0,018	0,015	0,318	0,100	0,015	0,025	3,90	15,10
	45-190	0,360	0,09	0,022	0,008	0,220	0,076	0,008	0,015	3,90	18,10

The amount of easily soluble salts in the arable and sub-arable layers of non-saline or salt-washed soils is 0.325-0.370% of the dry residue (Table 2). These values are above the salinity limit, but the toxic salts in them are below the salinity level of 0.08-0.09%. The amount of dry residue decreases to 0.202% from top to bottom along the section. According to the results of water absorption analysis, the amount of chlorine ion is less than the permissible level (0.008-0.01%) - 0.005-0.008%.

The amounts of sodium and magnesium cations considered toxic to plants vary across the soil section, respectively, in the range of 0.004-0.010% and 0.010-0.013%. Anions include sulfate ion,Calcium ion dominates in the composition of cations. The amount of toxic salts decreases from 0.09% to 0.05% along the soil section. The higher salt content in the upper layers is seasonal salt accumulation and is not dangerous, they are washed away by winter and spring rainfall.

The total amount of easily soluble salts in the arable and subsoil layers of weakly saline soils is equal to 0.852-0.768% of the dry residue and decreases to 0.215% in the lower part of the section. Chlorine ion content varies in the range of 0.020% in the upper layer and 0.010-0.022% along the section. The amount of toxic salts in the upper layers is 0.17-0.19%, their basis consists of sodium and magnesium salts (0.006-0.018% and 0.010-0.030%). In moderately saline soils, the total amount of slightly soluble salts is slightly more than 1%, but the toxic salts in their composition reach 0.36%. Only the layer adjacent to the seepage waters is not saline. The amount of chlorine ion is equal to 0.043% in the arable layer, fluctuates in the range of 0.015-0.025% in the saline layers of the section, and decreases to 0.008% in the lowest non-saline layer. Sodium cation, which is toxic to plants, is 0.015-0.056%, magnesium cation is 0.008-0.036%.

The Seybold Report
ISSN 1533-9211
DOI 10.17605/OSF.IO/4F9Y2

Only the layer adjacent to the seepage waters is not saline. The amount of chlorine ion is equal to 0.043% in the arable layer, fluctuates in the range of 0.015-0.025% in the saline layers of the section, and decreases to 0.008% in the lowest non-saline layer. Sodium cation, which is toxic to plants, is 0.015-0.056%, magnesium cation is 0.008-0.036%. Sulfate and calcium ions dominate the composition of salts at all levels of salinity. According to the chemical composition, the soil salinity is sulfate, sodium-magnesium.

Layers with a high gypsum content have a lot of dry residue and relatively high salinity, and vice versa, layers with a low or no gypsum content have a low salinity or are washed full of salts. The amount of gypsum and carbonates in the soil is not as large as in other regions of Central Ferghana, for example, Isfayram-Shohimardonsoi cones, nor is it widespread [4, 5]. However, some of the patterns associated with gypsum can be observed. The amount of gypsum is much higher in highly saline soils, and less in non-saline soils. The amount of gypsum increases inward from the surface of the soil and reaches the highest value in the middle of the soil-soil section. The highest value of gypsum is 15-22% in the soils of the lower part of the range and 20-26% in the soils of the ancient alluvial plain.

The amount of carbonates also increases from top to bottom in the soil section. In soils without gypsum layers, the increase of carbonates from top to bottom is uniform. But this law is violated as a result of multi-sex and multi-layered lithological structure (Table 2). There are few carbonates in layers with light mechanical composition, and they are abundant in layers with heavy mechanical composition. In gypsum soils, the amount of carbonates decreases with an increase in the amount of gypsum in the gypsum layers.

Table 3: Agrochemical properties of soils

Cut t/r	depth, sm	Rot, %	nitrogen, %	General forms, %		Mobile forms, mg/kg	
				R_2O_5	K_2O	R_2O_5	K_2O
Salt-washed meadow-oasis soils							
1	0-30 30-50	1,350 _ 0.822	0.107 0.063	0.134 0.0 63	1.45 1.35	32 25	400 327
Weakly saline swamp-oasis soils							
2	0-35 35-53	1,553 0.960	0.1 1 8 0.074	0.147 0.1 18	1.60 1.39	35 21	445 315
Medium salinity meadow-oasis soils							
3	0-35 35-55	2 , 206 0, 704	0, 135 0.0 55	0.1 1 2 0.073	1.44 1.29	20 10	380 286

Carbonates are the least in the maximum gypsum layer. And in the layers below the gypsum, carbonates have the maximum value. The amount of carbonates is 12-17% in the arable layers, 13-20% in the under-arable layers. It increases by 30% in the gypsum sublayers of the soil section. The total amount of gypsum and carbonates varies from 18% to 52% in the section of gypsum soils. A large amount of gypsum and carbonates increases the density of the soil layers, and the aeration porosity decreases dramatically. As a result, the water permeability of the layers where they are collected deteriorates, water-physical properties become unsatisfactory. In such cases, plant roots cannot develop freely. Salts do not wash well in soils with a high

ISSN 1533-9211

DOI 10.17605/OSF.IO/4F9Y2

content of gypsum and carbonates. Salinity is preserved for a long time. In addition, sulfate and carbonate salts of calcium disrupt the nutrient balance of the soil. Calcium immobilizes phosphorus fertilizers applied to the soil. As a result, there is a lack of phosphorus.

have priority distribution in the Sokh Konus area. The area of meadow-swamp-oasis soils formed in the shallower elements of the region is limited. Soils of regions differing in terms of geomorphology are also characterized by fertility indicators. In the cross-section of meadow-oasis soils in the middle part of its distribution, the amount of humus varies between 2.206-0.704%, and the total nitrogen content varies between 0.135-0.055%. The amount of humus in the arable layer of the soils of the lower part of the plain is 1.350-1.553%, in the sub-arable layers it is equal to 0.822-0.960%. The total amount of nitrogen is 0.107-0.118% and 0.063-0.074%, respectively.

The total amount of phosphorus is equal to 0.063-0.118% in the cross-section of the cone-spreading soils, 0.073-0.112% in the ancient alluvial plain soils, and 0.088-0.109% in the second layer soils. The upper layers have more phosphorus, the lower layers have less phosphorus. Soils do not differ significantly in terms of the total amount of potassium, its value varies between 1.37-1.60% in arable layers and 1.05-1.39% in sub-arable layers.

The agro-ecological condition of the settled soils formed in the upper part of the Sukh cone spread is satisfactory. The productivity of soils with a thick calmostasis layer is higher than those with less thickness. It is not provided in terms of the amount of food elements and it is insufficiently provided. The results of hydromorphism processes are clearly expressed in the morphogenetic sections of the soils in the middle and lower parts of the cone spread.

Soils with medium and light mechanical composition dominate throughout the region. Sandy, light, medium and heavy loams alternate quickly in soil sections. The lowest part of the cuts consists of sand and seeps are located in it. In the soils of the middle part of the spread, mainly weak salinity is found. Salinity increases towards the north and flanks of its periphery. Regional salinity is in the desalination-salinization stage. According to the amount of mobile forms of phosphorus and potassium, the soils of the Sokh river cone spread are mostly moderately and weakly supplied.

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