ECOLOGICAL AND RECLAMATION CHANGES IN THE SOILS OF THE SOKHSKY REMOVAL CONE

V.Y.Isakov
Kokand State Pedagogical Institute, Doctor of Biological Sciences, Professor
A.H.Khoshimov
Kokand State Pedagogical Institute, Doctor of Philosophy (PhD)
D.S.Meliboyeva
Lecturer of Kokand State Pedagogical Institute
https://doi.org/10.5281/zenodo.8431206

Annotation. The article makes a historical analysis of the study of the soil cover and the processes of development of irrigation and reclamation development of the territory. The natural and geographical features of the cone of the outflow of the river are highlighted. Sox and their changes under human influence. The properties of coiled and hydromorphic-oasis saz soils are described. The changes that have occurred in the land fund of the Fergana region over the past 30 years are presented.

Keywords: removal cone, one-time regime, calming, oasis soil formation, agroirrigation layer, plow sole, humus, land fund

Primary information about the soils of the Fergana Valley, including the alluvial fan of the river. Sokh, and their use are available in the works of A.F. Middendorf (1882), V. Nalivkin (1887). Systematic soil-geographical studies, in order to identify new lands for expanding the area under cotton cultivation, were carried out by expeditions of the Resettlement Administration in the second decade of the twentieth century (G.I. Dolenko, 1914; V.N. Tagantsev, 1914). Regular studies were of a soil reclamation nature and were carried out for the purposes of irrigation and land reclamation, development of new lands and increasing soil fertility. In the studies of M.A. Pankov conducted in 1931-1932 and 1949 [12], N.V. Kimberg and B.L. Pudovkin - in 1934-1935 [9], A.Z. Zaychikov - in 1939-1940 and others, the genetic affiliation and hydromorphic nature of the soils of alluvial fans were identified, reclamation properties and features that subsequently formed the basis for the construction of irrigation structures were determined, agrochemical properties were studied, agrochemical maps were compiled. According to large-scale soil surveys conducted by the Uzgiprozem Institute (1960-1963), soil maps of collective farms on a scale of 10,000, districts - M.1:50,000 and regions - M.1:200,000 were created. These maps were recalculated in the 70-80s.

In recent decades, a number of studies have been carried out in the area of the Sokh cone and adjacent territories, in which a lot of new materials have been obtained on the evolutionary development of soils [1, 8, 11], geochemistry and biogeochemistry [3, 4, 15], chemical and physical properties and characteristics, fertility and their changes [10, 14], land reclamation and their improvement [5, 6, 7]. These data differ significantly from the results of studies of the last century and require a reassessment of the quality of soil fertility and the widespread application of conclusions and recommendations. and a special approach to the use of soil resources at the level of modern requirements.

In soil studies conducted in the 1930s, in the middle part of the alluvial fan of the river. Sokhs were identified as irrigated meadow-swamp soils, irrigated dark- and light-meadow soils, irrigated meadow soils, and on the periphery, irrigated and virgin meadow

soils with varying degrees of salinity and various saline soils. The term “saz” was first applied to them [10].

The term saz (soz) was introduced into science by A.I. Bezsonov and L.I. Prasolov, this word means “meadow at the foot of the mountain” [7; 8, p.64]. Saz soils develop under conditions of constant ground moisture. The depth of the groundwater level in river valleys varies greatly depending on the season. But in alluvial fans such fluctuations are weakly expressed and their maximum level occurs in the summer months. The term “soz” (clay) is also associated with the mechanical composition of soils, since the lithological structure of the periphery of the foothills and foothill plains is dominated by rocks with a heavy mechanical composition, in particular clays, that is, loess.

It is known that the Sokha fan is divided into upper, middle and lower parts in accordance with its natural and geographical conditions. The upper part is composed of “bare” pebbles and sandy-gravel rocks, and most of the surface of the cone is covered with colmatage rocks: sands, sandy loams and light loams. Fresh groundwater is located at great depth, its surface is open and unprotected. The groundwater reserve is large and is considered a groundwater reservoir. These waters serve as drinking water for the city of Kokand and its surroundings.

In the upper gravel part of the fan, as a result of human activity, artificial soils were formed - soils called colmatage soils. Vegetables, rice and industrial crops are grown there, and orchards are widely developed. The thickness of the silt layer varies from 20-50 cm to 1-1.5 m. In the soil-ground profile, depending on how long ago they were used in irrigated agriculture, an agro-irrigation layer is distinguished. Underlying it are undifferentiated sandy-sandy loam and sandy-gravel rocks. The amount of humus in the top layer is 0.5-0.8%, in some places it reaches 1%.

In the gravel zone of the cone, livestock and poultry complexes are located, large and small enterprises are operating and new ones are being built (distillery, flour mill, cement, concrete plants), economic facilities are being organized (chipboard, slate, paving slabs, etc.). The process of developing new lands for agricultural crops is also gaining momentum. The areas of colmatage lands are expanding.

A free economic zone is planned for this territory, its construction is in full swing. Any change in the surface of the earth will affect groundwater. The water permeability of stone-gravel layers is high, and infiltration is strong. As a result, the quality of the waters of the Sokh underground reservoir, which had a high quality in the recent past, has deteriorated, and at the same time they have passed into a lower category.

The water flow of the Sokh River is currently 14.47 (3.21-44.48) m3/sec; this value before 1964 exceeded 41.4 m3/sec. In the distant past, the river was full of water, branching out from the mountain gorge to the valley into many branches, flowing in the northwest, north and northeast directions. Its waters spilled into the Syr Darya. The course of the river and its branches changed. Between the branches, due to the deposition of the runoff they brought, radially elongated flat hills and wide depressions were formed. The lithological structure of the hills is dominated by rocks with a light mechanical composition; accordingly, the groundwater level lies deeper and has better longitudinal and transverse flow. Soils of radial depressions have a heavier mechanical composition, groundwater is located close to the surface of the earth, and the flow is very slow.

4-4.5 km south of the BFC arc, the level of gravel and pebble deposits begins to deepen from the surface of the earth, from this place the middle part of the spread of the cone begins, which corresponds to the hydrogeological zone of groundwater pinching out. Its lithological composition includes sandy loam, various loamy and clayey rocks. The pebbles begin at a depth of 3-8 m. The area has a highly developed drainage network, with the help of which the level of fresh hydrocarbonate and hydrocarbonate-sulfate groundwater is maintained at a depth of 1-1.5 m.

Radially elongated flat elevations and depressions between them, characteristic of the upper and middle parts of the fan, are flattened in the lower part of the cone. The general slight slope is directed to the north, northwest. The lithological structure of the area includes multilayer sands, sandy loams, loams and clays. Under natural conditions, this area is a stagnant groundwater zone. But currently, the groundwater level is maintained at a depth of 1.5-2.0-3 m using the collector-drainage network. Their mineralization, which in the past was moderate to strong, has now decreased to moderate or weak. Their chemical composition is sulfate.

The alluvial fan of the Sokh River is located in the desert zone. Here the process of soil formation occurs under hydromorphic conditions. Irrigated agriculture has a long history. Oasis soil formation, having specific features, occurs in two stages. At the first stage of the process, the genetic horizons of the upper part of the soil profile are destroyed and an arable horizon is formed. The humus content decreases and is redistributed over time, with a gradual decrease towards the bottom. The arable horizon is constantly renewed and its thickness increases due to sediments brought by irrigation waters. All this in the second stage leads to the formation of an agro-irrigation layer, which is characterized by new properties.

Based on the above, in the territory of the alluvial cone, at the subtype level, irrigated meadow and irrigated meadow-swamp soils are identified, and in the presence of an agro-irrigation layer with a thickness of 50-60 cm - meadow-oasis and meadow-swamp oasis saz soils.

Irrigated swamp-meadow saz soils are common in areas near the upper pebble half of the middle part of the fan. In the morphology of these soils, the agroirrigation layer is not clearly formed. The arable layer, 20-25 cm thick, is dark gray with a bluish tint, has a fine-lumpy structure, and under it lies a dense, gelled, gley layer. In the works of A.N. Rozanova [13] and M.A. Pankova [12] and N.V. Kimberg [8] showed that in irrigated swamp-meadow soils the amount of humus is 2-4%. But in our studies this figure is 1.7-1.8%, rarely exceeding 2%. The decrease in the amount of humus is associated with the intensification of microbiological processes in irrigated agriculture, also with the monoculture of cotton, which has been continuously grown since the 60s, and the use of high rates of mineral fertilizers. Note that the decrease in humus content under irrigated conditions is widely covered in the scientific literature.

The soils are non-saline and the gypsum content is very low. The carbonate layer is clearly visible in the soil section. The amount of carbonates increases from top to bottom and reaches a maximum in the carbonate layer (15-20% and higher).

Meadow-oasis saz soils occupy large areas in the river cone. Soh. These soils represent the highest stage of the process of formation of oasis soils. The agroirrigation layer is bluish-gray in color, has an almost uniform mechanical composition and has a thickness of

30-60 cm. The amount of humus in the top layer of these soils is 1.5-1.7% and gradually decreases towards the bottom.

The section of meadow-oasis soils is characterized by the presence of a high-carbonate layer. This layer is very dense, cemented and is called “shoch”. The amount of CO2 carbonates in it reaches 25-27%, and sometimes exceeds 30%.

Mechanical composition of soils, as described by M.A. Pankov [12, 62 pp.], which is confirmed by our data, is diverse in both the middle and lower parts of the fan: on the surface of flat hills there are light loamy and loamy soils, on the slopes of hills there are heavy and medium loamy soils, and in flat hills depressions - clay soils. This description also applies to subsoil rocks. The mechanical composition of soil-forming rocks varies from sand and sandy loam to heavy loam and clay. Sandy and sandy loam layers and lenses are found in layers with a heavy mechanical composition.

Attention should be paid to one more feature of the soil profile of meadow-oasis Saz soils formed on the territory of the alluvial fan of the river. Soh. This is a dense subsoil horizon, formed as a result of continuous work of agricultural machinery for many years, its thickness is 5-10-20 cm, density reaches 1.6-1.7 g/cm3, sometimes more. Such a dense layer does not allow the plant root system to develop freely, and the result is a decrease in yield.

Thus, in the upper gravel and pebble part of the Sokh River fan there is a strong influence of the human factor on land resources. The development of the territory is a necessity arising from the development of the national economy, but it also has its negative sides. aspects, which include atmospheric air pollution, accumulation of waste, pollution of running water, in addition, this is manifested in changes in the quality of underground drinking water, in the deterioration of the reclamation condition of the lower hypsometric areas.

The development of the collector-drainage network and a sharp increase in the number of group artesian wells, as well as wells dug for irrigation, led to a softening of the strong hydromorphism in the middle part of the fan and the evolution of swampy soils. to meadow-marsh soils, as well as the reduction of springs characteristic of this area.

Virgin meadow soils with varying degrees of salinity, crusty and puffy solonchaks, widely distributed along the periphery of the alluvial fan, have been completely developed. Large areas of sand massifs were also developed. There are no virgin lands suitable for irrigation in the area, but there are wastelands abandoned for various reasons, including lack of water. During the years of independence, serious changes occurred in the structure of land use. Before Uzbekistan gained independence, land management was the responsibility of state (state farms) and collective (kolkhozes) farms. The total area of cultivated land in

Table 1

Area of irrigated lands in the Fergana region according to the size of irrigation maps [Talipov G.A., 1992]

Economy	Arable	Cards	Map areas by size, hectares

	land, hectares	Number of cards, pcs.	Average area, hectares	Before 0,5	0,6-1,0	1,1-3,0	3,1-6,0	6,1-10,0	10,1-15,0	>15,0
Kolkhoz	145013	29528	4,9	1553	3376	12997	20769	42170	32450	31698
State Farm	123580	30915	4,0	1333	3394	14662	30467	35557	24257	13910

Fergana region in 1990 was 268,593 hectares, which is 21,047 hectares more than the current situation (Table 1). So, in 30 years, so much land has been taken out of agricultural use. However, it should be noted that in practice this value is much higher, since during this period large areas were developed in Central Fergana and in the foothill-adir part of Southern Fergana.

The area of cities expanded, regional centers grew in size and received the status of cities. Villages grew, new settlements appeared, many large and small enterprises were built. All of this growth and expansion occurred at the expense of agricultural arable land. At the beginning of the 90s, agricultural arable land totaled 60,443 maps. Map areas ranged from 0.5 to 15 ha with an average size of 4.0–4.9 ha.

As of January 1, 2020, the number of land users (landowners) in the region is 20,263 people, and the average area of land assigned to them is 12.22 hectares. Household plots average 0.12 hectares, and 587,090 families own a total area of 71,962 hectares. Of these, 52,890 hectares are occupied by household crops (Table 2).

Table 2

Number of land users	Total area, hectares	Cultivated land, hectares	Perennial trees, hectares	Pasture, hectares	Total types of agricultural land, hectares	Homestead lands	
						Number of plots	Total land area, hectares
1	2	3	4	5	6	7	8
20263	698031	247546	49369	23480	317965	560391	71962

Land fund of Fergana region (as of January 1, 2020)

Lands of gardening and vegetable growing associations		Land for reclamation construction, hectares	Forestry land, hectares	Lands under water, hectares	Roads, hectares	Public buildings, courtyards, hectares	Total land unused in agriculture, hectares
Number of associations pcs.	Area, hectares						
9	10	11	12	13	14	15	16
9926	860	1878	14614	54727	26107	31803	290749

Table continuation

Conclusions. Active degradation is observed in the material composition and physical condition of soils. All soils, especially meadow soils, have a serious decrease in humus content. As a result, dark-colored meadow and swamp-meadow soils have passed into the category of light meadow. Large reserves of salt from salt marshes were washed away by capital washing and subsequent washing regime, and they turned into poorly and medium-saline irrigated meadow soils.

References:

1.Makhamatalikizi, A. N. (2021). Necessity and Problems of Typological Study of Onomatopoeia. International Journal of Development and Public Policy, 1(5), 101-102.
2.Aliboeva, N. (2022). The expression of comparative analysis. Science and innovation, 1(B7), 93-95.
3.Abdukakhorovna, J. M. (2021). Scientific Views on the Development of the Anthropocentric Paradigm in Linguistics. JournalNX, 7(07), 20-21.
4.Abdukahhorovna, J. M. (2021). History of the study of introductions and entries in russian linguistics. ACADEMICIA: AN INTERNATIONAL MULTIDISCIPLINARY RESEARCH JOURNAL, 11(1), 238-240.
5.Abdukakhorovna, J. M. (2020, June). THE SYSTEM OF PHONETIC GAMES IN THE TEACHING OF RUSSIAN LANGUAGE. In Archive of Conferences (Vol. 1, No. 1, pp. 70-71).
6.Жураева, М. А. (2016). ВНЕКЛАССНАЯ РАБОТА В СИСТЕМЕ НЕПРЕРЫВНОГО ОБРАЗОВАНИЯ (ЛИНГВИСТИЧЕСКИЙ КВН). Вестник современной науки, (2-2), 94-96.
7.Abdukahharovna, J. M. (2022). ANALYSIS OF THE SEMANTIC PECULIARITIES OF THE WORDS OF MASTERING THE RUSSIAN LANGUAGE IN THE UZBEK LITERARY LANGUAGE. ASIA PACIFIC JOURNAL OF MARKETING & MANAGEMENT REVIEW ISSN: 2319-2836 Impact Factor: 7.603, 11(11), 110-112.
8.Soliev, O. (2022). GENERAL CONCEPTS ABOUT EDUCATIONAL LAWS AND METHODS OF EFFECTIVE USING THEM IN EDUCATIONAL PROCESSES. Journal of Integrated Education and Research, 1(4), 448-452.
9.Ахмедова, Р. М., & Адилов, Ф. А. (2016). Подготовка специалистов в отрасли ремесленного производства в 20-х годах XX века. Ученый XXI века, (5-4 (18)), 62-64.
10.Ахмедова, Р. (2020). ЎЗБЕКИСТОНДА ДАСТЛАБКИ ШИФО МАСКАНЛАРИНИНГ ВУЖУДГА КЕЛИШИ (ФАРҒОНА ВОДИЙСИ МИСОЛИДА). ВЗГЛЯД В ПРОШЛОЕ, (SI-1№ 1).
11.Mukimovna, A. R. (2020, December). History of children's sanatorium resorts in Uzbekistan (1930-1953). In Archive of Conferences (Vol. 9, No. 1, pp. 311-314).
12.BURIYEV, S., MAXKAMOVA, D., & SHERIMBETOV, V. (2020). Ekologiya va atrof muhit muhofazasi. O ‘quv qo ‘llanma. T-innovatsiya ziyo.
13.Аҳмедова, Р. М. (2022). From the history of the socio-material situation of the population of Uzbekistan (on the example of 1920-1940). INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429, 11(09), 243-247.
14.Ahmedova, R., & Muxtorova, M. (2023). FARG’ONA VODIYSIDAGI SHIFO MASKANLARINING VUJUDGA KELISHI TARIXIDAN (“CHORTOQ” SIHATGOXI MISOLIDA). Interpretation and researches, 1(1).
15.Ahmedova, R., & Muxtorova, M. (2023). O’ZBEKISTON SANATORIY-KURORTLARI DAVOLASH ISHLARIDAGI AYRIM MUAMMOLAR TARIXI. Interpretation and researches, 1(1).

16.Ahmedova, R., & Shokirova, A. (2023). DEVELOPMENT OF REFORMS IN THE HEALTHCARE SYSTEM OF UZBEKISTAN AND ITS LEGAL FRAMEWORK OVER THE YEARS OF INDEPENDENCE. International Bulletin of Applied Science and Technology, 3(5), 1112-1116.
17.Mukimovna, A. R., Asqarovna, Q. S., & Sodiqovich, K. Q. (2022). HISTORY OF SOME PROBLEMS IN TREATMENT WORKS OF SANATORIUMS AND SPAS OF UZBEKISTAN. International Journal of Early Childhood Special Education, 14(7).
18.Abdukakhhorovna, Z. M. (2022). Lexical Polysemy of the Russian Language. Middle European Scientific Bulletin, 22, 77-81.
19.Abdukahharovna, J. M. (2023). DEVELOPMENT OF COMMUNICATIVE-SPEECH COMPETENCE OF FUTURE PRIMARY SCHOOL STUDENTS. INTERNATIONAL JOURNAL OF SOCIAL SCIENCE & INTERDISCIPLINARY RESEARCH ISSN: 2277-3630 Impact factor: 7.429, 12(02), 8-11.
20.Abdukahharovna, J. M. (2022). Working On Words With An Untested Unstressed Vowel At The Root Of A Word In Elementary School. Journal of Positive School Psychology, 145-149.
21.Abdukahharovna, J. M. (2022). PRIORITIES OF TEACHING THE RUSSIAN LANGUAGE IN SECONDARY SCHOOLS IN UZBEKISTAN. ASIA PACIFIC JOURNAL OF MARKETING & MANAGEMENT REVIEW ISSN: 2319-2836 Impact Factor: 7.603, 11(11), 113-119.
22.Soliyev, O. (2022). PEDAGOGIKA FANINI O'QITISHDA ILMIY-TADQIQOT METODLARIDAN FOYDALANISH. Science and innovation, 1(B6), 38-42.
23.Алибаева, Н. М. (2017). Бадиий матнларда эмоционал гаплар. Молодой ученый, (4-2), 2-3.
24.Isoqjonova, D., & Aliboyeva, N. (2020). INGLIZ VA O'ZBEK TILLARIDA INTENSIVLIK SEMANTIKASINI IFODALOVCHI XARAKAT FE'LLARINING QIYOSIY TAHLILI. In МОЛОДОЙ ИССЛЕДОВАТЕЛЬ: ВЫЗОВЫ И ПЕРСПЕКТИВЫ (pp. 363-366).
25.қизи Алибоева, Н. М., & Хошимов, Д. (2022). Тақлидий сўзларни типологик ўрганиш муаммолари. Science and Education, 3(3), 380-382.
26.Madumarov, T., & Ogli, G. O. R. (2023). FIGHT AGAINST CORRUPTION IN THE REPUBLIC OF UZBEKISTAN (ON THE EXAMPLE OF THE EDUCATION SYSTEM). Educational sacrifices, 02-05.