ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 7 | Issue: 5 | May 2021|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2021: 8.047 || ISI Value: 1.188

ECOLOGICAL AND RECLAMATION CONDITION OF IRRIGATED BROWN SOILS OF ZARAFSHAN BASIN

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ABSTRACT

As a result of the research, the emergence of salinization processes under the influence of various natural factors in the old-irrigated brown soils of the Zarafshan depression, widespread in the foothills, was studied. The levels of nutrient supply in the soils of the study area have been determined. Recommendations have been developed for the prevention and study of the processes of soil salinization in the region, a radical improvement in land reclamation, an increase in soil fertility and the creation of methods for their rational use.

KEYWORDS: ***reclamation, alluvial, soil, geomorphology, salinity, humus, phosphorus, brown, meadow, lithology, gypsum, agricultural technology, basin.***

INTRODUCTION

Research on the current state, properties of soils, soil fertility and their efficient use will be needed to address issues of agricultural development, proper crop placement and land reclamation, and measures to prevent soil degradation. Therefore, the development of soil research in irrigated lands, their comprehensive study, including the assessment of the current reclamation status of lands is one of the important tasks.

Of the total 2 million 418.8 thousand hectares of irrigated land in the country, 1 million 743.6 thousand hectares (72.1%) are saline soils of various degrees. In particular, a total of 96.8 hectares of irrigated agriculture in Navoi region, 62.4 thousand hectares (64.5%) of which are affected by salinization (reclamation of irrigated lands of the Republic of Uzbekistan and their improvement. Tashkent, University) , 2018) [1].

Previous studies have shown that warm weather, evaporation of groundwater in alluvial, agroirrigation and lyoss rocks and the accumulation of easily soluble salts in the soil surface layers are the main reasons for the development of secondary salinization processes. In addition, these processes promote the development of secondary salinization in the upper and middle parts of the soil profile of easily soluble salts in the soil under the influence of natural anthropogenic factors in the brown soils of the Zarafshan basin. [3].

The results of the study will be important for the implementation of the State Land Cadastre and monitoring of the ecological and reclamation status and fertility of brown soils in the foothills of the desert region. [2].

The main purpose of the study is to determine the level of salinity of irrigated lands and the negative impact of salinity on soil fertility, and to develop scientifically based recommendations to prevent soil salinization and improve the ecological condition.

RESEARCH LOCATION AND METHODS OF IMPLEMENTATION

The irrigated lands of Karmana district of Navoi region, where the Zarafshan basin is located, were selected as the object of study.

The research was carried out in the Republic of Uzbekistan on the basis of the "Instructions for conducting soil surveys and compiling soil maps for the State Land Cadastre" (2013), as well as methods of comparative geochemical and laboratory-analytical analysis.

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RESEARCH RESULTS AND DISCUSSION

The total land area of Karmana district of Navoi region, where the Zarafshan basin is located, is 16982.0 hectares. Due to its geographical location, Karmana district is part of the Central Asian arid continental climate region (province) of the Turan subtropical climate zone and is distinguished by its distinctive features belonging to the foothill semi-desert zone. The climate is characterized by high values of oscillation amplitude within the year and daily temperatures, dry and hot summers, almost low temperatures in winter, low cloudiness during the summer, very low atmospheric precipitation, specificity of wind activity. [3].

From the geomorphological point of view, the proluvial-deluvial and alluvial-proluvial deposits of the southern slopes of the Nurata mountain range and the Ziyoviddin-Zirabulak foothills in the east descend to the south from the foothills. The lands of the region are located at an altitude of 400-650 m above sea level. The brown soils of the region are developed in different lithological and hydrogeological conditions. [4].

According to the Bukhara branch of the Uzdaverloyiha Institute of the State Committee for Geodesy and Cadastre of the Republic of Uzbekistan, the specific features of these soils are their susceptibility to wind and water erosion and salinization, humus and other nutrients, their lack of mobile forms, groundwater The surface is relatively deep, weakly mineralized, the soils consist mainly of heavy and medium sandy mechanical composition, the amount of physical clay fractions is observed in the range of 29.2-68.4%. In the lower part of the soil profile, heavy sandy layers of sand and silt are observed in their composition. (Table 1). Mechanical composition of soil

Depth, see	The amount of fractions is in%, the particle size is mm. yes							
	> 0,25	0,25-0,1	0,1-0,05	0,05-0,01	0,01-0,001	0,005-0,001	<0,001	Physical mud (<0,01мм)
12 AK - cross-section consists of proluvial deposits .A Navoi massif Irrigated brown soils								
0-27	1,5	27,0	31,1	9,2	12,1	10,0	8,1	29,2
27-50	1,1	33,7	24,2	5,5	13,5	6,1	14,8	33,4
50-86	1,2	22,1	25,0	7,10	15,6	8,5	19,4	42,5
115-140	7,0	21,5	23,4	8,2	15,4	8,1	15,4	37,9
33 AK - cross-section is formed in polyuvial-alluvial deposits. An array of cultures Old-fashioned irrigated brown soils								
0-30	0,48	0,82	4,30	34,57	14,89	24,70	20,20	58,79
30-65	0,37	0,72	5,35	32,31	19,20	22,30	19,76	60,26
65-90	0,42	0,73	4,30	26,05	17,28	29,35	21,85	66,42
100-130	0,30	3,02	14,16	47,20	8,80	13,16	13,36	35,32

The amount of humus in the top plowing layer of the soil is moderate 0.55-0.80%, mobile phosphorus average - 27.4-11.50 mg / kg and exchangeable potassium - 181.4-197.7 mg / kg, the main amount of nitrogen accumulates in the topsoil and subsoil 0.54 At -0.71% lower horizons, their content decreases, the ratio of carbon to nitrogen (C: N) is 5.9-6.7 and pH = 7.4-7.3. The peculiarity of these brown soils is the shortness of the humus layer, the upper layers of which are subjected to different levels of leaching under the influence of irrigation and atmospheric precipitation, in some areas the upper horizons are washed away It is much poorer in nutrients than some soil distinctions (Table 2).

Table 2.The amount of humus and nutrients in the soilIndicators

Depth, see	Humus, %	Nitrogen, %	Phosphorus		Potassium mg / kg	CO_2carbonates, %	C:N	pH
			Gross	mg / kg				
12 AK - cross-section consists of proluvial deposits .A Navoi massif Irrigated brown soils								
0-27	0,55	0,054	0,050	27,40	181,4	13,40	5,9	7,4
27-50	0,47	0,047	0,053	14,20	183,3	12,97	5,9	7,5
50-86	0,31	0,030	0,042	13,00	180,2	12,54	5,8	7,2
115-140	0,17	0,020	0,035	11,20	150,8	12,00	4,9	7,3

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33 AK - cross-section is formed in polyuvial-alluvial deposits. An array of cultures Old-fashioned irrigated brown soils								
0-32	0,80	0,071	0,212	11,50	197,7	11,02	6,7	7,3
32-50	0,62	0,060	0,186	8,62	180,6	10,84	6,0	7,4
50-90	0,31	0,032	0,176	5,84	173,4	10,82	5,6	7,4

If the groundwater level is observed at a depth of 2-3 m and more, it is observed around 1-2.0 m in the main areas of the plain, rising to 1 m during the growing season, the amplitude of seasonal vibrations is 1.0-1.5 m. Especially in the lowlands of the plains, where the flow of groundwater is almost non-existent, the amount of easily soluble salts in water is increasing, and the primary salinity type in soils and groundwater is becoming mainly chloride-sulfate and magnesium-sodium salinity. In the group of non-saline and low-salinity soils dry residue (0.133- 1.210%), easily soluble salts (NaCl, Na_2SO_4, $MgSO_4$). in moderately saline segments, by contrast, the dry residue content is 1,431–1,114%, and in strongly saline segments, 1,543–1,351%. The amounts of chlorine and sulfate ions are recorded at a depth of 0–32 cm at 0.115 and 0.837%, respectively.

Gypsum (CaSO4 • 2H2O) in irrigated soils of the region occurs in different forms and amounts in soil layers at different depths from 40, 60, 90 cm to 130 cm.

As a result of dynamic changes in the hydrogeological conditions of the area throughout the year and measures related to irrigation, it is saline to varying degrees. Of the 16,982.0 hectares of agricultural irrigated land in the region, 190.22 hectares or 12% of the total irrigated land, 255.4 hectares of highly irrigated land, 1.50% of the total irrigated land, on average The area of saline lands is 4555.7 hectares, 26.83% of the total irrigated lands, the area of weakly saline lands is 10953.09 hectares, 64.50% of the total irrigated lands, the area of non-saline lands is 1027.56 hectares or 6.05% of the total irrigated lands. (Figure 1).

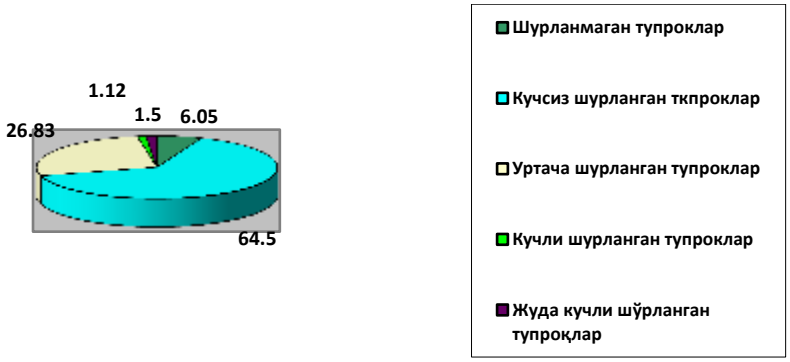

Figure 1

Land area according to the degree of salinity of irrigated lands of Karmana district (in%).

Natural processes in the course of salinity genesis and salt migration are also greatly influenced by complex complexes of irrigation, reclamation and agrotechnics. [3].

The study area is the top of the brown soils

Salt reserves in the 0-1 meter layer are formed depending on the natural conditions of the farms, as well as anthropogenic factors and agricultural culture. According to the chemistry of salinity, it consists of chloride-sulfate, and in some cases sulfate salinity types. To date, it has been found that the amount of salts in the upper 0–1 m layer of strongly saline soils increases sharply.

CONCLUSION

The irrigated lands of Karmana district of Zarafshan basin are of different salinity, different mechanical composition and types of salinity. struggle

In order to develop measures to increase crop yields, it is planned to perform the following tasks:

1) To study the morphological structure, characteristics, physical and chemical properties of the main soil types and subtypes in the region under the influence of anthropogenic and environmental factors;

2) to organize the implementation of saline leaching measures on the basis of established norms, starting from strongly saline soils, and to ensure the flow of surface and groundwater;

3) In the existing system of collector-drainage networks, taking into account the processes of salinity accumulation in the soils of the foothills, groundwater levels should be kept below the "critical depth" (2.5-3.0 m);

4) Depending on the parent rock, mechanical composition, gypsum and layer thickness and the initial amount of chloride ion, depth and level of mineralization of groundwater, it is expedient to determine the timing and norms of agro-ameliorative measures and to intensify research work. .

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