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SOIL SCIENCE

CAUSES OF SOIL DEGRADATION AND MEASURES TO PREVENT IT

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ПРИЧИНЫ ДЕГРАДАЦИИ ПОЧВ И МЕРЫ ПО ЕЕ ПРЕДОТВРАЩЕНИЮ

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АННОТАЦИЯ

Деградация земель является одной из наиболее острых экологических проблем в мире, и население планеты страдает от той или иной стороны деградации. Правительство Республики Узбекистан осуществляет ряд мер по выявлению причин процессов деградации земель, а также мер по их предотвращению. В статье был проведен мониторинг почв, разбросанных вокруг Бухарского оазиса, проведен анализ в районах "массива Бабур" и "массива Ибрагим Муминов" Шафирканского района, выявлено несколько случаев деградации в этих районах. Также в статье описан способ предотвращения деградации.

ABSTRACT

Land degradation is one of the most acute environmental problems in the world, and the world's population suffers from one side or another of degradation. The Government of the Republic of Uzbekistan is implementing a number of measures to identify the causes of land degradation processes, as well as measures to prevent them. In the article, the monitoring of soils scattered around the Bukhara oasis was carried out, an analysis was carried out in the areas of the “Babur massif” and “Ibrahim Muminov massif” of the Shafirkan district, several cases of degradation in these areas were identified. The article also describes a way to prevent degradation.

Ключевые слова: плодородие почв, деградация, подземные воды, засуха, климат, температура, эрозия.
Keywords: soil fertility, degradation, groundwater, drought, climate, temperature, erosion.

1. Introduction

Combating land degradation in the country and mitigating its negative consequences, preventing desertification and drought in the territories, preserving biodiversity, preserving and increasing soil fertility, restoring degraded lands, based on the widespread use of advanced scientific developments and innovations in this direction, in order to achieve sustainable development of the regions, the Decree of the President of the Republic of Uzbekistan No. PP was signed-277 On measures to create an effective system to combat land degradation [1].

According to the United Nations Food and Agriculture Organization, if the processes of degradation on earth continue in this way, by 2050, soil degradation could amount to 90% of agricultural land. Currently, the annual damage from degradation worldwide amounts to $ 490 billion. In most regions, 2.6 billion people suffer from soil degradation. Degradation led to the degradation of about 73% of pastures and 47% of rain-fed lands [2].

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During the decomposition of the earth, carbon and nitrous oxide are released from the soil into the atmosphere. This makes it one of the most important factors on climate change. As a result of scientific research, scientists have found out that we emit almost 24 billion tons a year from fertile soil. 3.2 billion people worldwide suffer from land degradation. Therefore, this topic is relevant [3].

2. Material and methods

The studies were carried out in the conditions of alluvial soils of meadows of the Babur and Ibrahim Muminov massifs of the Shofirkan district of the Bukhara region.

At the same time, cuttings were taken from soils and soil samples were taken from genetic horizons. The amount of water-soluble salts from the soil samples taken was determined based on the analysis of water absorption, and agrochemical indicators of the content in the soil were determined by generally accepted methods. A mathematical analysis of the results was also carried out.

Table 1.

Agrochemical properties of soils of the "Ibragim Muminov" massif of Shafirkan district of Bukhara region

№	Depth, cm	Dry residue, %	Sum of salts, %	100 g in soil, %/mg/eq						
				HCO_3^-	Cl^-	SO_4^{2-}	Ca^{2+}	Mg^{2+}	Anion	Kation
1	0-32	0.178	0.153	0.62	0.49	1.44	0.90	0.79	2.55	1.69
	32-68	0.142	0.128	0.56	0.39	1.19	0.75	0.64	2.14	1.39
	68-95	0.148	0.130	0.52	0.49	1.19	0.80	0.79	2.20	1.59
	95-137	0.142	0.123	0.50	0.39	1.19	0.75	0.79	2.08	1.54

3. Results

Soil salinization is one of the important degradation processes. Looking at the result of the experiment, we can say that the soils of the Shafirkan district of the Bukhara region are saline to one degree or another. According to the salinity levels, the territory studied by us is considered slightly saline. As for him, if in the upper arable layer of the soil 0-30 cm in terms of alkalinity, which changes the parameters of the medium, this indicator was 0.038%, then in the CL anion - 0.069%, the SO4 anion-0.069%, in this layer by the number of cations, the content of Ca2+ was 0.018%, and Mg2+ - 0.010% did. The joint fraction of the Na + cation and the K + cation was 0.020% when calculated on the basis of the generally accepted method. The total amount of water-soluble salts, i.e. the amount of dry residue in this layer was 0.178% (Table 1).

The amount of salinity has changed slightly towards the lower layers of the soil, it is not noticeable. For example, in the bedding layer of 32-68 cm, the total alkalinity was 0.5 mg/eq, and in CL- ; SO4 anions - 0.39; 1.19 mg/eq. These indicators are relatively high in cations, i.e. Ca2+ ; Mg2+, as well as in K+; Na+ cations, 0.75; 0.64; 0.75 mg/eq with a ratio of anions and cations of 2.14 mg/eq. In a layer of 65-95 cm of soil, the sum of cations and cations was 2.20 mg/eq, in a layer of 95-137 cm, these indicators were 0.142% by dry residue, in a layer of anions and cations were equal to.t.e. 2.08 mg/eq (Table 1).

In all layers it was noticed that the salinity language is C-S

Soil degradation negatively affects the agrochemical indicators of its content in which the plant is able to assimilate. We can see this in a decrease in the amount of mobile phosphorus and exchangeable potassium in the soil. One of the main factors determining soil fertility is the humus content. It is also observed that degraded soils have sharply decreased. For example, if in the surface layer of the soil, i.e. in the 0-32cm layer, the humus content was 0.6%, then in the underlying layers of the soil it decreases due to a decrease in the amount of organic matter, which is in layers 32-68; 68-95; 95-137cm of soil was 0.4; 0.4; 0.3%, respectively, the sequence of layers. One of the main agrochemical indicators of the soil is 10.3 mg/kg in the surface 0-32 cm soil layer which belongs to the group of extremely poor in mobile phosphorus content.

Table 2.

Supplying nutrients to the soils of the "Ibragim Muminov" massif of Shafirkan district of Bukhara region

№	Depth, cm	Humus %	P_2O_5 mg/kg	K_2O mg/kg
1	0-32	0.6	10.3	127.6
	32-68	0.4	8.6	102.0
	68-95	0.4	6.4	95.3
	95-137	0.3	5.0	88.0

The layer ranged from 8.6 mg/kg to 5.0 mg/kg, while the amount of mobile phosphorus also decreased as it moved down (Table 2).

Analysis of indicators for the content of exchangeable potassium shows that in the surface layer of 0-32 cm of soil, amounting to 127 mg/kg it belonged to the group of extremely poor, this indicator was 102.8 mg/kg in a layer of 32-68 cm. As the layer progressed downwards, the content of exchangeable potassium also decreased and belonged to the group of extremely poor, the ESA indicators were 95.3 and 88.0 mg/kg (Table 2).

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4. Conclusions and recommendations

The analysis shows that for 30-40 years, with a decrease in the duration of irrigation, an increase in salinity and a decrease in the amount of humus were observed in some points of the massifs in these areas. From this we can learn that the formation of an agro-irrigation horizon as a result of irrigation and its thickening has a much more effective effect on humus reserves. Consequently, humus reserves on irrigated meadow alluvial soils are higher than on newly developed and newly irrigated meadow alluvial soils. In addition to agricultural land, there are also salt marshes, coots and sand dunes that need to improve the phytomeliorative state. Seasonal use of pastures is necessary for the effective use of pasture lands of the farm. In order to increase the yield of pastures, artificial planting of black saxaul is recommended to strengthen the sands.

As a result of wind erosion, many shrubs and semi-shrubs dry up due to root exposure.

Pastures are the main source of feed and a medium for grazing and breeding livestock. Therefore, it is necessary to preserve existing pastures, prevent degradation, increase the yield of pasture plants, and generally establish rational and efficient use of pastures [4].

To do this, crop rotation is organized on individual pastures (in a rotational way) in order to prevent excessive grazing of livestock.

Careful use of existing wells to improve pasture water supply, repair of damaged ones, opening of new water sources in areas remote from water (drilling of wells and boreholes). It is necessary to carry out work on the restoration of flora on 11.8 thousand hectares of degraded areas identified as a result of research [5].

Considering that the weather, according to monitoring studies, will be dry every 10-3 years, cattle should not be fed on degraded fields, grazing on these degraded fields will lead to an increase in harmful and poisonous plants for livestock, which is the main factor predisposing pastures to a crisis.

To improve the reclamation condition of lands and the leaching of salts of their soils, it is necessary to bring the depth of on–farm and inter-farm collectors, ditches and drains to 2.5 - 3.0 m and ensure their good drainage. These works can be carried out with the use of complex agrotechnical and reclamation measures. As a result, the areas of saline soils on the land plots of the farm decrease, their fertility increases and the yield of agricultural crops increases.

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