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# The Composition, Properties and Meliorative Situation of the Irrigated Soils in the Gijduvan District of the Bukhara Oasis

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**Abstract:**The article provides information about the texture and properties of irrigated soils in the Gijduvan district of Bukhara Oasis, its changes, geomorphological-lithological, soil-climatic conditions, salinization process and its prevention, the effect of melioration on soil agrochemical status and soil fertility, the norm and status of salt washing.

**Keywords.** irrigated meadow alluvial soils, salinity, mechanical composition, melioration, geological-geomorphological, soil-climatic conditions, quantity of humus, active nutrients, norm and duration of salt washing.

**Introduction.**On a global scale, the role and importance of the agrarian sector in ensuring food security of the population is increasing day by day. In particular, the rational use of the available resources and opportunities in our country, the guaranteed provision of the population with agricultural products, the further increase of productivity and competitiveness, the introduction of scientific achievements and modern approaches to the sphere is an urgent issue.

As a result of the active influence of Man on the soil, changes in its texture-properties, increase or decrease in fertility, salinity, erosion, dehumification and soil conservation are also considered to be more noticeable than before.

Knowing, taking into account and predicting its meliorative status on the basis of maintenance, increase, protection of fertility of the lands being cultivated in the Republic is the guarantee of increasing fertility of soils. When improving the melioration condition of irrigated soils, first of all, it is necessary to have a complete understanding of the laws of origin of soils, their geological-geomorphological, geogeological and ecological status.

**Materials and methods.** The study was carried out in the conditions of irrigation Meadow alluvial soils of Bukhara Oasis Gijduvan district SattorJabbarovlocality. Soil samples were taken from the irrigated meadow alluvial soils and genetic horizons were separated into separate layers according to morphological signs. The amount of humus in the soil was determined by the method of Thurin, the method of N-$NO_3$-Granvald-Lyaju, the method of N-$NH_4$-Nessler reaction, the method of

action of phosphorus-Machigin, the method of almachinizing potassium-flame photometer MachiginProtasov, the method of water absorption of easily soluble salts in the soil.

**Results of the study.** The Bukhara oasis consists of flat lands, with altitude levels falling from North to South. Oasis zones do not differ sharply from each other in terms of organic structure and relief, climatic conditions and soil-plant world.

Complex organic, geomorphological-lithological, soil-climatic conditions of the Oasis zone have created a very complex geographical position, which is reflected in the indicators of the regime and balance of surface and groundwater.

As a result of the approach of drainage water to the surface of the Earth on irrigated lands, the area of geomorph (meadow) soils in an evolutionary way is depleted and the salinization process is progressing. The problem of preventing these situations and stopping negative processes remains the main urgent issue. The territory of the region consists of different rocks that are laid in organic periods, and the native rocks that form the soil are composed of low (weak) alluvial rocks. In the main part of the territory lay sand-mixed layers of alluvial san deposits, which are sandy and sandy layers above the native rocks forming soil [1,2,3].

The main factors affecting the salinity and secondary salinity of irrigated meadow alluvial soils of Gijduvan district are regular irrigation works and the active movement of groundwater. In most cases, more than the norm of water is spent on irrigation, the movement of drainage waters is not controlled, if in the process of irrigation water is spent depending on the type of soil, its mechanical composition and other characteristics, as well as the management of groundwater salination of soils as it is now in a systematic way will not meet[4].

The effectiveness of salt washing will depend on the soil (mechanical composition, water-physical property, degree of salinity, type of salinity), hydrogeological (depth of drained water and conditions of leakage), climate (amount of precipitation, temperature of air), soil zoning and agrotechnical conditions [Table 1].

**1-Table.**

**The ranging of the irrigated soils according to the salinity level in the Gijduvan district of the Bukhara region**.

| т/p | Names of localities | Area of irrigated lands, ha | According to the salinity level | | | | | | | | | | Saline lands | | Average, strong, and very strong saline soils | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Non saline | | weak | | medium | | Strong | | Very weak | | | | Ratio to the total irrigated lands | | Ratio to the total saline soils |
| | | | га | % | га | % | га | % | га | % | га | % | га | % | га | % | % |
| 1 | Gijduvan | 697,9 | 438,5 | 62,8 | 86,4 | 12,4 | 72,8 | 0,4 | 86,4 | 12,4 | 13,8 | 2 | 259,4 | 37,2 | 173,1 | 2468 | 66,7 |
| 2 | A.Gijduvani | 1363 | 443,2 | 32,5 | 732,4 | 53,7 | 181 | 13,3 | | | 6,4 | 0,5 | 919,8 | 67,5 | 187,4 | 13,8 | 20,4 |
| 3 | S.Jabbborov | 1426 | 623,1 | 43,7 | 752,8 | 52,8 | 50,2 | 3,5 | | | | | 802,9 | 56,3 | 50,2 | 3,5 | 6,2 |
| 4 | Uzbekistan | 1052 | 430,2 | 40,9 | 78 | 54,9 | 43,8 | 4,2 | | | | | 621,8 | 59,1 | 43,8 | 4,2 | 7 |
| 5 | Gulistan | 1233 | 330,5 | 26,8 | 837,2 | 67,9 | 33,3 | 2,7 | 32 | 2,6 | | | 902,5 | 73,2 | 65,3 | 5,3 | 7,2 |
| 6 | Jilvan-2 | 672 | 421,2 | 62,7 | 250,8 | 37,3 | | | | | | | 250,8 | 37,3 | 0 | 0 | 0 |
| 7 | Pakhtaabad | 1239 | 403,1 | 32,5 | 437,4 | 35,3 | 368,4 | 29,7 | 3,01 | 2,4 | | | 835,9 | 67,5 | 398,5 | 32,2 | 47,2 |
| 8 | OqOltin | 1326,2 | 322,4 | 24,3 | 749,5 | 56,5 | 217,4 | 16,4 | 37 | 2,8 | | | 1003,8 | 75,7 | 254,3 | 19,2 | 25,3 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Ibn Sino | 1230 | 497,3 | 40,4 | 539,4 | 43,9 | 143,2 | 11,6 | 35 | 2,8 | 15,1 | 1,3 | 732,7 | 59,6 | 193,3 | 15,7 | 26,4 |
| 10 | A.Navoiy | 1042 | 77,8 | 7,5 | 67,07 | 64,5 | 255 | 24,5 | 33,8 | 3,2 | 3,7 | 0,4 | 964,2 | 92,5 | 292,5 | 28,2 | 30,3 |
| 11 | H.oLIMJON | 1527,8 | 258,3 | 16,9 | 1177,5 | 77,1 | 82,2 | 5,4 | 4,9 | 0,3 | 4,9 | 0,3 | 1269,5 | 83,1 | 92 | 6 | 7,2 |
| 12 | F.Khujayev | 961 | 458,8 | 47,7 | 192,7 | 20,1 | 309,5 | 32,2 | | | | | 502,2 | 52,3 | 309,5 | 32,2 | 61,6 |
| 13 | S.Ayni | 1530 | 312,2 | 20,4 | 827,4 | 53,9 | 296,5 | 19,3 | 77,1 | 5 | 20,8 | 1,4 | 1221,8 | 79,6 | 394,5 | 25,7 | 32,3 |
| 14 | Urmonchilik | 87,4 | 75,8 | 86,8 | 11,5 | 13,2 | | | | | | | 11,5 | 13,2 | 0 | 0 | 0 |
| 15 | Kukcha | 407 | 21,3 | 5,2 | 219,1 | 53,9 | | | 53,4 | 13,1 | 113,2 | 27,8 | 385,7 | 94,8 | 166,6 | 40,9 | 43,2 |
| 16 | Mehnatobod | 349,1 | 262,9 | 19,5 | 734,7 | 54,5 | 267,4 | 19,8 | 64,5 | 4,8 | 19,8 | 1,5 | 1086,2 | 80,5 | 351,6 | 26,1 | 32,4 |
| 17 | Khalqobod | 1162 | 640,7 | 55,1 | 332,5 | 28,6 | 44,6 | 3,8 | 116,6 | 10 | 27,6 | 2,4 | 521,3 | 44,9 | 188,8 | 16,2 | 36,2 |
| 18 | Zarafshon | 1570,2 | 504,3 | 32,1 | 900,4 | 57,3 | 120,2 | 7,7 | 11,9 | 0,8 | 33,4 | 2,1 | 105,9 | 67,9 | 165,5 | 10,5 | 15,5 |
| 19 | Gijduvan AKT | 26,4 | 16,7 | 63,1 | 9,8 | 36,9 | | | | | | | 9,8 | 36,9 | | | |
| 20 | Parrandachilik | 126 | 126 | 100 | | | | | | | | | | | | | |
| **Total:** | | 20032,0 | 6664,3 | 33,3 | 10041,0 | 50,1 | 2485,4 | 124 | 582,7 | 2,9 | 258,7 | 1,3 | 13367,7 | 66,7 | 3326,7 | 16,6 | 24,9 |

The mechanical composition in light soils, salts are washed off quickly, even with low water consumption. On the contrary, salts are washed much less and in the long term when the mechanical composition is heavy, condensed, in the case of water-repellent plaster or carbonated layers in the soil [17,18,19,20,21].

Mechanical composition compared to light soils, the mechanical composition is heavy, in dense soils salt is less and difficult to wash. When a layer of sand is placed under the soil, the brine becomes easier to wash, and when a dense shallow layer is placed, it becomes more difficult.

Salt washing is very slow in soils where there are layers of gypsum or gypsum, or the grinding tooth is densified. If the soils with such a layer are softened with special softening weapons, the effectiveness of salt washing will be significantly increased.

The soil with granular ovules and grills, which have a lot of coarse, light and medium grit, is quickly washed and defrosted in the spindles with low water consumption.

The effectiveness of salt washing will also depend on the aggregate state of the soil and its moisture content. Salt from dry soils is washed less often than on wet soil. The smaller the soil aggregates, the easier the salt is washed off.

The effectiveness of water salting will also depend on the degree of salinity of the soil.

The more salt in the soil, the more difficult it is to wash it.

The effectiveness of salt washing is also attributed to the content of salts in the soil. If there are a lot of chlorides in the soil, they are easily washed off, since chloride salts are easily soluble in water.

In sulfuric saline types, salts are washed less often than in chloride saline soils. Because sulfates are less soluble in water, especially at low temperatures are less mobile [5,6,7].

The process of desalination of soils with a heavy mechanical composition, when the drainage water levels are located 1,5-3,0 m, is also very sluggish. The reason for the Bung is that when the drainage water level is located on the surface, the free capacity of the soil is very small, there is very little water in it, and the speed of my drainage water flow is very slow. Under such conditions, salt washing is also much more difficult, since the soil becomes strongly saturated with Capillary moisture. Drainage water level in the period from one irrigation to the second irrigation as a result of irrigation of the lands on which the surface is located, and even after irrigation, the soil is re-saline. Especially during the period of salting, when the Earth is not dewatered deeply, the soil is very quickly salted again, when the water level of drainage decreases slowly [8,9,10,11,12].

The effectiveness of salt washing will also depend on the degree of soil thinning. The more the area on which the brine is washed, the better the soil is drained at the effect of salt washing. In the case of deforestation, the norm of salt washing may be the same or less water is consumed than in non-deforestation, but the deeper layers of the soil are also well desalinated [22,23,24,25].

The amount of humus contained in the soil is the main part of the organic matter of the amount of organic matter in the soil [13,14,15,16].

When we determine the amount of humus contained in the irrigated meadow alluvial soils of the SattorJabborov locality in the Gijduvan district by the layers from top to bottom along the soil profile, we can see that the humus content is high in the haydov layer, that is, the surface layer, while the amount of humus increased to the lower layers of the soil was sharply reduced [Table 2].

**2-Table**

**Humus and active alimentation levels of the meadow alluvial soils in the irrigated soils of the Gijduvan district of the Bukhara region**

| Thickness of the layer in cm | Humus, % | $N\text{-}NO_3$, mg/kg | $P_2O_5$, mg/kg | $K_2O$ mg/kg |
|---|---|---|---|---|
| 0-41 | 0,975 | 2,93 | 12,0 | 183,0 |
| 42-74 | 0,755 | 2,57 | 10,0 | 171,0 |
| 75-111 | 0,375 | 1,18 | 9,0 | 122,8 |
| 112-150 | 0,225 | 1,26 | 7,0 | 91,5 |
| 151-193 | 0,187 | 1,48 | 7,0 | 125,2 |
| 194-220 | 0,187 | 1,12 | 6,0 | 134,8 |

For example, it was observed that if the amount of humus in the 0-41 cm layer of soil is 0,975%, 42-74; 75-111; 112-150; 151-193; 194-220 centimeters the amount of humus in layers, respectively 0,755; 0,375; 0,225; 0,187; 0,187 %.

In the soil profile under study, nitrogen in the form of nitrate ($N\text{-}NO_3$) from the top to the bottom is reduced. Here it was decreased from low-income to very low-income levels, with a surface layer of soil (0-41 cm) to 2,93 mg/kg, (42-74 cm) to 2,57 mg/kg, (75-111 cm) to 1,18 mg/kg, (112-150 cm) 1,26, (151-193 cm) to 1,48 mg/kg, (194-220 cm) to 1,12 mg/kg.

Another key indicator that determines the fertility of the soil is this movable phosphorus.

According to the results of the research, the amount of moving phosphorus in the surface layer of the soil (0-41 cm) is 12 mg/kg, in the layers of soil 42-74; 75-111; 112-150; 151-193; 194-220 cm respectively, in 10, 9,0, 7,0, 7,0, 6,0 mg/kg soil.

The amount of exchangeable potassium contained in the soil is important for the growth development of the plant.

If the amount of replaceable potassium in the soil profile under study was 183 mg/kg in the 0-41 cm layer of the soil, 42-74; 75-111; 112-150; 151-193; 194-220 cm in layers, respectively, amounted respectively 171,0, 122,8, 91,5, 125,2, 134,8 mg/kg.

**Conclusion.** In soils with low saline light mechanical composition, it is desirable to conduct current saline washing in early spring (March), moderately and strongly saline, and in soils with a mechanical composition of thief in October, December, January and February. In the autumn and winter seasons, when washing the brine, 2/3 of the general norms of salt washing is carried out in the spring, until a strong Frost falls, and the remaining 1/3 in the spring. Taking into account the discharge of drainage waters and other factors, the correct determination of irrigation periods, numbers and norms, strict compliance with irrigation regimes;

Among the many factors that cause soil salinity, it is necessary to pay special attention to the concepts of “critical depth” and “critical mineralization” of groundwater. In conditions where the evaporation from the soil surface of dry and scorching hot climates irrigated lands is several decades more than atmospheric precipitation, the salinization process is an inevitable situation to occur, the main meliorative measures should be directedto prevent this negative process, reducing its effect on plants.

It was observed that irrigation has had a positive effect on the agrochemical properties of irrigated meadow alluvial soils of Bukhara oasis for a long time. The amount of humus in it ranged from 0,975% to 0,187%, from 2,93 mg/kg ($N\text{-}NO_3$) to 1,12 mg/kg, from 12 mg/kg to 6 mg/kg of moving phosphorus, while the replaceable potassium was 183,0 mg/kg; 134,8 mg/kg.

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