# USE OF RESOURCE-SAVING TECHNOLOGIES AND STUDY OF MINERAL FERTILIZER CONSUMPTION IN THE BUKHARA OASIS INCREASING THE PRODUCTIVITY OF IRRIGATED SOILS

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*In accordance with the tasks defined in the strategy for the development of the Republic of Uzbekistan for 2020-2030, as well as the Comprehensive program, which provides for the mapping of saline soils in the irrigated agricultural lands of the Republic, the determination and mapping of the salinity level of the soils in the irrigated lands of the Republic is being carried out.. To the high stage of development of our country.At present, when intensive technologies are being introduced in agriculture and farming, the issues of efficient use of soils are becoming an urgent task. Protection of irrigated soils, agrotechnical, agromeliorating and other measuresohIn addition to improving the land reclamation and ecological condition, improving the efficiency of using land resources, itheany negative processes that harm moisture, including soil shohOne of today's priority tasks is to prevent the spread of the virus, eliminate its consequences bohis lib.*

Decree of the President of the Republic of Uzbekistan No. PF-60 of January 28, 2022 "On the Development Strategy of New Uzbekistan for 2022-2026" and No. PF-5742 of June 17, 2019 "On Measures for Effective Use of Land and Water Resources in Agriculture" Fulfillment of the tasks defined in the decrees, further improvement of the reclamation condition of irrigated lands and rational use of water resources serve to ensure the unconditional implementation of the State Program. From this point of view, in order to prevent secondary salinization processes in the irrigated lands of the republic and to successfully solve the problems of reclamation, in-depth study of the properties of irrigated soils and meliorational-ecological condition, and for this, to conduct large-scale "Saline Soil Mapping" works in irrigated lands,

Of course, systematic work aimed at studying and improving the reclamation condition of irrigated soils will be continued on the basis of using the scientific potential of relevant organizations of the republic, scientific research institutes and

higher education institutions, as well as studying the best practices of foreign countries.

Bukhara voyesIt is considered one of the oases of developed agricultural culture located in the southern part of the republic. It occupies an important place in the cultivation of agricultural products in the republic. That is why it is spread in the oasisproperties of soilsknowledge and increasing soil fertility are important in providing the population with ecologically clean, high-quality products.

Hydromorphic, automorphic and semi-hydromorphic soils of the desert region on the border of Bukhara regionrnican be found, they were formed in alluvial, proluvial, alluvial-proluvial deposits of different ages and genesis. One of the most common soil types in the oasis is irrigated grassland (old, newly irrigated, and newly reclaimed) soils. The depth of the Sizot waters is 2-3 m, that is, the ground layer is the soils formed in intensive wet conditions.

Bukhara oasis soilsrowdespite the fact that it was studied by scientists in different periods and reflected in their published scientific works,in the following periods, negative and positive changes in the soil are taking place in the oasis, which are connected with the construction of the Amu-Bukhara canal and the improvement of water supply. The study of these phenomena was considered one of the most urgent issues of the day.

Irrigated meadow alluvial soils vary in mechanical composition-It is distinguished by its haze. The mechanical composition of the lands located near the irrigation sources is somewhat light, and the further away from them, the heavier it becomes. The surface of previously irrigated meadow soils is covered with agroirrigated deposits, so their composition is uniform, and the thickness is up to 1-3 m. According to their mechanical composition, they are medium and heavy sand.

The content of humus (1.1-1.4%) and nitrogen (0.08-0.12%) is somewhat higher in old and newly irrigated meadow soils compared to other soils of the desert region. Irrigated meadowthe content of soils is low in phosphates. Low to moderate supply of potassium. The carbon content of soils is uniformly 8.8 - 9.3%. In general, irrigated grassland soils constitute a valuable land fund of the Bukhara oasis with high productivity.

Thus, among the irrigated meadow soils, together with marsh-meadow soils, strongly saline marsh-meadow soils can be found in the remote parts of the oasis in the abandoned lands. They occupy the lower areas of the relief and therefore the land reclamation is in a bad condition. In saline lands, salts accumulate in the upper layer of the soil section. These soils are poor in humus (0.5-0.7%), maccording to their organic composition, they are different: from heavy sand to sandy loam.

Grassy barren soils are distributed only in the upper part of the Zarafshan river tributary of the Bukhara oasis. They were formed in the somewhat higher relief part of meadow soils, and are relatively little moistened by seepage water, its depth is 3-4 (5) m. During periods of maximum watering and water use, seepage waters may

temporarily rise up to 1-2 m. The upper part of the section of these soils is covered with 1-2 m of agroirrigated deposits, which are medium and heavy sand.

Relatively low water in the areas located aboveofthe flow is good, and the leaching process is weak compared to grassland soils. Therefore, they are less salted and washedbeingthere are few areas of moderate and strong salinity. Formerly irrigatedThe arable layer of barren meadow soils may contain 0.5-1.1% humus and 0.04-0.12% nitrogen. The amount of carbonates varies from 7.4 to 9.2%.

Barren soils occur at the border of the irrigated area of the old alluvial and proluvial plains. Sizot was formed in conditions where the water depth is 5 m. In natural conditions, a barren soil is formed on the surface of the soil section, and the sub-barren and dense alluvial layer is separated. They are grassland barren soils of the recent past.

Irrigated barren soils are moderately saline. As a result of long-term irrigation, the depth of seepage water has increased to 3-5 m. Irrigation and capillary moistening of the soil cause a radical change in the hydrothermal order in the soil, therefore, microbiological activity develops and the basis for rapid processing of organic matter is created. The reverse process begins in the irradiated barren soils, i.e. return to grazing, the soils show signs of barrenness and grassland. The soil becomes a transient barren meadow. Barren-meadow soils differ little from barrens at the beginning of the development period. Despite the increase in the amount of organic matter in the soil and the increase in microbiological activity, they remain low in humus (0.7-0.8%), the amount of nitrogen in them is 0.06-0.07%. According to the mechanical composition, the irrigated barren-meadow soils are light sandy, and the protected ones are medium, heavy sandy and gravelly - stones from 0.4-1 m are found, the amount of carbonates is 8-10%. Their amount depends on the change in the mechanical composition of the layers. The degree of salinity of barren-meadow soils is weak and moderate.

Sandy-desert soils are formed when the sand is covered with plants, ephemeral grasses with their roots form a layer of humus, the thickness of which is 12-15 cm, together with the sub-layer of humus. Humus is mainly collected in this layer of the soil, its amount is up to 0.5%, and nitrogen is 0.04-0.05%, phosphorus is 0.140-0.145%. They are often alluvial, proluvial, or root sands that have been eroded by wind. The depth of Sizot waters is more than 5 m. Sandy-desert soils are non-saline or weakly saline.

In the following years, importance is being paid to the development of sandy-desert soils in irrigated agriculture. During land leveling, the humus layer on the soil surface is lost, as a result, sandy-desert soils lose their properties. In order to prevent wind erosion, to make the mechanical composition of the soil somewhat heavier and to increase their productivity, it is necessary to carry out complex special measures for these soils, watering them with muddy water, planting siderate crops, enriching with organic substances, applying bentonite, gluoconite and similar

mineral fertilizers with a heavy mechanical composition. necessary. Development of these soils should be carried out with a collector-water system, otherwise it will lead to high absorption and rapid rise of seepage water and rapid salinization. Irrigated sandy-desert soils are moderately to weakly saline.

On the edges of the irrigation area of the Bukhara oasis, brown soils are scattered. Sur brown soils differ in the shortness of the section, but the section is fully expressed, clearly separated into genetic layers. According to the mechanical composition, the brown soils are different: from loamy sand to heavy loam. Humus is rare in these soils. Depending on the mechanical composition, it fluctuates from 0.2 to 0.6% in its upper layers. In the lower layers, its amount is 0.2-0.3%. Carbonates are 3% to 6% by cross section. In the natural state, these soils are not saline on the surface, but saline. The amount of salts is up to 1-2% at a depth of 0.3-0.6 m. Periodic wetting of the cut and its drying bring the salts to the upper layers, therefore the irrigated brown soils have varying degrees of salinity.

The general water supply of the region, as well as irrigation and saline washes during the growing season, make the soil-ground water layer 1-3-5 m. In this regard, during its evolutionary period, brownish brown soils first turn into brownish brown meadows, and then into meadow soils.

Gray brown grassland has a different mechanical composition and salinity, similar to brown soils with a tinge of sur. The amount of humus in the driving layer is not much, it is more (0.4-0.8%) than in the irrigated brown soil, but its amount is less in the lower layers (0.2-0.3%). and less fertile similar to sandy-desert soils. Only when proper agrotechnical and reclamation measures are used, their productivity increases and they become cultured. According to the mechanical composition, newly irrigated brown soils are mainly sandy and slightly sandy. It is characterized by strong rockiness and skeleton (up to 20-40%) starting from the surface of the soil.

The mechanical composition of the soil depends on many of its properties - water retention, water retention in the soil, water permeability, heat and temperature regulation, the level of nutrient supply, microbiological activity, relative resistance to tillage, and at the same time the duration of tillage, cohesion, soil affects the level of physical fitness.

***The mechanical composition of the soil*** It refers to the ratio of mineral particles of different sizes to each other. The particles of the main part of the soil mechanical composition smaller than 1 mm are small particles of soil (melcozem), particles larger than 1 mm are called soil skeleton.

Separation according to the amount of soil particles is called classification (classification) according to their mechanical composition. The main criterion is the amount of particles with a size of 0.01 mm. Usually, particles smaller than 0.01 mm are called silt, and particles larger than 0.01 mm are called sand (Table 1).

**Classification of desert and desert soils according to their mechanical composition**

| Mechanical composition according to the name of the soil | Amount of turbidity (smaller than 0.01 mm), % | Sand (0.01 mm greater than) amount, % |
|---|---|---|
| Scattered sand | 0-5 | 95-100 |
| Sticky sandy soil | 5-10 | 90-95 |
| Sandy soil | 10-20 | 80-90 |
| Light loam soil | 20-30 | 70-80 |
| Medium loam soil | 30-45 | 5-70 |
| Heavy sandy soil | 45-60 | 40-55 |
| Light soil | 60-70 | 30-40 |
| Medium fine soil | 70-80 | 20-30 |
| Heavy soil | More than 80 | less than 20 |

The mechanical structure of the soil is considered an important water-physical and physical-mechanical indicator, sandy, loamy, sand and clay soils do not have the same properties and structure, the soils have their own physical-mechanical properties due to their mechanical differences. For example, sandy soils do not have a very high water (moisture) capacity, but have good water permeability and poor capillary properties. In clay soils, on the contrary, they have a large moisture capacity. These two different mechanical composition soils have their own air, water and heat regimes. If we evaluate both of these soils from the point of view of processing, since the viscosity and physico-mechanical properties of soils with light mechanical composition are less expressed, their processing is carried out urgently, even in conditions of high humidity.

In fact, it is of great practical importance to draw up maps on the mechanical composition of the alluvial soils of meadows that are widespread and irrigated in the Bukhara oasis. Because these soils have a very complex mechanical composition in their vertical section compared to gray soils. Meadow alluvial soils are not only sandy, loamy, sand and clay in cross-section, but also have a very complex mechanical structure with layers. It is observed that the cross-section becomes heavier or lighter from the upper layer to the bottom, as well as a rapid change of layers (sandy-clay-sandy; sand-sandy-clay-gravel and hakozo).

According to the mechanical composition of the irrigated soils of the Bukhara oasis, they consist of heavy, medium, light sandy loams and loamy, sandy loams. to 11931 sandy ones (Table 1).

The analysis of the obtained data shows that in the districts of Qorovulbazar (7371 ha), Vobkent (3905 ha), Kogon (2665 ha), Bukhara (2414 ha) and G'ijduvan (1879 ha), heavy sandy soils occupy slightly more areas than other districts. Medium and light loamy soils occupy the most land areas and are distributed differently among districts, that is, in Romitan (11,535 ha), Bukhara (10,300 ha), G'ijduvon (10,123 ha) and Vobkent (8,269 ha), soils with a medium mechanical

composition are found in Jondor (11,565 ha), In the districts of Karakol (10509 ha), Olot (8963 ha), Shafirkon (7113 ha), sandy and sandy mechanical composition soils are Shafirkon (2972-2740 ha), Jondor (1838-1852 ha), Olot (1481-2411 ha), Karakol (1177-1830 ha). occupies many areas of the district.

It is also possible to observe the difference in the mechanical composition of the soils of the Bukhara oasis along the vertical section. The amount of fine sand particles (0.1-0.05 mm) is from 23 to 54% in the 23rd section placed in the Peshko district Turkestan SIU, from 18 to 72% in the Shofirkon district J.Oripov SIU, in the Okhunboboev SIU of Karakol district and Kogon district. The amount of the above particles in Boston SIU is not evenly distributed across the cross-section. Its amount ranges from 1.8 to 35%. It should be noted that the amount of soil particles in the above-mentioned districts is distributed at different levels. For example, large dust particles (0.05-0.01 mm) are 32-53% in Karakol and Kogon districts, and 0.9-33% in Shafirkon and Peshko districts.

Table 2

**By districts of the Bukhara oasis**mechanical composition of soils, per hectare

| Name of districts | Mechanical composition | | | | | |
|---|---|---|---|---|---|---|
| | Heavy | Medium | Light | Sandy | Sandy | Total |
| 1. Bukhara | 2414 | 10300 | 5294 | 38 | 272 | 18318 |
| 2. Wobkent | 3905 | 8269 | 1475 | 275 | 0 | 13924 |
| 3. Live | 391 | 5230 | 11565 | 1838 | 1852 | 20876 |
| 4. Kogon | 2665 | 6435 | 4648 | 283 | 85 | 14116 |
| 5. Karakol | 436 | 3775 | 10509 | 1177 | 1830 | 17727 |
| 6. Karovulbazar | 7371 | 436 | 2730 | 1112 | 1020 | 15799 |
| 7. Tool | 186 | 2006 | 8963 | 1481 | 2411 | 15047 |
| 8. Romitan | 962 | 11535 | 5293 | 841 | 199 | 18830 |
| 9. Peshko' | 2083 | 6912 | 4183 | 684 | 1484 | 15346 |
| 10. Shafirkon | 506 | 5603 | 7113 | 2972 | 2740 | 18934 |
| 11. Gijduvan | 1879 | 10121 | 3549 | 832 | 38 | 16419 |

The mechanical composition of old irrigated meadow soils is heavy sand, and the amount of physical clay in their tillage and sub-tillage layers is 44-55%. In the old irrigated soils of Vobkent district, the amount of physical clay increases downwards along the section. Among the fine particles, large and small dust particles dominate.

So, different types of irrigated meadow, swamp-meadow, irrigated barren, barren meadow, gray-brown meadow, brownish-brown, sandy-desert soils are distributed in the Bukhara oasis, and its mechanical composition actively participates in the processes of soil formation, in turn, in the field of soil use. serves as a key indicator in the development of all necessary activities. Different types of soils of Bukhara oasis are distinguished by different mechanical composition. When

cultivating the soil, watering, fertilizing and planting different crops, it is necessary to classify them taking into account their mechanical composition.

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