



## **PHYSICS - MECHANICAL PROPERTIES OF IRRIGATED MEADOW SOILS IN BUKHARA REGION**

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**Abstract** – *The article provides data on the physical and mechanical properties of irrigated meadow soils of the Jandar region. Depending on the mechanical composition, the degree of salinity and cultivation, it varies within a wide range of physical and mechanical properties; certain differences are found caused by their genesis and regional characteristics.*

**Key words:** *mechanical composition, hardness, density, specific gravity, soil porosity, humus, solid residue, nitrogen, phosphorus, potassium.*

### **I.Introduction**

A number of scientific studies are being carried out in the Republic aimed at further developing agriculture, preserving, reproducing, increasing soil fertility, efficiently using land resources, optimizing the ecological state, assessing the water-physical, technological, agrochemical properties and the reclamation state of soils.

In this plan, special attention is paid to the development of agrotechnical, agrophysical measures, taking into account soil and climatic conditions, to the widespread use of scientific and practical achievements in improving, restoring and increasing soil fertility. "Population growth over the next 35 years will require an increase in food production of about 60%." Development of scientifically based measures aimed at increasing soil fertility. Improving the efficiency of irrigated lands, protecting the soil cover from degradation processes and preventing them is one of the urgent tasks.

### **II.Literature review**

This study was carried out in accordance with the priority direction of the development of science and technology in the republic. Irrigated soils, common in the Jandar region, differ in their properties and characteristics not only in soil zones, but also in soil and climatic conditions. On the problem of studying soil fertility, its management and other properties, large-scale scientific research has been carried out both abroad and in our republic. Irrigated soils of the Bukhara oasis not only differ in the properties of the steppe zone, they differ in climatic districts.

The morphogenetic structure, geographical distribution, reclamation state, agrophysical and agrochemical properties of the soils of the Bukhara oasis and other regions have been studied by many scientists, such as K. Gafurov, S. A. Abdullaev [3.1982; 130 p], U. Tojiev [9.2004; 158-159 p.], X.T.Artikova [1.2005; 28 p. 2.2019;



62 p.], M.A. Mazirov, S.V. Makarychev [6.2018; 605 p.], R. Kurv antaev [4. 2000; 40 p. 5.2019; 91-95 p.], Nazarova S.M. [7. 2016; 60-66 p. 8.2018; 187-190 P.], Sharipov.O.B., Gafurorova L.A. [10.2018; 76-79-pp.], Hakimova N., Kurvantaev R. [11. 2020; 68-71 pp.] and others. However, scientific research on the study of the current meliorative state, physical and mechanical properties of irrigated meadow soils in the Jandar region has not been carried out sufficiently.

### **III. Analysis**

The aim of the research is to develop recommendations for the correct organization of soil cultivation by determining the physical and mechanical properties and assessing the reclamation state of irrigated meadow soils common in the Jandar region.

The studies were carried out in soil-field and analytical-laboratory conditions. The reliability of the data obtained was carried out using the Microsoft Excel program on the basis of the "Methodology of field experience" by B.A. Dospekhov.

**Research results.** The irrigated meadow soils of the Jandar region are heavy and medium loamy in terms of the content of water-soluble salts, not saline (dense residue 0.150-0.375%), in some places (mainly chlorine) slightly saline (0.014-0.031%).

In the studied soils, the humus content in the arable and subsoil layers is 0.94-0.63%. At the same time, in the lower layers, no sharp differences are observed in the humus content, and along the sections, the humus content is 0.41–0.30%.

The influence of the age of irrigation on the content of nutrient reserves (nitrogen, phosphorus and potassium) is clearly seen. In the irrigated meadow soils of the Jandar region, nitrogen is 1.9–3.2 t / ha, phosphorus is 6.5–14.5 t / ha, and potassium is 51.4–106.5 t / ha.

Physic mechanical properties of irrigated soils in the Jandar District It is noted that the soils are distinguished by their mechanical composition by their originality in the administrative and geomorphologic regions formed on alluvial deposits of the lower part of the river. Zarafshan [5. 2019; 91-95 p. 7.2016; 60-66 p. 8. 2018; 187-190 s.]. Basically, the mechanical composition consists of the following particles: coarse sand (1–0.25 mm), medium sand (0.25–0.1 mm), fine sand (0.1–0.05 mm).

The mechanical composition of the soils of the Jandar region consists of sandy, sandy loam, light, medium, heavy loams. The figure shows a map of the mechanical composition of the soils of the Jandar region of the Istiklol (Scale 1: 10000), sandy loam, light-, medium-, heavy loamy.

The specific gravity is a stable unit, it depends on the chemical, mineralogical composition and on the supply of humus to the soil. In irrigated meadow soils in the lower reaches of the Zarafshan in the district, the specific weight is 2.58–2.66 g / sm<sup>3</sup>.

Volumetric mass is a variable and different unit depending on.



#### IV. Discussion

Various processes occurring in the soil. In the top, arable layer soil, the bulk density varies between 1.27–1.63 g / sm<sup>3</sup> depending on humus content, texture, salinity and other properties. Among the upper layers, the highest density (1.53–1.63 g / sm<sup>3</sup>) is observed in the soils of the Jandar region.

Old-irrigated meadow soils, as a result of numerous visits of heavy machinery and non-compliance with the irrigation regime, increases the optimal density of the addition [4. 2000; 40-p.]. It was determined that under the conditions of irrigated meadow soils, their density increases with the weighting of the mechanical composition (Table 1).

In irrigated soils, the movement of water, the content of soluble salts, the preservation of moisture, and the provision of air to the root system is directly related to the porosity of the soil. In the studied meadow soils, the total porosity, depending on the duration of irrigation, varies widely across the genetic layers of the profile (42–51%).

**Table 1**

**General physical properties of irrigated meadow soils of the Jandar region**

cutting depth, sm	0-35	35-50	50-75	75-105	105-132	132-180
pecific weight, g / sm <sup>3</sup>	2,58	2,67	2,64	2,60	2,66	2,66
ulk weight, g / sm <sup>3</sup>	1,34	1,49	1,53	1,52	1,53	1,48
otal porosity, %	48	44	43	42	42	45

Soil hardness is a technological indicator of a property, it is of particular importance in fertility and soil. The hardness of the genetic soil layers in the Jandar region, depending on the mechanical composition, layer moisture and density, varies from 5.1 to 16.7 kg / sm<sup>2</sup>, high hardness indicators are confirmed by the data obtained for the subsoil layers (Table 2). The resisting density for the development of plant roots in deep layers is determined by the penetrometer device, the results obtained show in the Jandar region along the vertical horizons is 72.5–350 kPa.

The greatest resistance is observed in the layer 105-132 sm (350 kPa). The soils widespread in various farms resist the development of the root system to varying degrees, especially there is a high resistance for plant roots of common soils in the Istiklal.



horizon depth, sm	horizontal hardness, kg / sm <sup>2</sup>	vertical depth, sm	vertical hardness, Pa
0-35	7,8	10	72,5
35-50	16,7	20	155
50-75	6,1	30	232
75-105	5,8	40	237
105-132	5,1	50	350
132-180	5,7	60	300
		70	250

**Table 2**

**Indicators of hardness of meadow soils of Jandar district**

The content of agronomic valuable macro-aggregates in the arable layer of old-irrigated medium loamy meadow soils in the Jandar region in the Istiklal is 52-73%.

**V.Conclusion**

Distributed in the lower part of the Bukhara oasis of soils, peculiar basic morphological features were formed in the process of prolonged irrigation. Soils of geomorphological regions are characterized by their peculiarity in the mechanical composition of soils and consist of sandy loam, light-, medium-, heavy-loamy varieties, mainly consisting of the following fractions: coarse, medium fine sand

The specific gravity in the genetic layers varies in the range of 2.56–2.67 g / sm<sup>3</sup>. Soils on the genetic horizons have different density (1.27-1.63 g / sm<sup>3</sup>), the total porosity in the upper layer is satisfactory (47-51%), in the lower layers it belongs to the unsatisfactory (38-42%) categories.

For genetic horizons, depending on the density and texture, the value of hardness varies from 5.1 to 16.7 kg / sm<sup>2</sup>, soil support for root development is 72.5 - 350 kPa.

**References:**

1. Artikova Kh.T. Soils of the Bukhara oasis and their change under the influence of irrigation. Abstract. Cand. diss. Tashkent. 2005 . 28 p.
2. Artikova X.T. Evolution, ecological state and soil fertility of the Bukhara oasis. Avoref. diss. Doctor of Science (DSc). Tashkent, 2019.-62 p.
3. Gafurov K., Abdullaev S. Characteristics of the soil cover of the irrigated zone of the Bukhara region. Tashkent: Publishing house "Fan", 1982. - 130 p.