*Modern American Journal of Biological and Environmental Sciences*
**ISSN (E):** 3067-7920
Volume 01, Issue 03, June, 2025
**Website:** usajournals.org


# AGROCHEMICAL PROPERTIES OF IRRIGATED SOILS (On the Example of Kasan District)

Boboev Farrukh Farkhodovich
Teacher of Karshi State University

**Abstract**
Today, in the development of agriculture in our republic, increasing soil fertility is of particular importance, depending on its condition, the cultivation of agricultural land, and the use of agrotechnical measures. Scientific research is being conducted worldwide in a number of priority areas related to the state of soil fertility, its indicators, the relationship between soil fertility and other factors, and soil fertility modeling. In addition, modern geoinformation technologies are used to study soil properties, assess, improve soil fertility, and manage it, and relevant developments are being introduced into production.
Keywords: Structure, agrochemical index, soil-climatic, mechanical composition, humus, saline soils, organic matter, agrotechnical measure, salinity, soil environment, amount of NPK.

Relevance of the topic. It is important to know the agrochemical properties of the soil - that is, the degree of provision of the soil with basic nutrients and organic substances. In the course of our research, a significant change in the agrochemical properties of the soils of the Sh. Norkulov farm of the Kasan district was observed under the influence of salinization. It is known that humus is the main source that ensures soil fertility and improves the physical condition of the soil, agrochemical indicators, biological activity, structural state, growth and development conditions of plants. soil fertility and crop yields increase. The obtained data show that the soils of the studied territory contain little humus. In all soils, a large amount of humus is distributed in the upper layers, and a significant decrease in humus content is observed towards the lower layers. [1].

*Modern American Journal of Biological and Environmental Sciences*
**ISSN (E):** 3067-7920
Volume 01, Issue 03, June, 2025
**Website:** usajournals.org


Humus deficiency is primarily due to the low vegetation cover and the decrease in microorganisms and enzymes in the soil. The humus layer manifests itself in short horizons, and in deep layers the humus content sharply decreases. This indicates a significant severity of the melioration state of these soils. If we analyze the humus content of soils according to the indicators of the humus state, developed by M.M. Tashkuziev, N.I. Shadieva, then the newly irrigated desert sandy soils are moderately (humus content - 1.0 - 1.5%), and the remaining soils are poorly provided (humus content 0.5 - 1.0%) The amount of gross nitrogen in the long-irrigated meadow soils of the Kasan district of the Sh. Norkulov farm is 0.088%, and in the next horizon - 0.071%. The distribution of the total nitrogen content along the profile in these soils is explained by the mechanical composition of the soil and the degree of salinity. The N-NH3 form of nitrogen in soils fluctuated within 11.7-25.4 mg/kg, while the N-NO3 form fluctuated within 1.0-5.5 mg/kg.

Results of the study: Some changes in the total phosphorus content depend on the humus content and the mechanical composition of the parent rock, and the predominance of the total phosphorus content in the upper horizons can be attributed to its biological accumulation in these layers. It was established that the content of gross phosphorus in the upper horizons of the studied soils varies within the range of 0.062 - 0.26%. It was established that the content of total potassium in the upper horizons of the studied soils fluctuates within 0.744-1.0%, and with depth along the soil profile, its content decreases depending on the humus content and mechanical composition of the soil. The studied hydromorphic soils have practically identical indicators in terms of carbonate content. In all soils, the carbonate content varies from 6.94 to 8.75% along the profile, depending on the mechanical composition of the soil. Soil reaction is its most characteristic and sensitive sign. The soil environment reflects the most important properties of the chemical composition of the soil, all conditions of soil formation, soil genesis, as well as the most subtle aspects of changes occurring in the soil. It is known that most agricultural crops grow and develop well when the soil environment is close to neutral and slightly alkaline (pH=6-7, pH=7.1-8.0).

*Modern American Journal of Biological and Environmental Sciences*
**ISSN (E):** 3067-7920
Volume 01, Issue 03, June, 2025
**Website:** usajournals.org


The soil reaction medium, i.e., its acidity, neutrality, or alkalinity, is of great importance for the chemical and biochemical properties of the soil. The results of determining the pH indicators of the studied soils during our research showed that the studied soils mainly have a slightly alkaline environment, and it was noted that the pH of the soils fluctuates within 7.4-7.7. According to the results of the analysis, it can be seen that the distribution of nutrients in the soil along the profile depends on its mechanical composition and the amount of humus.

It is known that salinization can occur under the influence of natural or anthropogenic factors. The main factors of modern and ancient soil salinization are the evaporation and transpiration of groundwater under conditions of incomplete drainage. The melioration state of irrigated soils, their water-salt regime, depends on a number of factors, including groundwater parameters, soil solution concentration, irrigation regime, the quality of leaching and irrigation water, the mechanical composition of soil soils, as well as the geomorphological-lithological structure and climatic conditions of the area. All factors determining the salt regime of specific soil types are closely interconnected, and a change in one of them simultaneously leads to a significant change in the others.

The melioration status of the soils distributed in the Kashkadarya region is unique, with irrigated soils distributed near the western center of the region. Desert zone soils, rainfed soils, and highland soils are more prevalent in the region compared to irrigated soils. In terms of salinity, irrigated soils are more weakly and moderately saline, while strongly and very strongly saline soils are less common. The quality assessment of more than half of the irrigated soils is considered high. The role of the human factor in the salinization of irrigated soils is greater than the role of natural factors; below is an analysis of irrigated soils by region by corresponding districts (Table 3.4.1). [4].

Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 01, Issue 03, June, 2025
Website: usajournals.org


**Table 3.4.1. Agrochemical analysis of soil samples**

| Layer deep width, cm | Humus % | Gross, % | | | $N-NH_3$ mg/kg | $N-NO_3$ mg/kg | Mobility, mg/kg | | $CO_2$ carbo nates, % | pH |
|---|---|---|---|---|---|---|---|---|---|---|
| | | N | P | C | | | $P_2O_5$ | $K_2O$ | | |
| 1- Segment. Non-saline soils of the "Nasaf" massif, Kasan district | | | | | | | | | | |
| 0-25 | 1.126 | 0.075 | 0.13 | 0.744 | 25.4 | 5.5 | 35. | 90. | 7.52 | 7.4 |
| 25-33 | 0.872 | 0.052 | 0.12 | 0.742 | 20.2 | 3.5 | 20. | 80. | 7.83 | 7.4 |
| 33-50 | 0.715 | 0.039 | 0.075 | 0.732 | 17.4 | 3.0 | 12. | 55. | 8.92 | 7.3 |
| 50-92 | 0.225 | 0.018 | 0.062 | 0.65 | 15.1 | 1.0 | 8. | 12. | 8.9 | 7.3 |
| Section 2 - slightly saline soils of the "Yorkurgan" massif, Kasan district | | | | | | | | | | |
| 0-24 | 0.991 | 0.082 | 0.15 | 0.916 | 27.8 | 2.5 | 12. | 110. | 6.84 | 7.5 |
| 24-37. | 0.721 | 0.061 | 0.08 | 0.732 | 24.1 | 1.7 | 16. | 103 | 6.36 | 7.5 |
| 37-77. | 0.532 | 0.042 | 0.08 | 0.722 | 17.3 | 1.0 | 10. | 65. | 6.3 | 7.6 |
| 77-120. | 0.530 | 0.042 | 0.07 | 0.722 | 17.3 | 1.0 | 10. | 64. | 6.3 | 7.6 |
| Section 3. Moderately saline soils of the "Yorkurgan" massif of the Kasan district. | | | | | | | | | | |
| 0-25 | 0.859 | 0.049 | 0.26 | 0.816 | 28.1 | 1.7 | 23. | 150. | 7.73 | 7.4 |
| 25-37. | 0.715 | 0.031 | 0.26 | 0.732 | 21.9 | 3.1 | 19. | 135. | 7.84 | 7.4 |
| 37-50 | 0.618 | 0.019 | 0.21 | 0.744 | 19.7 | 2.0 | 13. | 90. | 7.89 | 7.3 |
| 50-80 | 0.525 | 0.014 | 0.19 | 0.72 | 15.6 | 4.8 | 12. | 60. | 8.47 | 7.3 |
| 80-152 | 0.332 | 0.012 | 0.15 | 0.6 | 14.3 | 3.7 | 10. | 55. | 6.88 | 7.3 |
| Section 4 - Highly saline soils of the "Koson" massif, Koson district | | | | | | | | | | |
| 0-28 | 0.971 | 0.088 | 0.35 | 1. | 37.3 | 5.5 | 6. | 148. | 7. | 7.4 |
| 28-36. | 0.894 | 0.071 | 0.24 | 0.792 | 19.4 | 1.6 | 13. | 128. | 6.64 | 7.3 |
| 36-48. | 0.715 | 0.065 | 0.18 | 0.612 | 20.2 | 2.5 | 12. | 80. | 7.52 | 7.3 |
| 48-60 | 0.697 | 0.049 | 0.16 | 0.612 | 17.9 | 1.5 | 12. | 50. | 7.83 | 7.3 |
| 60-126 | 0.532 | 0.038 | 0.1 | 0.6 | 14.4 | 1.7 | 10. | 35. | 8.92 | 7.2 |
| 126-144 | 0.512 | 0.038 | 0.1 | 0.5 | 14.4 | 1.7 | 10. | 35. | 8.92 | 7.2 |

## Conclusion

The humus content in irrigated meadow soils is 1.29-1.67%. The amount of nitrogen in the sod layer of typical sierozem soils is 0.17%, but in eroded soils it is 0.07-0.08%. The nitrogen content in the arable layer of irrigated urban soils is 0.09-0.11%, which is associated with the development of microbiological processes. The amount of total phosphorus in natural sierozem soils, i.e., in the sod layer, is 0.18-0.20%, and in the arable layer of irrigated meadow soils, it is 0.21%.

The smallest amount of nitrogen is concentrated in easily eroded soils. In the eroded soils, this indicator is higher in the upper layers compared to the previous soils and is 0.129%, gradually decreasing down to 0.029. Such a picture is

*Modern American Journal of Biological and Environmental Sciences*
**ISSN (E):** 3067-7920
Volume 01, Issue 03, June, 2025
**Website:** usajournals.org


observed in the upper layers, which is 0.158-0.132% of the total phosphorus content. In light and moderately eroded soils, the total phosphorus content is low and 0.122-0.103%, decreasing down to 0.076-0.075%. Depending on the high degree of carbonation and heavy mechanical composition of the soil, the amount of mobile phosphorus, which is a derivative of ammonium carbonate, in the upper layers of poorly leached soils is 58.7-46.0 mg/kg, and in the lower layers 13.0-11.0 mg/kg. In the upper layers of light and moderately eroded soils, it is 22.4-15.2 mg/kg, downwards - 10.2-10.5 mg/kg. The total amount of potassium averages 1.9-2.4. The amount of mobile potassium in the soil ranged from 320 to 730 mg/kg. When determining the content of carbonates CO2 in the soil, we found significant differences in general across various elements of the slope and the soil profile. The results of soil pH determination show that the soil reaction is weakly alkaline, with pH fluctuating within 7.1-7.7

**References**

1. Toshkuziev M.M., Shadieva N.I., Dusaliev A.D. Humus content, absorption capacity, composition of absorbed cations of hydromorphic soils of the typical sierozem zone and their changes under the influence of irrigation // Bulletin of the National University of Uzbekistan. - Тошкент, 2020. - No 3/2. - P. 49-55.
2. Raupova N.B., Gulomova Z., Khalimov B. Recommendations on ways to improve the humus state and fertility of irrigated and rainfed eroded soils // Recommendation Certificate No. 21-3540 of the State Press Committee of the Republic of Uzbekistan. - Тошкент, 2019.-Б.
3. Rasulov A.M. Soils of the Karshi Steppe, Ways of their Development and Increasing Fertility Tashkent: FAN, 1976. 248s.
4. Fayziev R. Composition and properties of mechanical fractions of the main soil types of the Karshi steppe: Abstract of the dissertation of Cand. of Sciences. Tashkent, 1981. 25s.