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GRAY IRRIGATED SOILS OF PAYARIQ DISTRICT ON AGROCHEMICAL PROPERTIES

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Abstract: The agrochemical properties of gray irrigated soils of Payariq district and the influence of the irrigation process on them were studied. The main factors ensuring soil fertility - the content of nitrogen, phosphorus, potassium and the dynamics of their change were analyzed. Also, the problem of soil salinization and degradation as a result of improper irrigation was considered, and recommendations were given to increase soil fertility.
Keywords; gray soils, irrigation, agrochemical properties, salinity, soil fertility, nitrogen, phosphorus, potassium.

Introduction. Payariq district is one of the important regions for agriculture , and its gray soils constitute arable land, the fertility of which is increased by irrigation. Studying the agrochemical state of soil is of great importance in maintaining and increasing its fertility . This article analyzes the chemical composition of irrigated gray soils of Payariq district and the effect of irrigation on them .

over the past half century,
while the world population has increased
from 4 billion to 8 billion, the area of arable land for agriculture has increased by only 8% . It is impossible to understand how valuable
these lands are to humanity. Currently,
the total area of our republic is 44,410.3 thousand hectares, or 57.8 million hectares of the total land fund. Of these
, intensively used
agricultural lands, that is, irrigated areas, are considered
the “golden fund ” of our republic . They make up about 10% of the total land fund and
provide 95
% of gross agricultural products . This determines
the production activities of the agricultural and national economy of our republic and serves as the main factor in increasing the economic potential of our state
.
Increasing soil fertility
is associated with the laws of soil formation processes. Therefore,

a detailed comprehensive assessment of the composition and properties of soils, as well as the determination of the laws of their distribution,
is becoming an urgent task.
Currently, land is a limited and non-renewable natural resource.
Land used in agriculture, especially irrigated land, is undoubtedly an invaluable treasure of all peoples and an important source of living conditions. The rational and effective use of these lands, the expansion of their land fund have always been the main issue facing humanity. This is especially evident with the continuous growth of the population and the demand for food products.
Rational use of land and natural resources, soil protection, and
improvement of its meleorative state are of great importance. Naturalists, ecologists, soil scientists, land reclamation specialists, economists, and lawyers were deeply concerned about the rapid and sometimes irreparable destruction of the soil layer, as well as the widespread soil crisis, which was not given serious attention during the former Soviet Union.
Irrigated agriculture is widespread in Uzbekistan.
Irrigated soils are mainly located in the region of typical and light gray soils, on the gray-brown, barren soils of the vachol zone. Large areas or oases where irrigated agriculture is practiced are spread in our republic between the Zarafshan, Amu Darya, Syrdarya rivers and in the Fergana Valley. In Uzbekistan, irrigated light-colored, typical dark gray soils, gray meadow soils, and bozo-meadow soils are considered the most fertile by their natural properties, while barren, especially gray-brown and sandy desert soils are less fertile. They differ from each other in the physical properties of water and the amount of humus.
Different soils undergo different changes in their profile structure, depending on when they were developed and how long they have been irrigated .

Under the influence of irrigation, an eluvial process occurs, a new agroirrigation
layer is formed, and its biological activity increases, and biologically active substances in the soil increase. Such changes occur especially rapidly in the conditions of modern agricultural production . As a result of the annual application of large amounts of local and mineral fertilizers to the soil and deep tillage, a lot of organic matter accumulates in the soil, its agrophysical properties improve, and its genetic layers change significantly. Thus, a new type of soil is formed, the properties of which are almost equal for automorphic and hydromorphic soils. There is almost no difference between desert soils and gray soils.

Soil conditions of Payariq district

Soil layer, cm	**pH**		**Humus content, %**		**Nutrient type**			
					Phosphorus content (P_2O_5), mg/kg		**Potassium content (K_2O), mg/kg**	
	2022	2023	2022	2023	2022	2023	2022	2023
0-20	7.99	7.99	0.67	0.66	15.67	15.45	146.00	147.00
20-40	7.85	7.85	0.61	0.62	13.12	13.21	127.00	1 28 ,00
40-60	7.83	7.83	0.59	0.57	12.1 1	12.10	115.00	112.00

60-80	7.66	7.66	0.50	0.5 2	10.30	9.92	108.00	106.00

Table 1

One of the important genetic features of the foothill soils is
the almost uniform composition of the soil layers . The new layer formed under the influence of agroirrigation deposits in it
is 1-2 m or more.
Another feature of their genesis is the renewal of soil-forming processes due to the annual addition of agroirrigation nutrients along with irrigation water.
Oasis soils in the gray soil region and desert zone
differ from the soils of protected areas in the thickness of the humus layer and the even distribution of humus in the soil layer. As in other soils, humus decreases at a certain rate as it moves into the lower layers. Nitrogen is also evenly distributed in the soil layers, like humus.
the activation of mineralization processes in the cultivated layer
, the total amount of humus and nitrogen in oasis soils is higher than in protected land soils. Oasis soils are much richer in phosphorus, potassium and other nutrients. However, in newly irrigated, relatively newly developed areas, there
is not much natural humus content.
General description of irrigated gray soils. The climatic conditions of the Payariq district are dry and hot , and the fertility of the gray soils in this area depends on the irrigation system. These soils have a low humus content and are of medium to light mechanical composition.

The content of humus and nitrogen in the fertile soils of the Samarkand region

Table 2

Layer depth, cm	Humus, %	Nitrogen, %	C:N
Light gray soils			
0-18	1.04	0.099	6.1
20-30	0.83	0.075	6.5
40-50	0.67	0.045	8.6
115-125	0.53	0.033	9.3
190-200	0.37	0.039	5.5
470-480	0.21	0.015	8.1

The significant increase in the absolute and relative amounts of magnesium absorbed in lowland soils is very characteristic, as noted by A.N. Rozanov (1951).
When applying fertilizers and other agrotechnical measures,
landowners
must take into account these characteristics of the republic's traditionally irrigated soils.

that have been irrigated for many years, especially
those that are irrigated with excessive water and where it is difficult for runoff to drain, the soil gradually becomes swampy and waterlogged. As a result, salinization often begins in such areas.
After determining the annual nitrogen requirement, it
is converted into nitrogen-containing mineral fertilizers received by the farm and distributed to the phases of the growing season using the specified fertilizer application system.
can also be checked in the same way .

The practical importance of such information for the farmer is that
if the active content of nitrogen, phosphorus, and potassium in the soil exceeds the required amount, the annual rate of fertilizer application will be reduced.
This allows you to save on fertilizer. Or, if the soil
contains less mobile nutrients, the annual rate of fertilizer will be higher. In such a case, instead of resorting to additional mineral fertilizers, which are already scarce, you can find additional sources of nutrients (manure, solid waste from wastewater, tree leaves, sawdust, deep water sludge, silkworm eggs) and prepare high-quality organomineral fertilizers from them. Another important point is that these residues contain a certain amount of organic matter. When these residues are used as fertilizers, additional organic matter also enters the soil along with nutrients.

Conclusion:

of the Payariq district showed that irrigation processes have a significant impact on soil fertility. The mechanical composition and agrochemical state of the soil change as a result of irrigation , and the ratio of nutrients in it is distributed differently. As a result of the studies, it was determined that the content of nitrogen, phosphorus and potassium in the soil composition changes depending on the irrigation regime. In addition, it was observed that the salinity level, humus content and pH indicators of the soil also depend on irrigation technology.

also found that long-term irrigation can lead to compaction of the soil structure, and in some cases, to an increase in salinization. In order to maintain and increase soil fertility, it is important to apply scientifically based agrotechnical measures, including the use of alternative irrigation methods, the moderate application of organic and mineral fertilizers, and the correct organization of a crop rotation system.

In general, to ensure the efficiency of the gray irrigated soils of the Payariq district , it is necessary to apply scientifically based agrotechnical measures, rationally use water resources, and implement comprehensive measures to increase soil fertility.

List of used literature .

1. . Khashimov, F., Mamadiyor, X., Yaqubov, S., & Nasiba, I. (2024). EFFECT OF MINERAL AND ORGANIC FERTILIZERS ON YIELD AND CROP QUALITY OF WHITE CABBAGE. RESEARCH. UZ, 39(4), 86-90.
2. Khaitov, M., Rasulov, I., & Karshiyev, J. (2024). TECHNOLOGY AND METHODS OF PROPAGATION OF FRUIT SEEDLINGS. *Science and innovation* , *3* (D9), 276-279.
3. Khayitov, MA, Qarshiyev, JD, Yaqubov, SM, & Narzullayev, BA (2023). THE EFFECT OF PS-AGRO-FERTILIZER RATE ON THE NUMBER OF HEADS IN THE GRAPE VARIETY OF KARA KISHMISH AND THEIR AVERAGE WEIGHT. *Central Asian Journal of Education and Innovation* , *2* (10), 187-191.
4. Khashimov, F., & Yaqubov, S. INFLUENCE OF MINERAL FERTILIZER RATE ON THE RICE GROWTH AND DEVELOPMENT.

5. Turaboyeva, B., Miyzamov, D., Kadirova, G., & Hayitov, M. (2023). EDUCATI ON AUTUMN BUG 'DOYNI OLINGUGURT SACLOVCHI CHI 'ITLASH WITH CHI 'ITLAR. *Academic research in educational sciences* , *4* (SamTSAU Conference 1), 1182-1185.

6. Mamadiyar, X., Mehroj, A., Dostonbek, M., & Bakhtigul, T. (2023). EFFECT OF VARIOUS RATE AND RATIO OF MINERAL FERTILIZERS ON WINTER WHEAT GRAIN YIELD. *PROSPECTS OF DEVELOPMENT OF SCIENCE AND EDUCATION* , *19* (23), 239-242.

7. Khaitov, M., Rasulov, I., & Karshiyev, J. (2024). TECHNOLOGY AND METHODS OF PROPAGATION OF FRUIT SEEDLINGS. *Science and innovation* , *3* (D9), 276-279.

8. Khayitov, MA, Qarshiyev, JD, Yaqubov, SM, & Narzullayev, BA (2023). THE EFFECT OF PS-AGRO-FERTILIZER RATE ON THE NUMBER OF HEADS IN THE GRAPE VARIETY OF KARA KISHMISH AND THEIR AVERAGE WEIGHT. *Central Asian Journal of Education and Innovation* , *2* (10), 187-191.

9. Karshiyev, JD, Khoshimov, UA, Egamberdiyev, AO, Orozboyeva, RZ, & Abdumalikova, SU (2024). SWEET PEPPER VARIETIES CULTIVATED IN UNHEATED GREENHOUSE CONDITIONS. *Central Asian Journal of Academic Research* , *3* (1), 184-188.