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State of Soil Fertility on Irrigated Land and Possibilities for its Improvement

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ABSTRACT: In subsequent years, the productivity of irrigated farmland in our republic is significantly reduced. This, in turn, creates a number of difficulties in obtaining a rich and high-quality harvest from grown crops. This article provides information on the effectiveness of the use of natural agro-ores in the restoration of lands with a reduced level of fertility.

KEYWORDS: Soil fertility, natural agricultural ores, irrigated agriculture, agricultural crops, productivity, fertilizer, compost.

I.INTRODUCTION

It is known that the areas of irrigated agriculture in the republic make up 8-9% of the total land area, and these existing irrigated lands are the golden fund of the republic. That's why it is important to carefully preserve land, increase its productivity, scientifically justify the ways of effective and rational use, based on the different soil and climate conditions of the republic, in case of correctly choosing the type of agricultural crops that preserve and increase soil fertility and satisfy the population's demand for food products. Suggestions and recommendations for effective land use remain relevant. In recent years, there have been cases of declining productivity of fertile lands as a result of various effects.

The decrease in soil fertility is primarily caused by constant planting of the same type of crops, limited feeding with additional organic nutrients, and in some cases, failure to carry out agrotechnical measures in crop care on time, which seriously affects the weight and quality of the harvest from agricultural crops.

II. SIGNIFICANCE OF THE SYSTEM

In subsequent years, the productivity of irrigated farmland in our republic is significantly reduced. The study of methodology is explained in section III, section IV covers the experimental results of the study, and section V discusses the future study and conclusion.

III. METHODOLOGY

If we take the analysis of the decrease of soil fertility in the republic over the next 30 years, according to the data obtained on the level of humus supply of the soil, in the next 30 years in the soil of our republic, this amount decreased by 0.15%, that is, by 5.61 tons per hectare, in the 0-30 cm layer of the soil. in particular, these indicators increased by 0.42% (16.25 tons) in Tashkent region, by 0.23% (8.77 tons) in Bukhara region, by 0.21% (8.25 tons) in Surkhandarya region, and by 0.20% in Andijan region. % (7.70 tons), it can be mentioned that it decreased by 0.16% (6.44 tons) in Kashkadarya region (Table 1).

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Table 1
Level of humus supply of irrigated soils of the Republic
(Data from 2000-2020 of PSUEAITI and ITIs of Agrochemistry and Soil Science)

№	Provinces	0-30 sm 1980 y %	0-30 sm 2015 y %	0-30 sm 1980 y t/ hec	0-30 sm 2015 y t/ hec	The difference t/ hec
1	Karakalpakstan Republic	0.89	0.86	34.52	33.35	1.17
2	Andijan	1.31	1.11	50.99	43.29	7.70
3	Bukhara	1.02	0.79	39.59	30.81	8.77
4	Jizzakh	1.12	1.08	43.39	41.93	1.56
5	Kashkadarya	0.92	0.76	35.98	29.54	6.44
6	Navoi	0.87	0.86	33.74	33.34	0.39
7	Namangan	1.24	1.04	48.26	40.56	7.70
8	Samarkand	1.10	1.04	43.00	40.56	2.44
9	Surkhandarya	1.06	0.85	41.21	32.95	8.25
10	Sirdarya	1.17	0.98	45.5	38.35	7.15
11	Tashkent	1.50	1.08	58.37	42.12	16.25
12	Fergana	1.07	0.95	41.73	36.95	4.78
13	Khorezm	0.73	0.72	28.47	28.08	0.39
Average for the republic		1.08	0.93	41.87	36.30	5.61

It should be noted that in recent years, the level of supply of the republic's soil with phosphorus and potassium has been decreasing. For example, during the next 36 years, the areas with "very little" supply of phosphorus increased by 170,600, the areas with "low" supply increased by 149,400 hectares, the area with "high" level of supply increased by 26,000, and the areas belonging to "very high" by 97,000. decreased per hectare. In terms of the amount of potassium in the soil, the areas with the "very low" supply level increased to 140 thousand hectares, the "low" supplied areas to 215 thousand hectares, the "average" supplied areas to 89 thousand hectares, while the "high" and "very high" supplied areas belong to 63 respectively; decreased by 3 thousand hectares.

It can be seen that during the next 30-35 years, the main productivity indicators of the existing irrigated fields in the republic, the amount of humus, nitrogen, phosphorus and potassium have decreased and are decreasing.

The information given above shows that the situation requires the application of organic fertilizers, manure, composts, industrial waste, mineral raw materials in sufficient quantities to the soil in order to prevent the decrease in soil productivity and to replace the nutrients removed from it.

IV. EXPERIMENTAL RESULTS

Scientifically based and recommended 25-30 tons of additional organic nutrients every three years aimed at maintaining and increasing soil fertility are limited and this amount is drastically reduced. use will be appropriate.

In order to maintain and restore soil fertility during the period of shortage of organic additional nutrients, scientific research works were carried out on the effect of using existing livestock and poultry manure and preparing composts based on existing non-traditional agro-ores and applying them to the soil.

The presence of bentonite mud from non-traditional agro-ores and the presence of macro and micro elements in it as an additional nutrient is significant due to the influence and final effects of applying it to the soil at different rates and periods.

Existing non-conventional mineral raw materials are abundant and cheap, and can replace some of the missing minerals in agriculture and are highly effective in their use as supplementary food [1].

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Unconventional raw materials with absorbent, catalytic and cleaning properties (bentonite, polygorskite, vermiculite, glauconite, perlite, diatomite, trepel) can be widely used in agriculture. The use of these minerals provides high efficiency and economic benefits [2].

World experience shows that bentonite and bentonite-like rocks, glauconite, etc. are versatile raw materials, according to the distinctive features and composition of agro-ores, the richness of various components, the physico-chemical properties of absorption, and these are:

- as a rich source of macro and micro elements in plant nutrition;
- as an adsorbent, increasing absorption in cation and anion exchange, improving soil water retention, cleaning soil from toxic chemical elements, heavy metals and radiation [3].
- as an ameliorant, reducing the amount of harmful salts in the soil, improving the mechanical composition of sandy and loamy soils;
- as a catalyst in the physiological processes of plants, it is important in photosynthesis, metabolism, respiration, and in increasing plant resistance to diseases [4, 5, 6, 7].

In Surkhandarya and Khorezm regions, non-traditional agro-minerals, especially bentonite mud and glauconite sand, caused a 20-25% decrease in wilt disease and an increase in cotton yield by 5.8 t/h when used in cotton at different rates and periods [8].

In recent years, the sharp decrease in the use of organic additives to the soil in the agriculture of our Republic, due to the shortage of potassium and phosphorus fertilizers and the depletion of these nutrients in the soil, leads to the large-scale use of cheap local agro-ores. In this regard, the use of mineral raw materials is widely used not only in industrial production, but also in agriculture as local raw materials. It is noted that mineral raw materials obtained from large deposits and small finds are widely used on an industrial scale to grind betonite mud from non-traditional agro-ores to different levels and add it to feed in livestock farming, increase the ration of poultry feed and as additional food in agricultural crops [9].

More than 200 experiments conducted in Czechoslovakia show that when bentonite slurry is added to the soil at an average rate of 4 t/ha, 20-32% additional yield of potatoes, tomatoes, cucumbers, corn and legumes has been achieved [10].

In the Arab Republic of Egypt, bentonite slurry is widely used to improve the water-physical properties of desert soils with a light mechanical composition and to prevent the lack of micro and macro elements necessary for crops [11].

The largest deposits of agro-ores in Uzbekistan have been found in southern Aqrabot, Aktash, Maidan, Guzor, Yakkabog, Pachkamar, Dehkhanabad and Hovdak.

In our republic, reserves of natural agro-ores amount to 125,717 thousand m3, and they contain 0.3-4.7% carbon, 0.4-3.0% potassium, 0.3-1.5% phosphorus, and many trace elements: copper, zinc, boron, cobalt, molybdenum, manganese, sulfur. It should be noted that the bentonite slurry found in the Hovdak mine contains more of the above-mentioned elements and, when added to the soil with a low Na content and a high Sa content, improves the soil structure. According to the mechanical composition of the soils, specific norms and periods of their use as additional nutrients have been developed.

1. 6-9 t before autumn plowing on light sandy soils
2. Before plowing, 3-6 t is applied to medium sandy soils
3. Preparation and use of organo-mineral composts with various components in 1:4 or 1:6 ratio for heavy loam soils gives good results [12].

In order to improve the productivity of 3,200,000 hectares of irrigated land in the Republic using natural resources effectively, in the last ten years, at least 20.0 tons per hectare with manure or various composts, the organo-mineral composts needed for additional nutrition once every three years there is a possibility of preparation.

On average, in one year, 24 million 750 thousand t of 17 million 181 thousand head of cattle, 723668 thousand t of 20 million 101 thousand head of sheep and goats and 504 thousand t of manure from 70 million poultry are taken into account, 25 million 465 thousand t of organic matter per year manure accumulates.

According to the developed recommendation, if compost is prepared by mixing existing non-traditional agro-ores in a ratio of 1:0.4, 10 million 180 thousand tons of bentonite slurry can be added, and 35 million 645 thousand tons of compost can be prepared in one year. If this amount is used as additional organic food at 20 tons per hectare, it will be possible to feed 1 million 700 thousand hectares of land in one year.

Taking into account the use of organo-mineral composts once in three years, it will be possible to supplement the 3 million 200 thousand hectares of irrigated land in the republic completely once in three years.

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Organo-mineral composts are prepared in large and small batches from 60 to 600 tons according to the production technology.

Large pits are excavated with a length of 30 m, a width of 3 m and a depth of 2 m. A 20 cm thick layer of manure is placed on the prepared soil, and a second layer of 10 cm thick bentonite slurry is laid on top of it. In the same order, the second and third layers are laid, the mixture is filled and moistened with the necessary amount of water when it reaches a height of 1.5 m above the ground, and its top is covered with soil 15 cm thick and plastered. Composts will be completely ready in 3-4 months.

When the ratio of manure and bentonite slurry is 1:0.4, it is possible to prepare 600 t of compost in one heap, and for this, 360 t of manure and 240 t of bentonite are used. If 600 tons of prepared organo-mineral compost is used as additional food at the rate of 20 tons per hectare, it will be possible to feed 30 ha.

In one year, 59,400 large trenches will be needed to prepare 35,645,000 tons of organic-mineral compost, which can be made from manure and bentonite reserves in our country.

For example, in the Surkhandarya region, 20 to 4,400,000 tons of organic-mineral compost is needed for every hectare of 220,000 cultivated land, and 2,640,000 tons of manure and 1,760,000 tons of bentonite are used to prepare this amount. 7,330 large compost bins are needed to make the above amount of compost

V. CONCLUSION AND FUTURE WORK

The nutritional advantage of unconventional organo-mineral compost compared to manure is that 100,000 tons of rotted manure contains 400 t of pure nitrogen, 250 t of pure phosphorus and 500 t of pure potassium, while 100,000 tons of organic-mineral compost contains 700 t of pure nitrogen. , pure phosphorus-450 t, pure potassium-800 t, the total amount of nitrogen, phosphorus and potassium is 1950 tons, and it will be possible to get 6045 tons of additional cotton crop in exchange for this amount of food.

Currently, there is an opportunity to effectively use existing livestock waste and non-traditional agro-ores, which are abundant in reserves, by preparing composts, and increasing the productivity of soils under irrigated agriculture has been found to have the potential for high and quality crops in the future.

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