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FERTILITY OF IRRIGATED SOILS AND ITS MODULATION

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Annotation

This article provides information on the application of fertility parameters based on maintaining stability and the ecological state of the biolayer - the top soil layer, which is the main means of agricultural production, as well as on the basis of natural and climatic conditions and determining the level of soil fertility.

Keywords: Earth, soil, fertility, humus, microflora, biota, agricultural technology, model, agricultural climate, bioecology.

Introduction

Land and its soil resources in the Republic of Uzbekistan are the backbone of all existing industries, the main means of production. So, the development of the agricultural sector of our economy depends on it. Efficient use of various soils on irrigated lands plays an important role in the development of modern agriculture. Prospective agronomists, soil scientists, agrochemists and farm managers should study in detail the soils of the farm or individual area where they operate, as well as know the secrets of applying soil fertility measures. [1.204.]

The problems of soil fertility and its complete redevelopment have attracted the attention of researchers and scientists in recent years. In the concept of soil fertility in irrigated agriculture, it is necessary to add a number of other properties of the soil that ensure the growth and development of plants, such as soil air, physical and chemical properties, and so on. Soil fertility is manifested through its chemical, physical, physicochemical, biological properties. These additions were made as a result of an in-depth study of the soil requirements of cultivated plants. It should be noted that the productivity of agricultural crops is not entirely related to soil fertility, but also to the climatic conditions of the area, agro-technical measures, as well as the characteristics of the cultivars grown, and so on. The role of soil fertility factors in the irrigation process increases somewhat. This is because water and nutrient regimes allow a number of factors to be controlled to a certain extent, such as the plants going through certain stages during the growing season. [2.112-113] Soil organic matter is a key indicator that distinguishes it from soil-

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forming rocks. Humus plays a major role as a “constituent” of the soil system. Of course, humus and soil fertility should not be equated with the amount of humus in the soil and productivity, but in any case, humus is to some extent a "storehouse" of plant nutrients - nitrogen, phosphorus, potassium and microelements. In addition, it contains enzymes, vitamins, growth substances. Perhaps this is why mineral fertilizers are better absorbed in well-drained humus soils. Soil fertility is determined not only by the total amount of humus in it, but also by the active humus in the top layer of the soil, which is renewed annually as a result of the decay of plant residues.

The environmental role of humus is also very large. Its effect on plant growth and development in a positive physiological-biochemical way is scientifically based. However, no matter how important humus is for soil fertility, the process of humus formation in general, like the process of soil formation, develops very slowly. [2.114.] The importance of soil physical properties in the fertility of irrigated soils is enormous. At a certain density of the soil, the development of the plant root system is improved, creating favorable conditions for the mineralization of plant residues. The conditions for the development of beneficial aerobic microflora (azotobacteria, etc.) in air-exchange soils are normalized, and the pathogenic effect of wilt-forming fungi and other disease-causing microorganisms is reduced. The soil density indicator shows the physical condition of the soil to a certain extent. If we take humus as the “Organizer” of the entire soil system, the Soil Density represents the general physical state of the entire soil mass. The process of irrigation, usually the density of the soil, indicates the physical state. This is due to the fact that the peculiar lyossimon, i.e. clay substances, interfere with the lower parts of the soil profile. In addition, the mechanical pressure of tractors and agricultural implements leaves a strong mark on soils that are wet and have a lot of moisture under the influence of irrigation. The soil seems to be tightly compacted under their weight. Degradation of soil mass also occurs during irrigation. In this regard, the density of soils is slightly higher than a certain level and is around 1.4-1.5 g / cm3 instead of 1.2-1.3 g / cm3. The physical condition of soils is one of the indicators that their density is somewhat controlled when the components of the farming network are applied correctly. This should be decided by choosing the time of tillage and tillage at a certain humidity, taking into account the local conditions, climate and soil characteristics of each place. [2.117.] In order to protect the fertility of irrigated soils and increase the productivity of agricultural crops, we recommend the following measures:

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1. In dry years, it is possible to carry out spring wet irrigation, periodic leveling, economical use of irrigation water.
2. In order to increase soil fertility, it is expedient to introduce crop rotation and establish reserve trees.
3. In order to increase the efficiency of fertilizers, composting organic fertilizers with mineral fertilizers, feeding agricultural crops, applying 25-30 tons of organic fertilizers per hectare are highly effective.
4. Ensuring soil fertility and crop nutrients using cover crops
5. The use of cover crops in increasing the porosity and water absorption capacity of the soil
6. Periodic cleaning of collector drainage systems on farms, which increase their efficiency and prevent the rise of groundwater. When grouping soils according to the degree of salinity, attention is paid to the total amount of water-soluble salts and chlorine in them. With increasing salinity, soil quality deteriorates, fertility decreases, and reclamation measures become necessary.

Before sowing in saline soils, it is necessary to carry out the following reclamation measures:

- One of the most important measures to prevent soil salinization is the careful development of water use plans on the basis of rules that fully meet the requirements of agronomy, the transition to a new irrigation system, construction of hydraulic structures from irrigation stations, water conservation, pollution;
- It is possible to remove and improve the salinity of salts and salts of different levels by stopping the continuous rise of groundwater saline through the capillary pathways and removing harmful salts accumulated in the soil; - To improve the physical and chemical properties of soils, it is necessary to put gypsum on these soils. Its feature is that it removes sodium and calcium from the absorbing complex of the soil, as well as improves the physical condition of the soil; - Measures such as fertilization of loamy and loamy soils, deep plowing of loamy soils, large-scale introduction of irrigation works, digging ditches and reducing their level are the main measures to improve the physical and chemical properties of soil, increase its fertility. If agromeliorative measures are applied in a timely and correct manner, it is possible to plant crops in these soils and obtain consistently high yields from them; Salinity will increase further if the norm of saline leaching water is not taken into account when soil salinity is washed away, the depth and salinity of groundwater. Proper rotation improves the reclamation of saline and swampy soils, increases soil fertility and increases productivity. The reclamation effect of

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crop rotation is that the soil is fertile, which increases organic and nutrient content, improves physical properties, and moisture evaporates less. [5.157.] Soil fertility is strongly related to genetic-geographical conditions, i.e., factors that shape soil types, the nature of the parent rock, the environment of the soil formation, and the characteristics that determine its use in agriculture. In irrigated soils, a significant portion of high, often excessive, mineral fertilizers are transferred to the lower part of the soil by irrigation water and accumulate there. They also pass into groundwater. As a result, they are polluted with nitrogen, phosphorus and their accompanying elements. This, in turn, worsens the overall environmental condition of the biocomplex. The productive capacity of soils is related to a number of factors that are not related to soil quality in addition to soil fertility. One of the most important of these factors is the agroclimatic factor. If the climatic conditions differ from the norm in one way or another, the harvest in that year will not be at the norm. In addition, the cultivated plant varieties are related to the state of beneficial and harmful organisms in the agro-system. None of these components should be considered. For example, no matter how fertile the soil is, no matter how good the biota is in it, if the land is not planted with a variety suitable for the soil and climatic conditions, the harvest will be almost non-existent. Thus, the above data index and characteristics are a parameter of productivity. They are created by taking them into account and modeling their interactions. [2.120.]

Many scholars give different meanings to the concept of model. In our opinion, the model is the standard. As for soil fertility, it is the sum of its specific properties, a function that maintains and increases soil fertility, ensuring a stable yield of agricultural crops. In other words, ensuring the yield of agricultural crops is a set of all the conditions necessary for the passage of certain soil regimes. The first generation of the soil fertility model is based on expert and statistical data in terms of agronomic soil science. They represent the total sum of agronomically significant properties and characteristics that determine the yield of agrosystems in a particular form. The simplicity of such models, their intelligibility to a wide range of specialists, the relatively small number of parameters, serve as a good basis for their subsequent research and development. In addition, they also blend well with farm soil maps and help apply them to agricultural production. These models are, as mentioned above, “first generation models” and reflect the state of some parameters of soil fertility, but do not fully reveal the dynamic relationship between them. In the study on modeling the fertility of irrigated soils, 2 class

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models were distinguished. The first is a specific fertility model, which reflects the factors that make up soil fertility, including agronomic practices and climatic conditions. The second real fertility model is that it shows the current state of soil fertility. Comparing these shows which parameters of the soil differ to a certain degree. Such models allow to determine the level of soil fertility, determining the direction of agrotechnical and other measures. In addition, we show the fertility model of irrigated grassland soils:

Table – 1 Fertility model of irrigated meadow soils

Agronomic indicators		Models	
Agroclimate		**Specific**	**Real**
1.	Average annual rainfall, mm	300-320	266-440
2.	Average annual temperature	14,5	14,0-15,5
3.	Sum of effective t0 above 100s	2300	2140-2220
4.	Precipitation in March-April, mm	100-120	100-200
5.	Water mode type	irrigation	avtomorph
6.	Irrigation rate, m3	4700	8000
Chemical		**Specific**	**Real**
1.	The amount of humus in the driving layer,%	1,5-2,0	1,3-2,2
2.	The amount of humus in the half-meter layer (average%)	0,09-0,11	1,2-1,70
3.	Total nitrogen,%	0,09-0,11	0,07-0,11
4.	Total phosphorus,%	0,18-0,20	0,15-0,18
5.	Total potassium,%	2,0	1,6-2,4
6.	Harakatchan phosphorus, mg / kg	30-45	20-140
7.	Motile potassium, mg / kg	300-400	200-500
8.	The sum of the absorbed cations	14-15	12-16
9.	At the rate of mg / eq per 100g of soil absorbed calcium,%	80	50-80
Agrophysical		**Specific**	**Real**
1.	Depth of driving layer, cm	30	28-35
2.	Physical lost amount,%	35-55	
3.	Density of driving layer, g / cm3	1,30 -1,40	
4.	Water permeability in 1 hour, mm.	70-90	
Bioecological			
	Nitrogen utilization rate of plants Soil nitrification activity The amount of useful protofauna The amount of soil contaminants Contamination of soils with nitrogen phosphorus and others.		

Scientific research to further increase the fertility of irrigated soils and to develop ways to use them properly in agriculture has yielded certain results. However, it should be noted that the fertile potential of the oasis soils is not fully used to date. The main reason for this is that the factors that make up soil fertility have not been fully studied, and the factors that determine fertility have not been identified. The solution to these problems can be solved by creating their fertility models for each soil type.

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