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THE IMPORTANCE OF SIDERATE CROPS IN INCREASING SOIL FERTILITY

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Abstract
The scientific and practical issues of using land resources to enhance soil fertility are focused on the rational use of the soil layer, a crucial part of land resources, to maintain and increase its fertility. Increasing the fertility of cultivated soil in all aspects should remain a fundamental principle of agricultural development. Maintaining and enhancing the fertility of soils used in agricultural practices is directly linked to their proper and efficient use. From this perspective, instances of declining soil fertility due to improper use are also observed in some areas.

Introduction

Fertility is generally divided into natural and effective types. Natural fertility is characterized by the total reserves of nutrients in the soil; its formation is related to the conditions and factors of soil formation as well as its genesis. Since soil fertility requirements vary and depend on plant biology, soil that is considered fertile for one type of plant may not be fertile for another.

The thin top layer of soil that possesses fertility is limited, yet over 93.9% of the food products necessary for humans are obtained from these lands. Today, the rate of soil fertility loss is accelerating compared to its preservation and restoration. Therefore, consistent reforms have been implemented in our country in recent years in this regard. To improve the condition of irrigated lands, maintain and increase their fertility, and use the land efficiently, it is first necessary to improve the condition of various degraded lands—saline, eroded, compacted, stony, and nutrient-depleted areas. For this, it is essential to follow scientifically based agro-meliorative, agrochemical, agrophysical, and agrotechnical measures and recommendations aimed at increasing soil fertility.

Nutrient Levels in Soil (Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulfur, Iron, Boron, Manganese, and Other Micronutrients) The nutrient content in soil depends on the composition of soil-forming rocks and underlying sediments (substrate) as well as the processes of soil formation. The soil reaction significantly influences the absorption of micronutrients by plants. The nutrient reserves in the soil are managed through the application of mineral and organic fertilizers. One key condition for soil fertility is the absence of excessive amounts of soluble salts in the soil, mainly sodium, but also magnesium, calcium, and other cations. Excessive amounts of these salts can lead to soil salinization, primarily caused by improper irrigation practices, resulting in a sharp decline in fertility. To remove harmful salts from the soil layer, saline lands are washed. To prevent salinization, irrigation regimes are determined based on the soil's properties and composition.

Low soil fertility is often linked to the presence of pathogenic organisms. Eliminating them through chemical methods (sterilizing pests, applying fungicides, etc.) and agrotechnical measures (crop rotation, soil tillage) can significantly increase effective soil fertility. To preserve soil fertility, methods that prevent erosion are employed, field shelterbelts are established, and the banks of rivers and canals are reinforced, among other practices.Jo'raqul Sattarov.

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In our research conducted on the lands of Xavos district in Sirdarya region, we found that there are irrigated gray-meadow soils with varying amounts of humus (0.98%, 1.60%, and 3.75%). This indicates that soils with different fertility levels are formed depending on agricultural practices. The composition and condition of the soil directly affect the productivity and quality of the biomass products obtained from the cultivated crops.

The solution for sustainable agricultural development and increasing soil fertility, in our opinion, must be carried out considering the natural-ecological laws of social development and biosphere evolution. Currently, the fertility level and the ameliorative-ecological condition of the majority of the lands used in agriculture do not meet the required standards. There are both objective and subjective reasons for this, of course. However, it is incorrect to conclude that this situation is the same everywhere.

This is because it is observed that the fertility of the soils on the lands of farmers and agricultural enterprises that follow recommendations based on the achievements of sciences such as soil science, agrochemistry, farming, land management, and land use, and rely on the traditional experiences of our ancestors, is at a high level. The decrease in organic matter in the soils leads to the loss of many positive agrochemical properties. The reduction of humus in the soils is due to the absence of crop rotation with alfalfa, the lack of planting green manure crops, the dominance of cotton monoculture, and the non-use of organic fertilizers.

To improve the humus content of the soil, it is necessary to apply organic fertilizer (manure) to all lands. Additionally, straw, cotton stalks, and poultry farm waste should be incorporated and plowed into the soil, as these materials contain nutrients that are readily available to plants. Considering the shortage of organic fertilizer (manure), it is necessary to use poultry farm waste and composts. The annual application rates of manure and compost should be differentiated based on the humus content of the soils. In the cotton-wheat-rice cropping system, it is necessary to expand the planting of alfalfa, legumes, green manure crops, and cover crops. The green mass produced is essential for livestock and, when plowed under, it is crucial for increasing soil fertility. Our research results indicate that the current farming system of alternating major cotton and wheat (winter wheat) crops and using high amounts of mineral fertilizers has led to a decrease in organic matter in the soil and a deficiency of essential nutrients for plants. To prevent this situation, it is necessary to enrich the soil with organic matter, create ecologically clean soil conditions, and apply resource-saving technologies to produce ecologically clean products.

Currently, measures are being implemented in our country to maintain and increase soil fertility, taking into account soil-climatic conditions and the requirements of agricultural crops. As a result, positive changes are occurring in soil conditions, and agricultural crop yields are increasing. The main reason for this improvement is enhancing soil conditions, enriching soil with organic matter, correctly placing crops, and rationally using land, water, and natural resources, along with applying modern advanced agrotechnologies.

This agrotechnology, which involves using various types of organic fertilizers and incorporating green manure crops without the use of mineral fertilizers, forms the basis for biological (organic) farming in agriculture. Many scientific conclusions confirm the soil-climatic, technological, ecological, and economic feasibility of year-round use of irrigated lands. When cover crops are grown as green manure, the humus (organic matter) content in the soil increases from 0.05% to 0.12-0.16%. Additionally, the soil's water permeability, aggregate composition, and other

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indicators also improve.

Green manure crops enhance soil fertility, reduce soil acidity, activate beneficial microflora, and enrich the soil with organic fertilizers and biological nitrogen. They also protect the soil surface from intense sunlight, preventing the formation of cracks. The green mass of these crops is rich in nitrogen, protein, starch, sugar, and various microelements, and therefore, they should be plowed in while still fresh to turn them into green manure. If green manure crops are left for too long, their stalks may not decompose well in the soil and could become a source of viral and fungal diseases. It is essential not to wait until the green manure plants start producing seeds.

In general, green manure crops should be adapted to local conditions. These crops need to grow rapidly, be robust, not be too demanding on fertile soils, and accumulate significant amounts of nitrogen. Before planting green manure crops, it is crucial to determine the desired yield and understand the agro-technical characteristics of the crops to be planted. The more green manure mass there is, the more effective it will be. It is not recommended to plant crops from the same family consecutively.

When growing cover crops, it is essential to pay special attention to selecting species, subspecies, various varieties, and hybrids based on their distinctive features and characteristics. In summary, ensuring the success of increasing soil fertility through the planting of green manure crops depends on practitioners adhering to scientific approaches and requirements in their field activities.

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