

## **THEORETICAL ASPECTS REGARDING SOME ECOLOGICAL MEASURES TO PREVENT SOIL DEGRADATION**

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### **ABSTRACT**

Eco-biological agriculture involves the choice of ecological methods of tillage, more favorable to life, using various equipment and systems of agricultural machinery, depending on the properties of the soil, agrotechnical works in accordance with pedoclimatic conditions, timely and good quality, a fertilization in relation to the requirements of the plants, the favorable zoning of the agricultural crops, the realization of efficient amelioration measures, all based on a good knowledge by the agricultural specialist of the physical, chemical and biological qualities of the soil.

### **INTRODUCTION**

Through its multiple functions, ecological, social and economic, the soil has had, holds and will have a special importance in the life of mankind. The agricultural occupation aims at providing humanity with the raw material necessary for the productive process.

Soil is the main means of production in agriculture, because it carries out the entire process of growing and fruiting plants and, at the same time, it ensures the production of organic matter from mineral matter through plant organisms. Soil is a means of production resulting naturally and not through the productive activity of humans; therefore, it must be used rationally, in order to maintain its productive capacity for future generations. This means of production, if used properly, does not wear out morally over time, and can maintain its productive capacity or even increase it.

Taking into account these features, the entire agricultural activity carried out by the anthropogenic factor must take into account the ecological measures necessary to prevent and combat soil degradation.

Soil is a natural body with a heterogeneous composition, consisting of a mineral component, an organic

component, a liquid component and a gaseous component.

In order to ensure good conditions for plant growth and fruiting, the soil components must be maintained in the optimal natural ratio, any deflation causing a decrease in the productive capacity of the soils.

### **MATERIAL AND METHOD**

Agricultural activity must take into account ecological, scientific measures, for a reasonable choice of soil exploitation methods, to use appropriate agricultural systems and machines, to carry out agricultural work on time and of good quality, to apply a balanced chemization, to make a proper zoning of agricultural crops and to apply the most appropriate pedo-amelioration works.

### **RESULTS AND DISCUSSIONS**

Ecological mechanization means the selection of agricultural machines according to the physical-mechanical properties of the soil and the performance of agricultural works with the help of agricultural machines in the aggregate. Any deviation from these requirements means settlement, structural degradation, destruction of microbiological life and uneconomical energy consumption.

The correct choice of agricultural machinery and the performance of agricultural works in the aggregate ensure a conservation of the productive capacity of the soils and a good balance between the degradation processes and the processes of soil fertility restoration.

The agrotechnical works influence and modify the physical, chemical and biological factors and have a decisive role in the preparation of a good quality germination bed, which will ensure the obtaining of efficient productions qualitatively and quantitatively. They ensure the capitalization of soils affected by limiting factors (excess moisture, salinization, drought, erosion, etc.) by improving the internal drainage of the soil, fragmenting the hardpan, crushing the crust, favoring the salt washing process, etc.

The volume of agrotechnical works and their impact on the upper part of the soil are very important. They favor soil depollution by intensifying the activity of microorganisms, favoring oxidation processes. On well-worked soils, smaller amounts of fertilizers, herbicides and insecticides are required, which leads to a reduction in pollution.

Therefore, the timely and good quality of agrotechnical works is of great importance in the development of the productive process in agriculture. Any deviation from the principles of a scientific agrotechnics means regression because there is a physical, chemical and biological degradation of soils and a decrease of their productive potential. Weeds also control weeds, as well as some diseases and pests that have development cycles related to the soil.

By deeply incorporating plant debris on which pathogenic fungi have developed, the source of disease infection is removed for the next year.

The current application of herbicides and pesticides to control weeds, diseases and pests has led to an improvement in agrotechnics and has resulted in an increase in agricultural production per unit area. These products intended for the

protection of agricultural crops are produced and introduced in a certain dose in agroecosystems in order to obtain a biological control effect but they impress a certain toxicity to the soil.

Therefore, when applying these products, the following aspects will be taken into account:

- the least toxic products will be used for the same biological effect;
- avoiding the introduction of products that are difficult to biodegrade or with a residual effect and high remanence;
- avoiding the use of easily leachable products;
- avoiding the use of products that induce side effects, accumulations, destruction of useful entomofauna, alteration of interspecific relationships, biological imbalances;
- non-use of products that, through their persistence, easily penetrate the soil - plant - animal - human food chain;

The chemical fertilizers incorporated in the soil have the role of contributing to the increase of the production of the cultivated agricultural plants. Plants extract nutrients from the soil such as N, P, K, S, Ca, Mg and trace elements. It is therefore necessary to return these elements to the soil in an amount equivalent to that extracted from the soil. Thus, the use of chemical fertilizers in excessive quantities and for a long time determines the accentuation of the minimization of the organic material, negatively influencing the fertility of the soils by damaging the structure, by reducing the adsorbent complex of the soil.

Chemical fertilizers, and especially those with nitrogen, can cause, in addition to soil pollution, indirectly, the pollution of groundwater and also in the case of overdoses, can cause changes in the bacterial flora of the soil, a first consequence being the nitrogen-fixing bacteria in the soil or just inhibiting them.

To reduce soil pollution by applying chemical fertilizers, they should be administered in appropriate doses, balanced but there are many and

widespread cases of strong increase in soil fertility by fertilizing the soil with manure, compost and other organic fertilizers, this level of treatment of the soil going on the line of integral and stable bio - physico - chemical fertilization.

Increasing soil fertility through chemical and organic fertilizers, fundamental means, must be completed by the contribution of plants to improving the conditions of structure - porosity and organic matter, the source of physiologically active substances and other elements of fertility. To this end, organic fertilizers and regular cultivation of perennials (grasses and legumes) are effective solutions and therefore very necessary.

The basis of high plant productivity is the fullest possible satisfaction of plant requirements for ecological factors, the most harmonious correspondence between the ecology of species (varieties and hybrids) and the living conditions of plants. Without ensuring such correspondence, any measures will be ineffective.

From here we can deduce the importance of detailed knowledge of the ecology of species and varieties, the causal explanation of their vitality and fruiting in different soil and climate conditions and a proper zoning of agricultural crops.

Land improvement works are a dynamic element that produces large transformations of the soil over long periods of time, which is why it is necessary for these works to be carried out in actions of correlation with nature. In this sense, land improvement works must lead to soil transformation, which increases the potential for fertility, improves natural conditions and maintains nature-friendly characteristics, on the one hand, and removes the natural or artificial causes that are harmful to nature and could lead to changes in biological balance, on the other hand.

The solution of the two aspects can be achieved by finding the best

solutions, which will make them exist in a permanent interdependence. In this sense, these hydropedic improvement works to fill the moisture deficit by irrigation, elimination of excess moisture by dams, open canals, drainage, prevention and control of water and wind erosion, improvement of saline soils and amendment of acid soils, leveling and the modeling of sandy lands and sands, etc., must be done in complex with the agricultural works that are currently executed and only following some judicious studies undertaken in the field.

## CONCLUSIONS

Compared to other natural resources, the soil is limited in extent and has a fixed character. Once destroyed, the soil will not be able to recover as it was because the conditions and history of its formation cannot be reproduced, the degradation of the soil occurring immediately and irreversibly. Any surface thus compromised must remind us that the formation of a layer of soil 3 cm thick, naturally, requires a period of 300 - 1000 years of development of physico-chemical and biological processes and the genesis of a layer of 20 cm. cm thick lasts between 2,000 and 7,000 years.

Therefore, every specialist working in the field of soil science has the responsibility to highlight all the knowledge, the latest achievements of science, so that the soil is given to future generations at least at the current level of fertility.

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