

10,000 gardens in Africa project

Soil management



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One of the most important factors to be taken into consideration is the soil.

The **characteristics of the soil** are factors to which our choices must be adapted, because they are permanent, they cannot be modified, or can only partially be modified, and only with a high expenditure of time and/or resources.

Normally, the best thing to do is to select crops that adapt to the soil and not vice versa. Therefore, before starting to sow, it is important to know the characteristics of the soil at our disposal. Each type of soil can be suitable for certain plants and not for others, and it may or may not benefit from a specific crop technique.

Compared to natural soil, agricultural soil evolves according to human activities.

Farming activities modify the process of organic matter degradation. For instance, activities such as harvesting reduce plant biomass and, therefore, the quantity of organic matter - which in a natural ecosystem would decompose in the soil and thus restore fertility.

A lower content of organic matter has a negative effect on the structure and porosity of the soil, the capacity to retain water and nutrients useful for the plant and the community of decomposer microorganisms present, thus reducing biodiversity and the rate of mineralization of the soil's organic matter.

The reduction of organic substances in the soil due to agricultural activities must be counterbalanced by organic amendments and fertilizers that return to the soil the resources consumed and removed.

Fertility



Every year on our planet, 5.5% of the **organic matter** that is part of the plant world falls to the ground, meaning that a huge mass of organic matter (25 billion tons of carbon alone) enters the phase of decomposition and humification in the cycle of organic matter.

When we go into a wood or forest and stir the mantle of dead leaves, we notice a pleasant smell, and as we go deeper, leaves, branches, animal and insect remains gradually lose their original

shapes and colors: beneath the first layer of leaves and debris not yet decomposed, there is an intermediate layer, under which we find soft soil, dark in color, rich in humus and sweet smelling.

Kitchen scraps kept in plastic trash bags (so-called urban wet waste) emit unpleasant odors after a very short time, and are to be disposed of.

The difference in behavior between the underworld and our organic waste is related to the fact that forest soil is an ecosystem characterized by a food chain, by a cycle of living organisms that thrive thanks to the reutilization and transformation of organic matter that reaches the ground. Considering a depth of 30 cm, one hectare of natural fertile soil can hold more than seven tons of living

decomposers such as bacteria, fungi, protozoa, algae, nematodes, annelids, insects and even small vertebrates. These organisms feed on organic matter, triggering a long and complex sequence of physical transformations involving chemical and biochemical processes of decomposition, mineralization and humification.

In the food chain of decomposers, the organic matter of plant residues is transformed into humus, releasing abundant inorganic nutrients, in particular nitrogen for plants, water and carbon dioxide.

The organic substances present in plant residues (starches, sugars, cellulose, lignin, resins, etc.) become nourishment for the decomposers which draw energy from their degradation, producing carbon dioxide (just like when we breathe). These organisms use the energy thus obtained as well as a part of the substances to synthesize new proteins, to grow and to multiply.

The constant input of organic substances facilitates the accumulation of moisture and the absorption of nutrients, which are released gradually, satisfying the nutritional needs of the plant in the long term.

The cycle of organic matter knows nothing about the concept of waste, it reuses everything. Only the human species, particularly in recent decades, has invented and introduced non-recyclable waste and its storage.

To replicate in a garden the cycle of organic matter that regenerates soil fertility by recovering plant residues (from the garden itself, a neighboring garden, a kitchen or a canteen, etc.), we can make use of composting. Another example of “recycling” is the direct incorporation of crop residues into the soil.

A similar function of restoring organic matter in the soil is that of applying manure, green manure, and in part, mulch.



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