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Soil conservation ensures food security

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Photo: Gisele Rosso

energy production with the lowest environmental impact. In this scenario, maintaining healthy and high-quality soils becomes a major responsibility. Without the application of knowledge for good soil management, serious environmental problems can arise, such as soil degradation and water resource degradation.

Soil is much more than just a substrate for plant growth. It is a complex living system that must be understood and worked on in the best way possible to ensure the success of agriculture. Soil science shows that it is not simply a material, but a natural body in layers, with a physical organization of minerals and organic matter, which resulted from chemical and biological processes. And that soil is a fundamental component of terrestrial ecosystems, playing a critical role in their functioning and in the sustainability of human life. Its location, composition and the processes that occur there have an influence on the functioning of ecosystems and on human existence.

The Food and Agriculture Organization of the United Nations (FAO-UN) estimates that one third of the world's soils are degraded due to inappropriate use. The main problems include erosion, compaction, acidification, salinization and contamination.

Water erosion is considered the biggest soil degradation problem in tropical environments. This process begins with the direct impact of raindrops on a surface that is not protected by vegetation or mulch. The impact of the drop triggers a series of events involving the disintegration, removal and transport of particles, nutrients and organic matter. It is considered one of the main causes of degradation of agricultural soils in Brazil. The intensity of rainfall, the type of soil and the vegetation cover influence this process. Vegetation cover is a key element in preventing it, as it protects the soil by reducing the erosive energy of raindrops by minimizing the

Remembering that the biomass that grows and protects the soil acts on the surface, with the cover, and in the subsurface with the growth of the roots.

The consequences of water erosion range from the loss of essential resources such as soil, water and nutrients, resulting in significant costs. Erosion represents a global and urgent challenge, compromising the production of food, fiber and energy, the availability of agricultural land and the quality and availability of water.

Degraded soil is incapable of sustaining complex ecosystems, compromises climate regulation, interrupts water flows and makes food production unviable. On the other hand, healthy soil is the foundation of food security and agricultural sustainability, ensuring the vitality of production systems and the sustainability of natural resources. Healthy, high-quality soil has greater carbon storage, reduces greenhouse gas emissions into the atmosphere and the effects of global warming, increases water infiltration and retention, regulates temperature, stimulates biological activity and increases nutrient cycling.

The loss of topsoil during erosion can render soils unproductive. The effects of erosion go beyond the loss of fertile land, and can lead to increased sedimentation, eutrophication and siltation in streams, rivers and reservoirs, obstructing waterways, causing declines in aquatic life and reducing water availability. Degraded lands often have reduced water retention capacity, which can worsen flooding and aquifer recharge. In addition to the loss of nutrients, carbon, soil structure and biodiversity are also lost.

There are also economic losses from applying inputs to a harvest that can be washed away by rain. These are significant losses that impact farmers' income, since fertilizer costs can represent up to 40%

maintaining terraces, which require more hours of work and machinery.

Furthermore, there is an environmental imbalance caused by carbon losses. The soil stores this element as organic matter. The soil's organic carbon reservoir is twice the amount of carbon present in the atmosphere and about two to three times greater than the carbon accumulated in living organisms in all terrestrial ecosystems on Earth. Due to their potential for carbon sequestration, agriculture and agricultural soils, since the Paris Agreement (2015), have gained more prominence and have become part of the global carbon agenda for mitigating and adapting to climate change.

April 15th is National Soil Conservation Day. This is an important day to show society that soil conservation is essential for maintaining life and to raise awareness about the threat of irrational use.

Soil is not just a natural resource, it is a legacy that has been entrusted to humanity. The way it is managed today will define what will be left to future generations.

A few decades ago, preserving and producing were seen as conflicting activities, and it was impossible for them to happen at the same time in Brazilian agriculture. With the advancement of science and good agriculture, this idea was left aside. Today, farmers and technicians know that preserving and producing is possible, and can also be very advantageous and essential to guarantee the sustainability of the agricultural sector, food security and environmental preservation for future generations. It is a paradigm shift in the way of producing, seeking a balance between productivity, profitability, social responsibility and environmental conservation.

Contribution to SDGs

(UN): SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture), SDG 13 (Take urgent action to combat climate change and its impacts) and SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss).

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