Editorial

DECODING THE LIVING SOIL : SCIENCE-DRIVEN PATHWAYS TO SUSTAINABLE AGRICULTURE

Soil is not merely a physical support for plant growth; it is a dynamic, living system that underpins food security, environmental quality, and ecosystem resilience. Understanding soil in its physical, chemical, and biological complexity is central to achieve agricultural sustainability. The current issue of *"Harit Dhara"* brings together science-based insights, novel agricultural practices, and emerging technologies that help decode the living soil and guide pathways toward sustainable agricultural development. Recent advances in soil and environmental sciences enabled researchers to interpret the subtle signals embedded in soils that influence crop productivity and ecosystem resilience.

This issue highlights soil colour and hidden information it provides on soil health and mineralogy, emphasizing the importance of traditional observations as effective diagnostic tools. Micronutrient management, often overlooked in soil fertility discussions, is addressed through an in-depth analysis of molybdenum in crop production.

Recognizing soil as a biological powerhouse, several articles focus on microbial synergy, showcasing beneficial microbe-based technologies for smart and sustainable agriculture. The role of agricultural land-use planning is examined from a landscape perspective, emphasizing its importance in achieving sustainable food production while conserving land and natural resources.

The issue also explores life in extreme environments through a discussion on extremophiles, organisms that offer promising insights for global sustainability solutions. Further, the article on glomalin explains its functional significance in soil aggregation, carbon sequestration, and ecosystem stability.

Contemporary practices such as plastic mulching are critically evaluated to balance short-term productivity gains against long-term environmental concerns. The issue also discusses on modern technologies for estimating soil contaminants, highlighting advances in remote sensing, nanotechnology, microbial tools, and analytical techniques.

I hope this issue of *"Harit Dhara"* helps readers to develop a deeper understanding of living soils and the informed application of scientific knowledge to preserve productivity, ecological integrity, and food security.

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