National Conference on Recent Advances in Science, Engineering, Technology, Humanities, and Management (NCRASETHM - 2024)
28th January, 2024, Banquet, Noida, India.

CERTIFICATE NO : NCRASETHM /2024/C0124131

A Study of Enhancing Precision of Soil Characterization in Landscape

Gade Vishnu Hanmant
Research Scholar, Ph.D. in Physics, P.K. University, Shivpuri, M.P., India.

ABSTRACT

Enhancing the precision of soil characterization in landscapes is critical for informed land management, agricultural productivity, and environmental conservation. Traditional soil characterization methods often involve labor-intensive field sampling and laboratory analysis, which can be time-consuming and may not fully capture the spatial variability of soil properties across large landscapes. To address these challenges, advanced techniques such as high-resolution remote sensing, proximal soil sensing, and digital soil mapping are increasingly being employed. These methods allow for the collection of detailed soil data with greater spatial accuracy and temporal frequency. Remote sensing technologies, including satellite imagery and UAV (drone) surveys, provide extensive coverage and can detect variations in soil properties like moisture, organic content, and texture. Proximal sensors, such as electromagnetic induction and ground-penetrating radar, offer in-situ measurements with minimal disturbance to the soil. By integrating these data with geographic information systems (GIS) and advanced statistical models, soil scientists can produce precise soil maps that reflect the heterogeneity of the landscape. This enhanced precision in soil characterization supports better decision-making in agriculture, such as optimizing fertilizer application, improving crop selection, and managing soil health. It also contributes to sustainable land use planning, helping to balance the demands of agriculture, development, and conservation.