

Soils from Space

Scientists at National Remote Sensing Centre (NRSC) developed soil spectral libraries using advanced hyper spectral remote sensing techniques. Soil spectral signatures of specific soil types along with soil properties, and its nutrient recommendations are analysed.

Precise mapping of soil using conventional analysis is laborious and time consuming. Remote sensing techniques have been tested to develop solutions for rapid soil assessment. These techniques are fast, non-destructive and have large spatial coverage.



Four factors namely, mineral composition, organic matter, soil moisture and soil texture influence the remote sensing of soils. Field observations have been carried out using portable hyper spectral radiometer and soil signatures were captured for different soil samples in Palakkad district of Kerala.

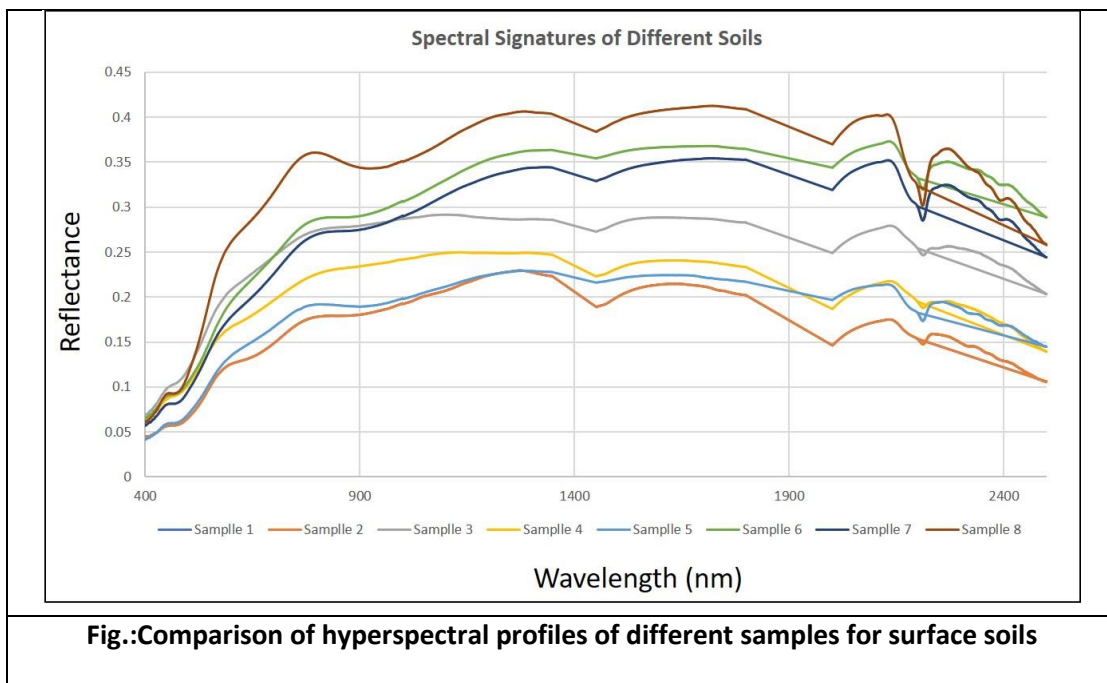
Simultaneously both surface and sub surface soil samples have been collected in all the plots to understand the variation between surface and sub surface soils. In a single plot, of an average size of 1 acre, 8 representative samples were collected. In addition to the soil sample collection, basic management practices adopted by the farmers were also

recorded, which will be of use to understand how the management practices influenced the soil health.

The soil samples were analyzed for parameters, namely, soil pH, Electrical conductivity (EC), Organic Carbon (OC), Nitrogen (N), Phosphorus (P) and Potassium (K) adopting standard procedures in soil testing laboratory. The lab analyzed values were compared with the hyper spectral soil signature data using advanced statistical transformation techniques.

The scientific results are promising and it is established that that these techniques can be extended to other areas and suitable assessment of soil can be made in rapid manner as a reconnaissance survey.

Scientists are extending the research for larger applications to upscale the approach at national level.





Measurement of Soil Spectra using Spectro radiometer at Palakkad

Take aways

- Local governments can use these techniques to assess the soil health and make suitable recommendations for NPK supplements.
- Fertiliser industry can adopt suitable strategy to ensure the availability of required NPK products.
- Researchers can use these techniques to develop optimal solutions for enhanced agricultural production leading to food security.
- Students can explore and contribute in field observations in larger perspective across country to build a comprehensive soil spectral library addressing multiple diversities across country. The large spectral library database, once developed will serve as reference spectra for interpretation of satellite images in agricultural applications.