

## **Developing a Virtual Soil Moisture methodology using Optical/Thermal and Microwave Satellite Imagery for surface Soil Moisture Mapping**

Irrigation is the largest (80%) user of freshwater resource, demand of irrigation water is continuously rising. It is important to make optimal use of water resources with improved agricultural productivity through objective and accurate information provided by remote sensing. This proposed research work develops a methodology for estimation of soil moisture using microwave remote sensing data from RISAT-1 to estimate soil moisture for agriculture land. The objectives of the proposed work is (i) to develop empirical/semi-empirical model to estimate surface soil moisture using Microwave remote sensing imagery, (ii), to estimate surface soil moisture using optical/Thermal measurements by satellite remote sensing and (iii) to develop a Virtual Soil Moisture methodology using optical/Thermal and Microwave Satellite Imagery for High Resolution surface Soil Moisture Mapping for drought assessment. Microwave remote sensing can be used to estimate soil moisture on the basis of large contrast that exists between the backscattering values for dry, wet and cropped soils. Temporal monitoring of water availability at soil root zone during growth periods of crop could prevent water stress and improve the productivity. At field scales, the high resolution soil moisture data can be better used for irrigation scheduling through precision agriculture. At larger scales, low resolution soil moisture data as alternative to vegetation index can be used to monitor and predict crop yield. Since microwaves penetrate cloud, microwave remote sensing could be a good alternative to VIS/IR data for monitoring vegetation distribution, health and water needs for agricultural applications. Outcome of the proposed work will improve our understanding about the estimation of soil moisture, the accurate knowledge of soil moisture helps to improve the crop productivity, crop scheduling, drought mitigation and flood. The soil moisture product is also required for study of climate change hence the soil moisture product will be used as input in climate related studies. The project will be self sustaining on its completion, implementation and adoption by the target user group.