

## **7. Early warning of flash drought using Evaporative stress in rain-fed and limited irrigation regions with Remote Sensing and Eddy Covariance measurements**

### **Aim**

This study aims to monitor the changes in evapotranspiration to identify the crop stress status in near real-time.

### **Scope**

Earth Observations (Water Resources and Agriculture)

Future utilization: ESI will help provide a remote sensing-based spatial index for drought early warning. ESI can be utilized for the development of a decision support system (irrigation advisory) for irrigation water management and early warning indicator of crop damage.

### **Current constraints / Challenges**

With the increasing climate change scenario, frequent dry spells are imminent. The increased frequency and extended duration of dry spells increase the risk of flash drought. A flash drought event causes severe damage to the crop physiologically and also causes a reduction in yield. It is essential to monitor these flash droughts to take mitigation measures. ESI is an important Drought indicator. Conventionally the moisture adequacy index is being used, which is primarily a meteorological index. Evaporative Stress Index (ESI) provides early warning of the onset of vegetation stress, which has an impact on evapotranspiration. The ESI is a thermal indicator of anomalous ET conditions. The ESI quantifies temporal anomalies in normalized evapotranspiration (ET), describing the ratio of actual-to-reference ET derived from satellite remote sensing. Optimizing water use in agriculture requires innovations in detecting plant water stress at various stages of the growing season to minimize crop damage and yield loss. In this direction, future remotely sensed plant stress indicators provide early loss detection and timely irrigation.

### **Expected outcome**

Near real-time evaporative stress index, utilized for the development of decision support system (irrigation advisory)

### **Time frame**

The project is in the initial phase of methodology development. TDP is expected to be completed on March 2024.