

6. Selection and implementation of an appropriate method for downscaling for actual evapotranspiration product

Aim

The primary aim of this study is to downscale the coarse resolution daily Actual Evapotranspiration (AET) to field-level AET for use in better irrigation management.

Scope

Earth Observations (Water Resources and Agriculture)

Future utilization: High-resolution daily AET maps will be helpful for Agriculture and water management applications, improving crop water requirement information and irrigation scheduling. It will support decision-makers and farm managers for water resources management-related applications.

Current constraints / Challenges

At the field scale, ET can be measured over a homogenous surface using conventional energy balance techniques, such as eddy covariance (EC), Bowen ratio, energy balance or soil water balance techniques, or by Lysimeter. However, these systems do not provide spatial estimates. Satellite remote sensing can give viable approaches for ET monitoring over large areas. Coarse/regional scale estimation offers an excellent opportunity for routine monitoring of actual evapotranspiration estimates, but these estimates need to be more accurate at the field level. Especially from the crop point of view, it is too coarse, and single-pixel generally covers larger than individual crop fields. Producing daily ET maps of a high spatial resolution has been challenging as high-resolution thermal band data is available only on a 16-day time scale. Downscaling is a critical way of utilizing the combined benefits of high temporal resolution of coarse-resolution satellite images and fine-resolution satellite data. Continuous monitoring of Actual Evapotranspiration (AET) is critical for water resources management at both regional and local scales.

Expected outcome

Daily high-resolution Actual evapotranspiration (AET) data

Time frame

The methodology development and testing phase of the TDP project is completed, and product validation with field data (flux tower data) is in progress. Validation of downscaled AET product is being taken up and is due for completion by March 2023.