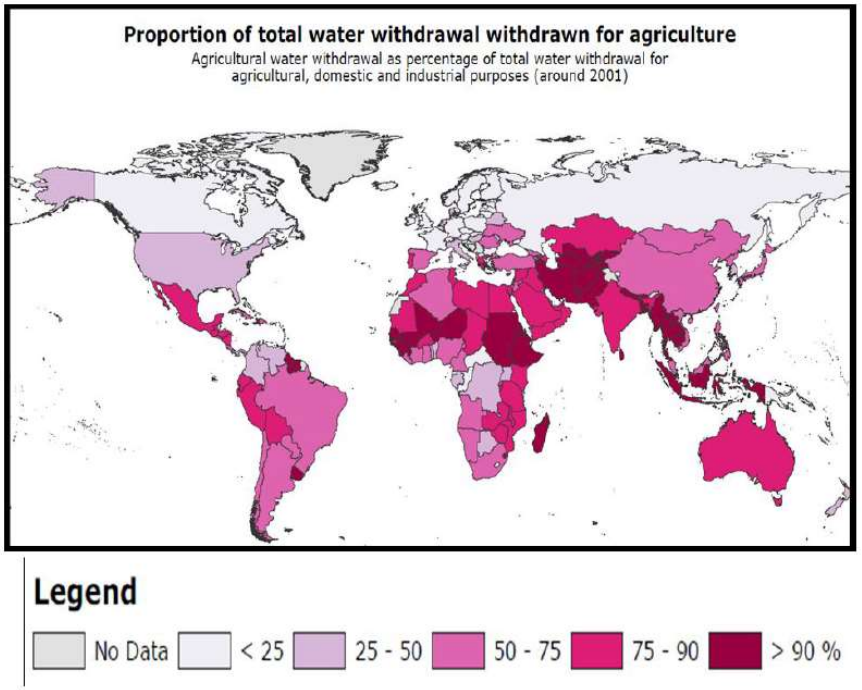
Development of a Remote Sensing–Driven Demand-Based Irrigation Scheduling System: A Case Study of the Narayanpur Command Area

Annie Maria Issac
Water Resources Group
National Remote Sensing Centre

9th INDIA INTERNATIONAL WATER WEEK
22nd – 26th September, 2026

Need for Irrigation Decision Support and Information System

- About 80 % of total water withdrawn is for irrigation in India
- Efficient Irrigation is an effective means to enhance crop productions
- Irrigation water needs to be supplied accurately, taking into account
  - Availability
  - Crop Water Requirement
  - Crop Productivity
  - Feasibility



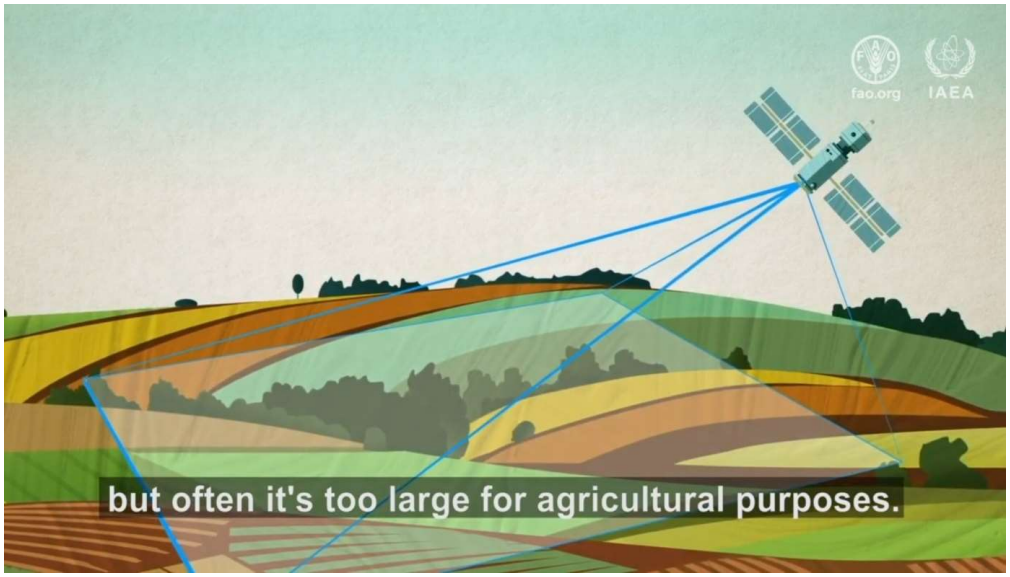
When?

Where?

How much?

Soil Moisture Status Based Irrigation Decision Support System



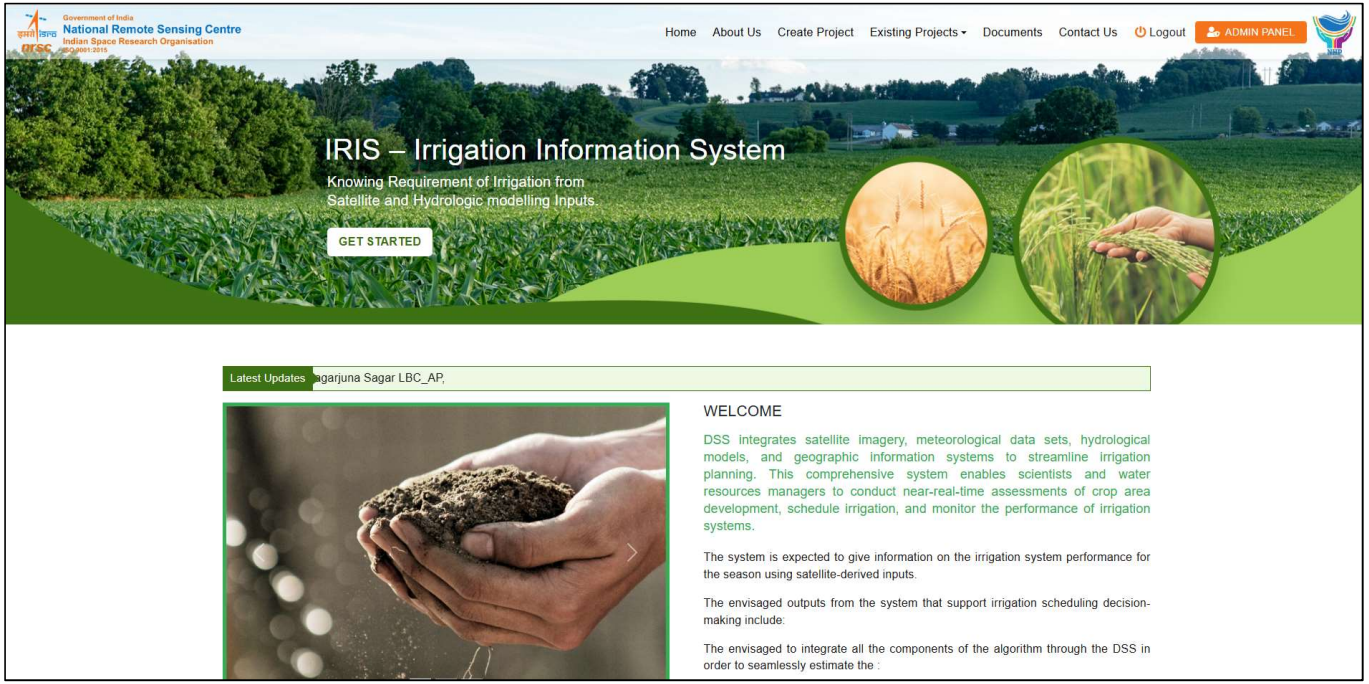


Source: FAO

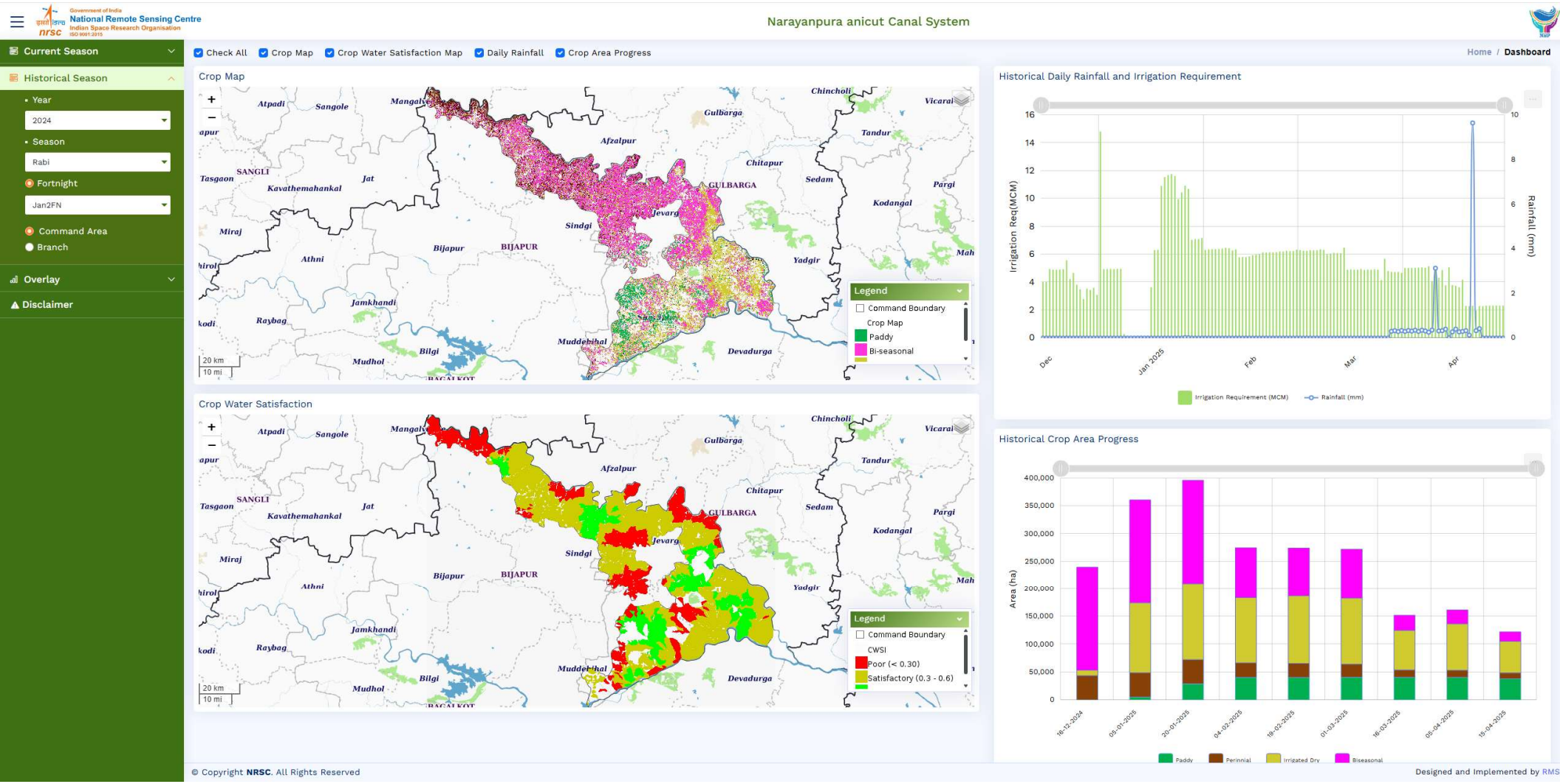
- Soil Water Balance Simulations gives soil moisture status at near real time and forecasted conditions
- Crop information at medium resolution from the satellite through the season
- Scale in between point measurements and satellite measures applicable for agriculture

Decision Support System for Irrigation Scheduling

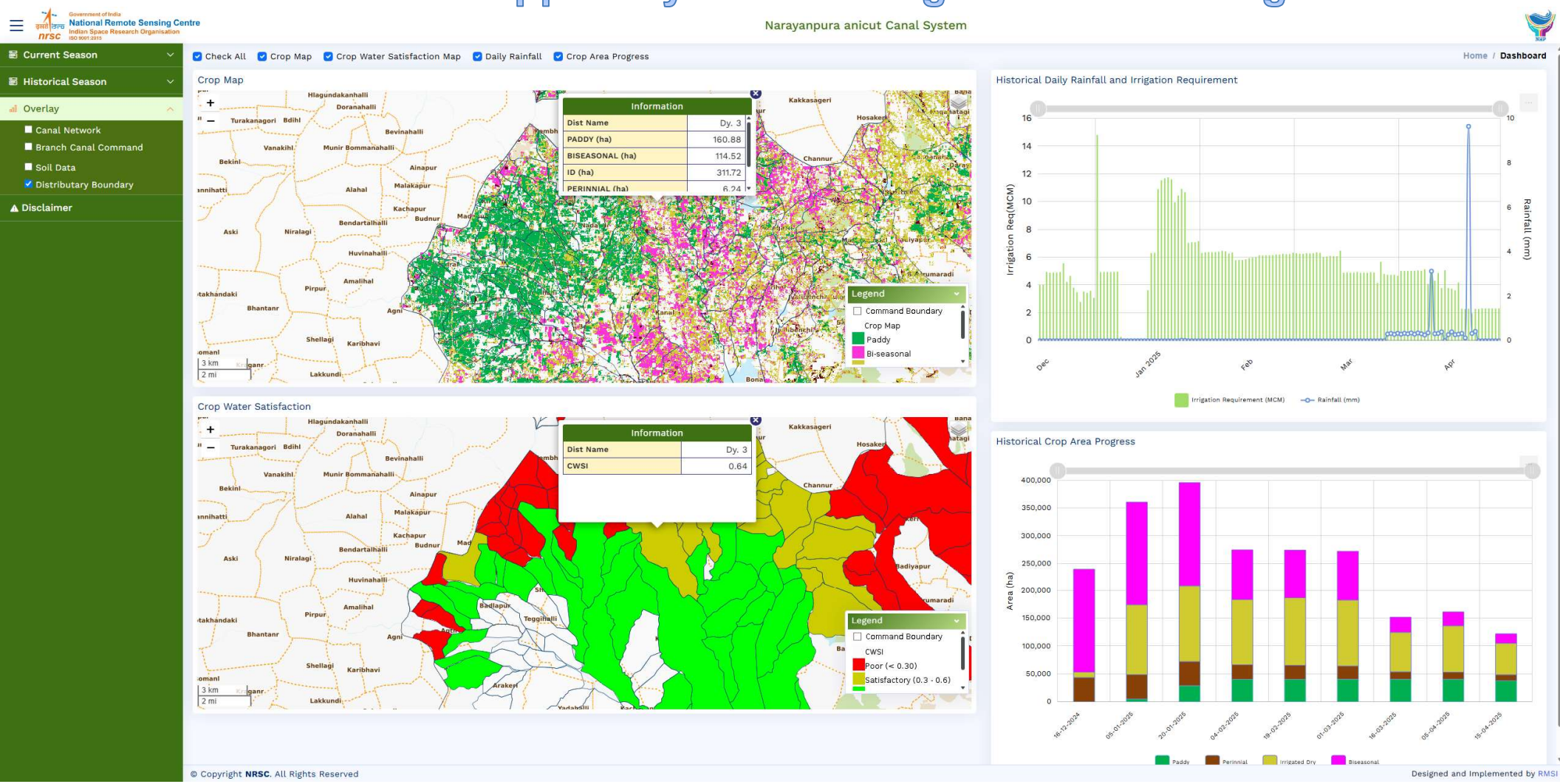
- Decision Support System developed which generates periodically
  - Cropping Pattern
  - Irrigation Requirement
  - Performance Assessment
- Visualization of outputs through portal



Decision Support System for Irrigation Scheduling

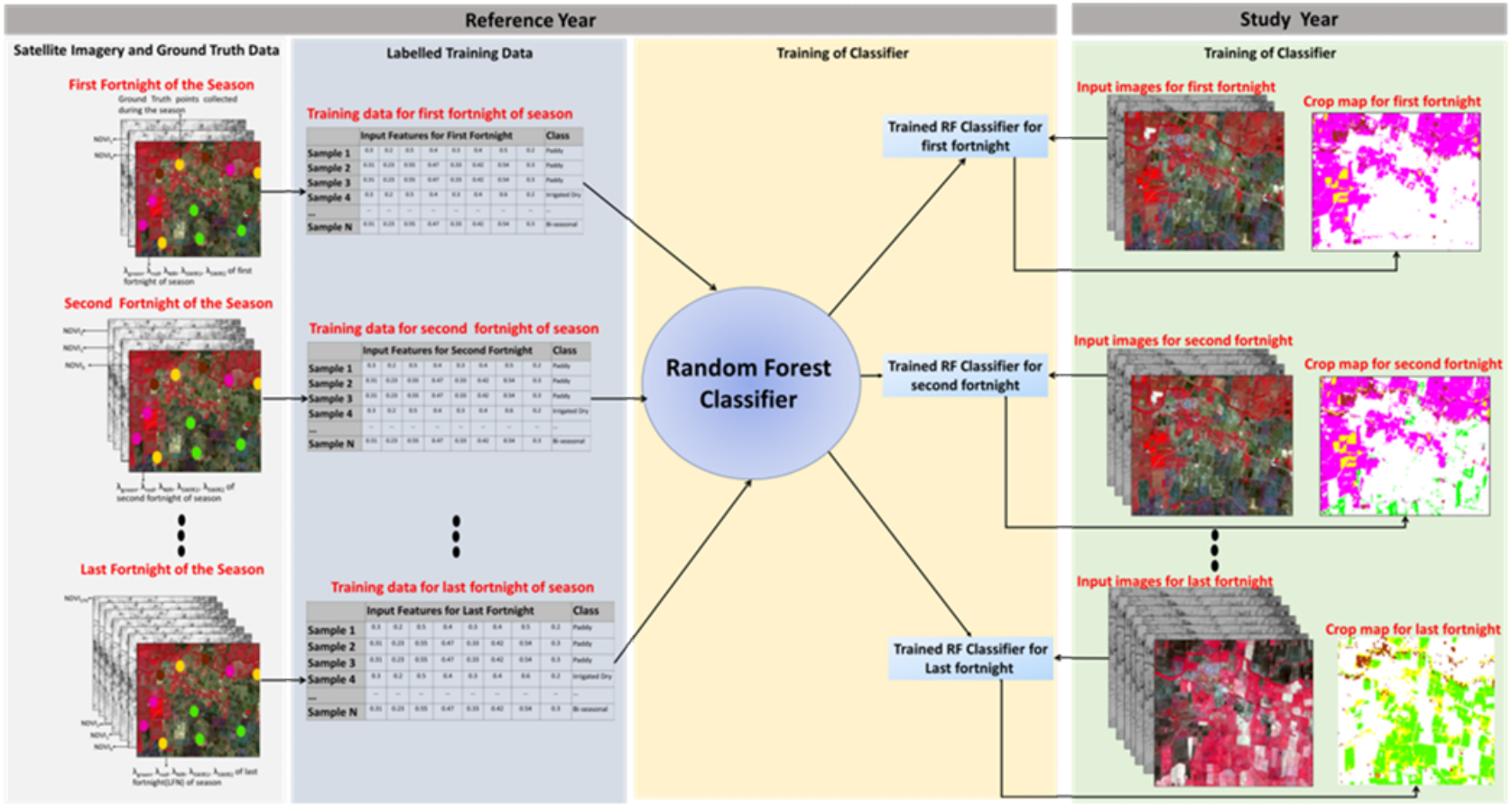


Decision Support System for Irrigation Scheduling



What Happens in the System ?

In-season Crop Maps Generation using Machine Learning

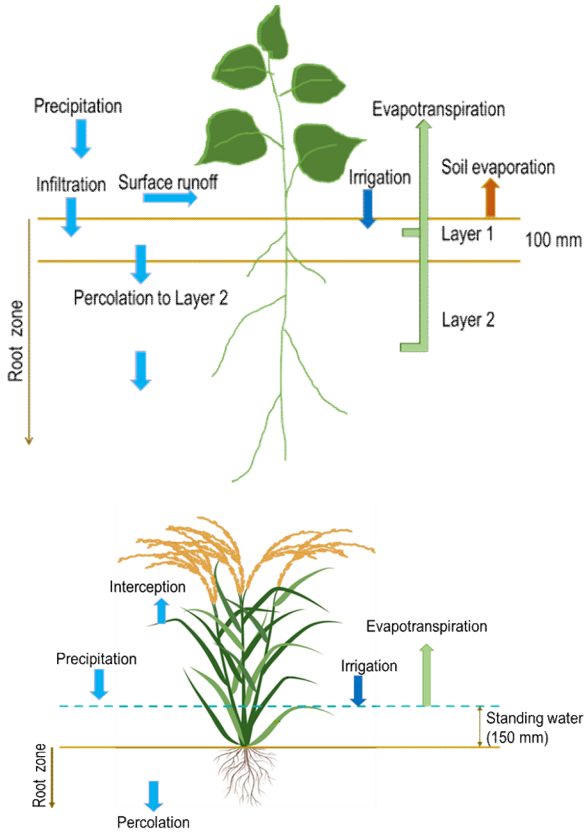


Mallya, S., Issac, A. M., Sithara, S., Singh, R., Abdul Hakeem, K., Chandrasekar, K., & Venkat Raju, P. (2025). Identification of Suitable Machine Learning Classifier for In-Season Crop Mapping in the Absence of Concurrent Ground Truth Data. Journal of the Indian Society of Remote Sensing, 1-23. https://doi.org/10.1007/s12524-025-02329-2

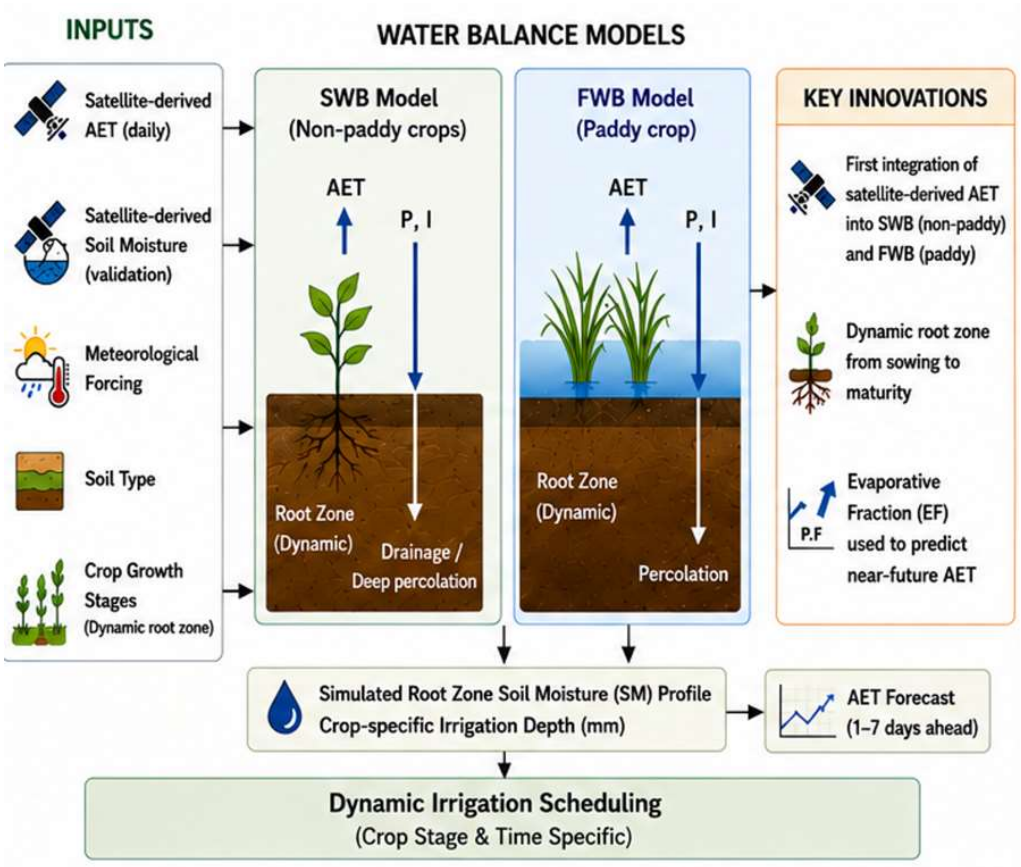
What Happens in the System ?

Irrigation Requirement Estimation

Conceptualization

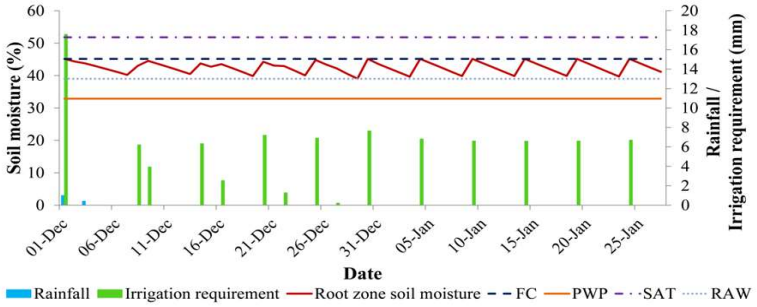


Overall Framework

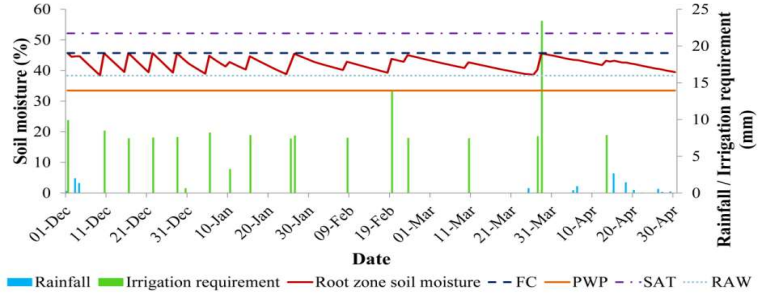


What Happens in the System ?

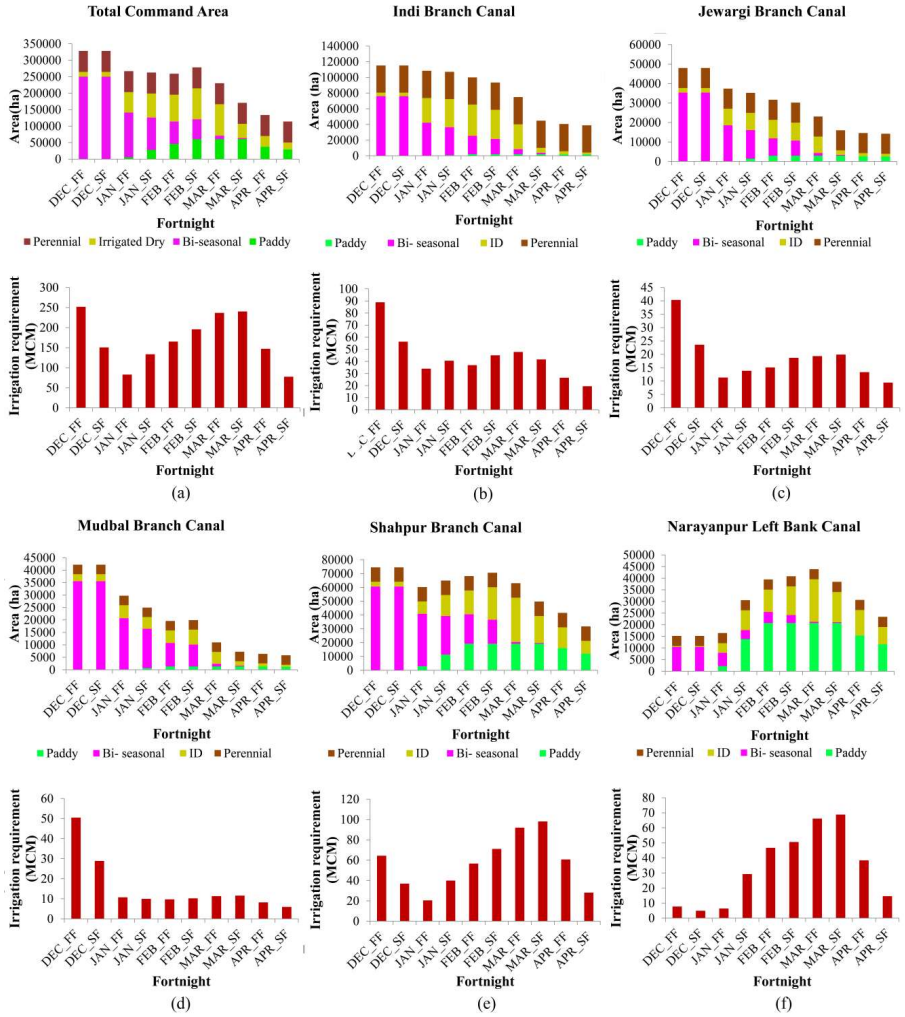
Irrigation Requirement Estimation



Irrigation requirement for Chilli along with rainfall and soil moisture variation



Irrigation requirement for Irrigated dry crops along with rainfall and soil moisture variation



What Happens in the System ?

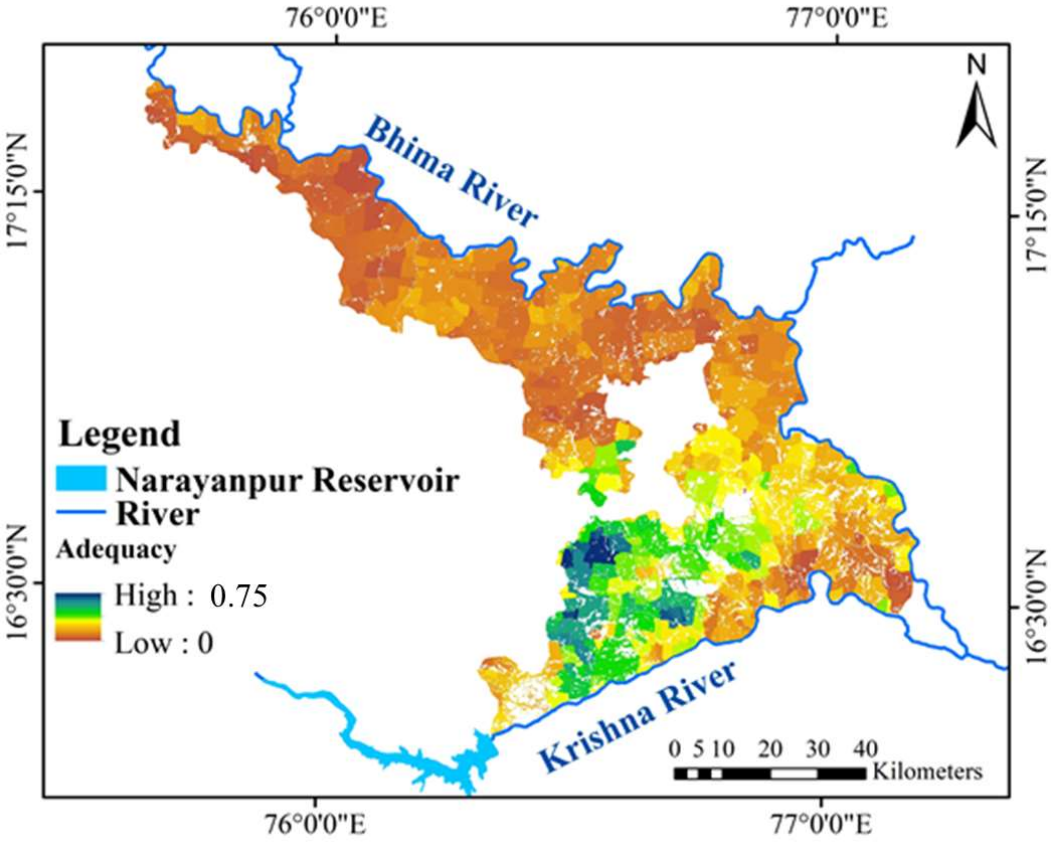
Performance Assessment of the System through the Season

- The CWSI is the ratio of cumulative AET and cumulative PET

$$CWSI = \frac{\sum AET}{\sum PET}$$

- The CWSI is a good indicator of plant performance based on the water available to the crop during a season.

- The greater the CWSI, the better the performance of the crop and vice-versa.



Implementation In Other Irrigation Systems



Create New Project

Home / Create New Project

The layers of Land Use and Land Cover, Crop Mask, Soil, Digital Elevation Model and Curve Number will be generated from available regional datasets. If user prefers project specific soil layers login as Administrator or contact –admin@email.com

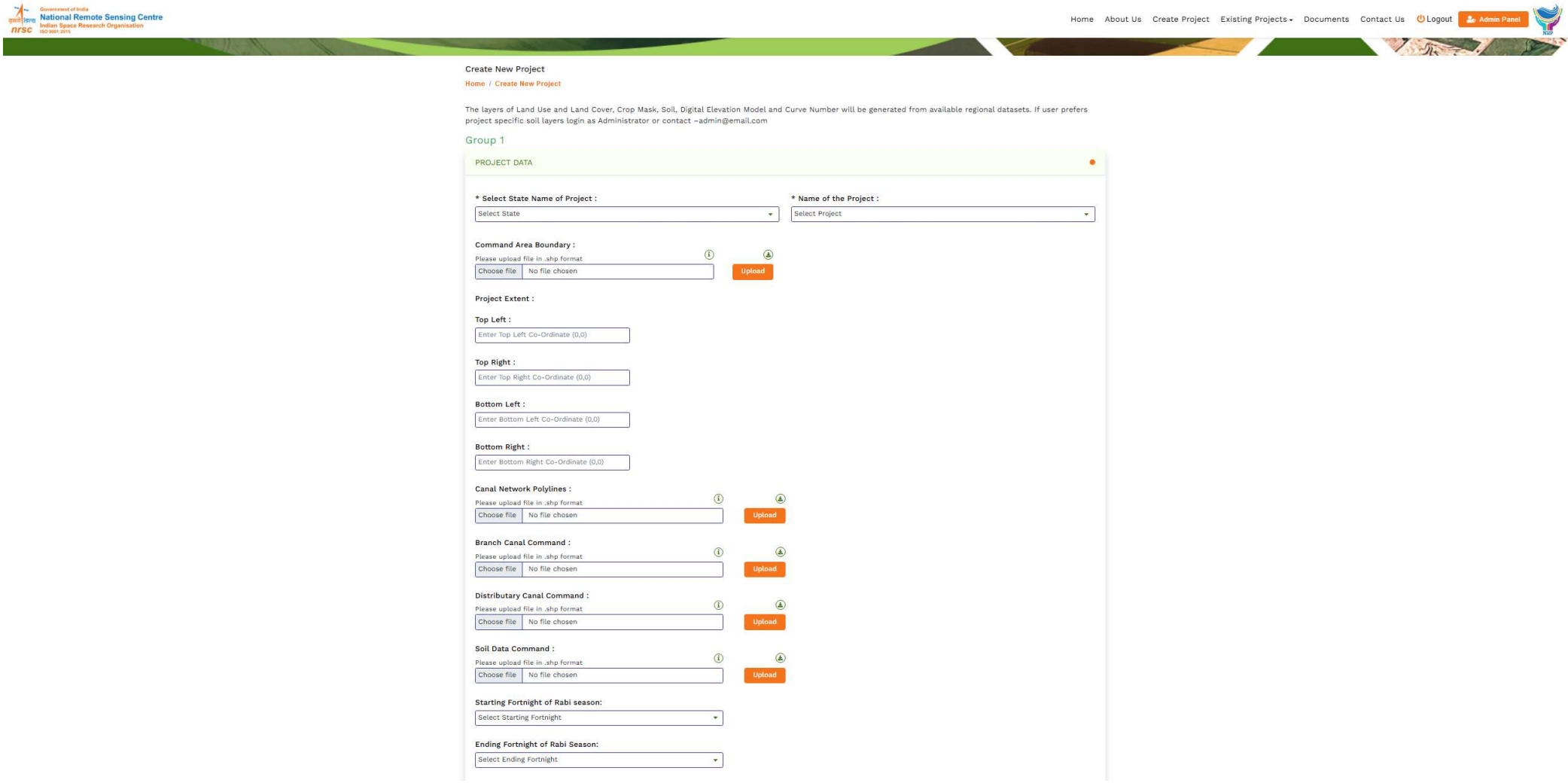
Group 1

PROJECT DATA

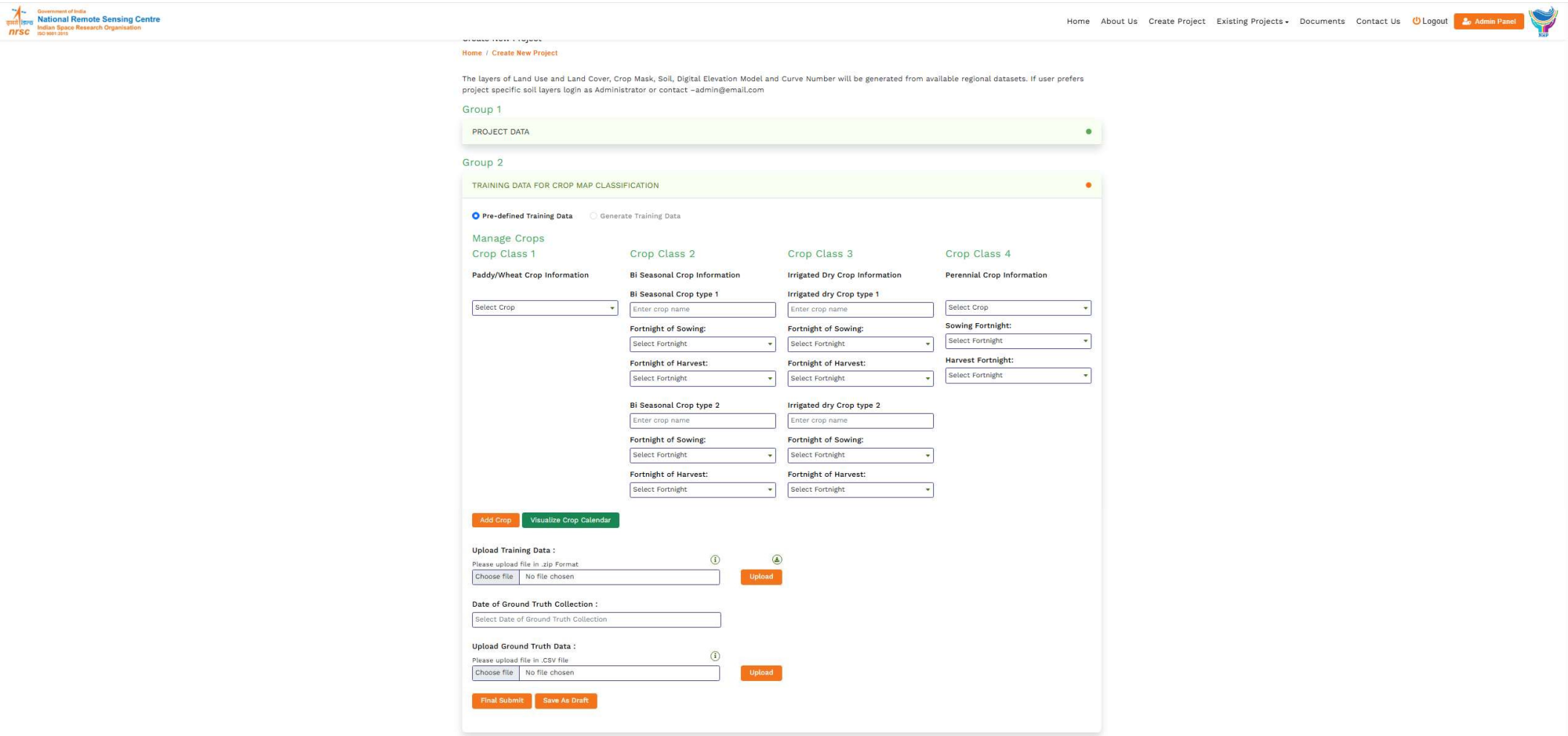
Group 2

TRAINING DATA FOR CROP MAP CLASSIFICATION

Implementation In Other Irrigation Systems



Implementation In Other Irrigation Systems



Implementation In other Irrigation Systems

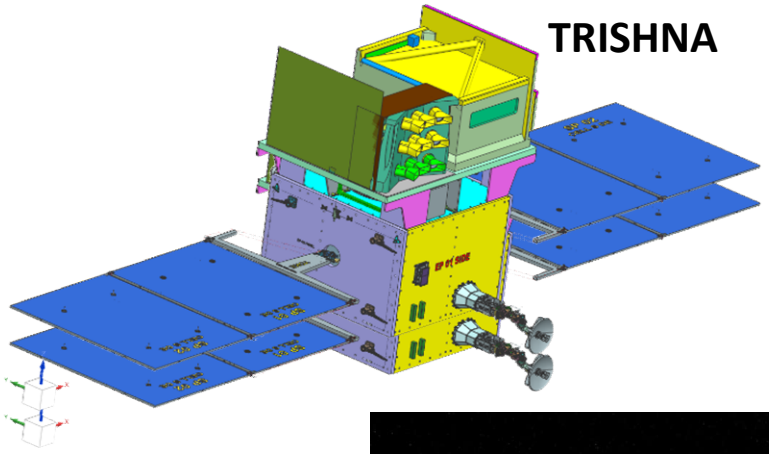


*Example of replication with tentative inputs on crop which are not collected from field

Way forward for Efficient Agriculture Water Management

- Minor Irrigation Systems Management
- Soil Plant Atmosphere Continuum Simulations
- TRISHNA, NISAR, Landsat Next Missions
- Integrated Systems for Agriculture Water Management

TRISHNA



NISAR



THANK YOU

Contact : anniemaria_issac@nrsc.gov.in