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International Commission on Irrigation and Drainage (ICID)



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

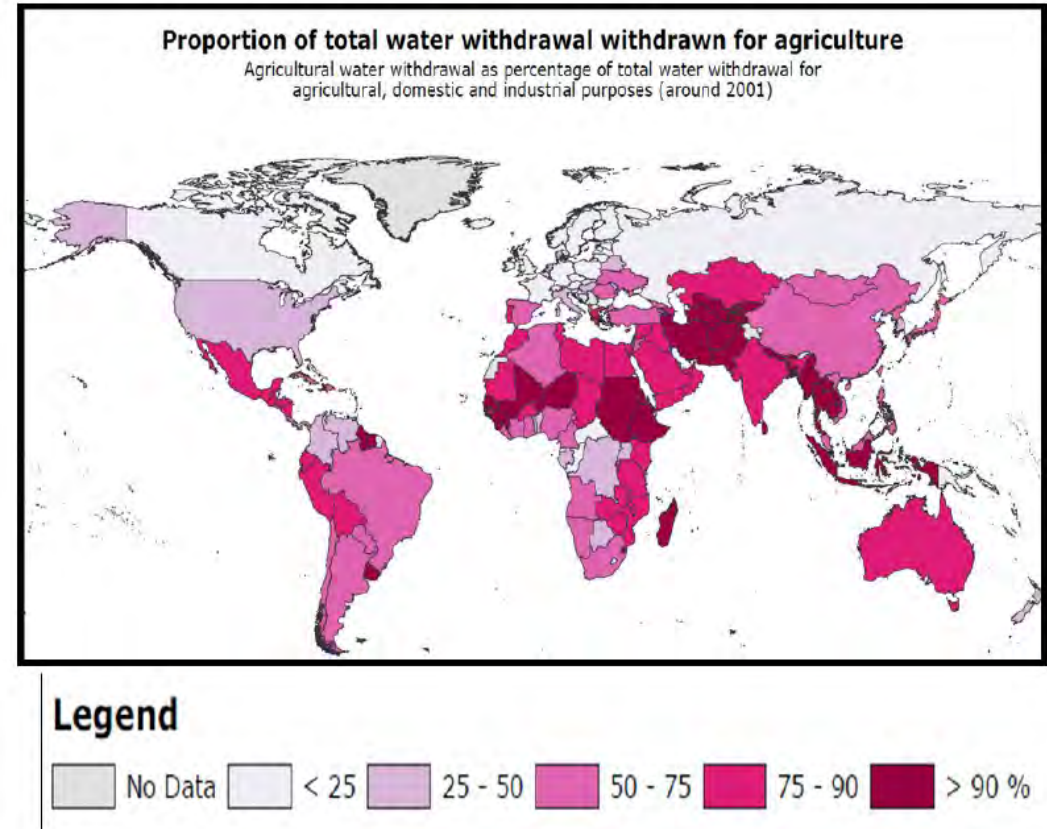
2nd Indo Global Irrigation Summit
24-25 June 2026, New Delhi India

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

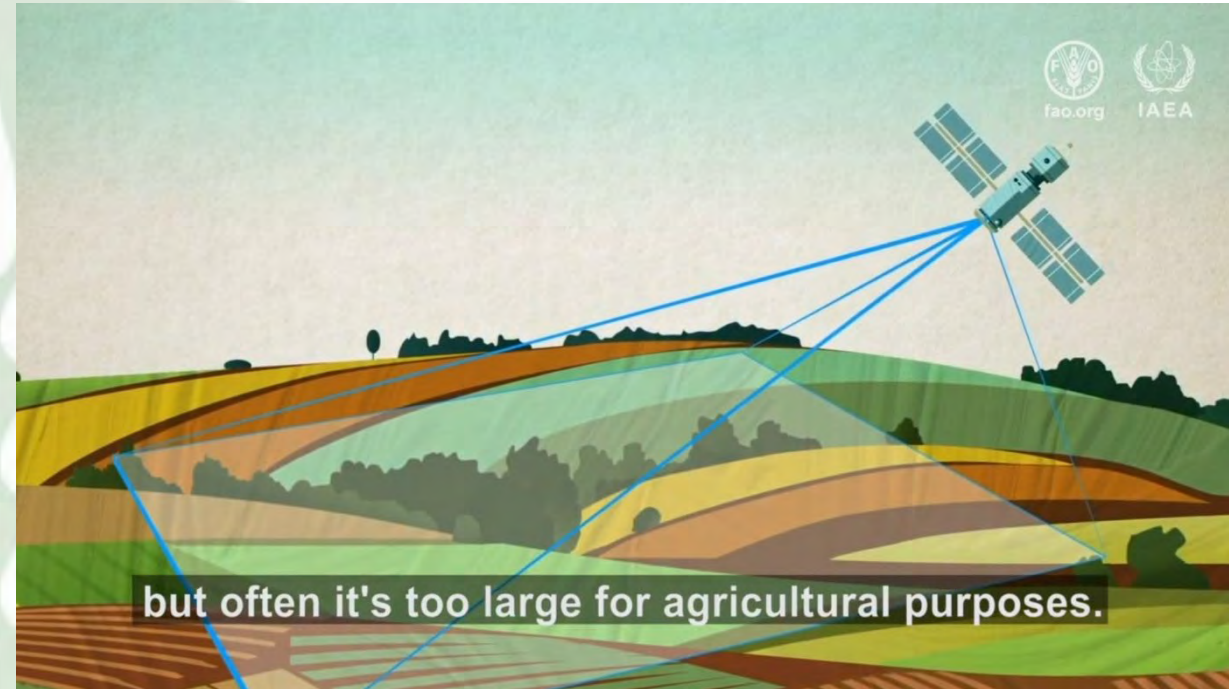
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Water Resources Group
Remote Sensing Applications Area
National Remote Sensing Centre

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- About 80 % of total water withdrawn is for irrigation in India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 its availability, crop requirement and land size, irrigation systems, and crop productivity and feasibility



Soil Moisture Status Based Irrigation Decision Support System



Source: FAO

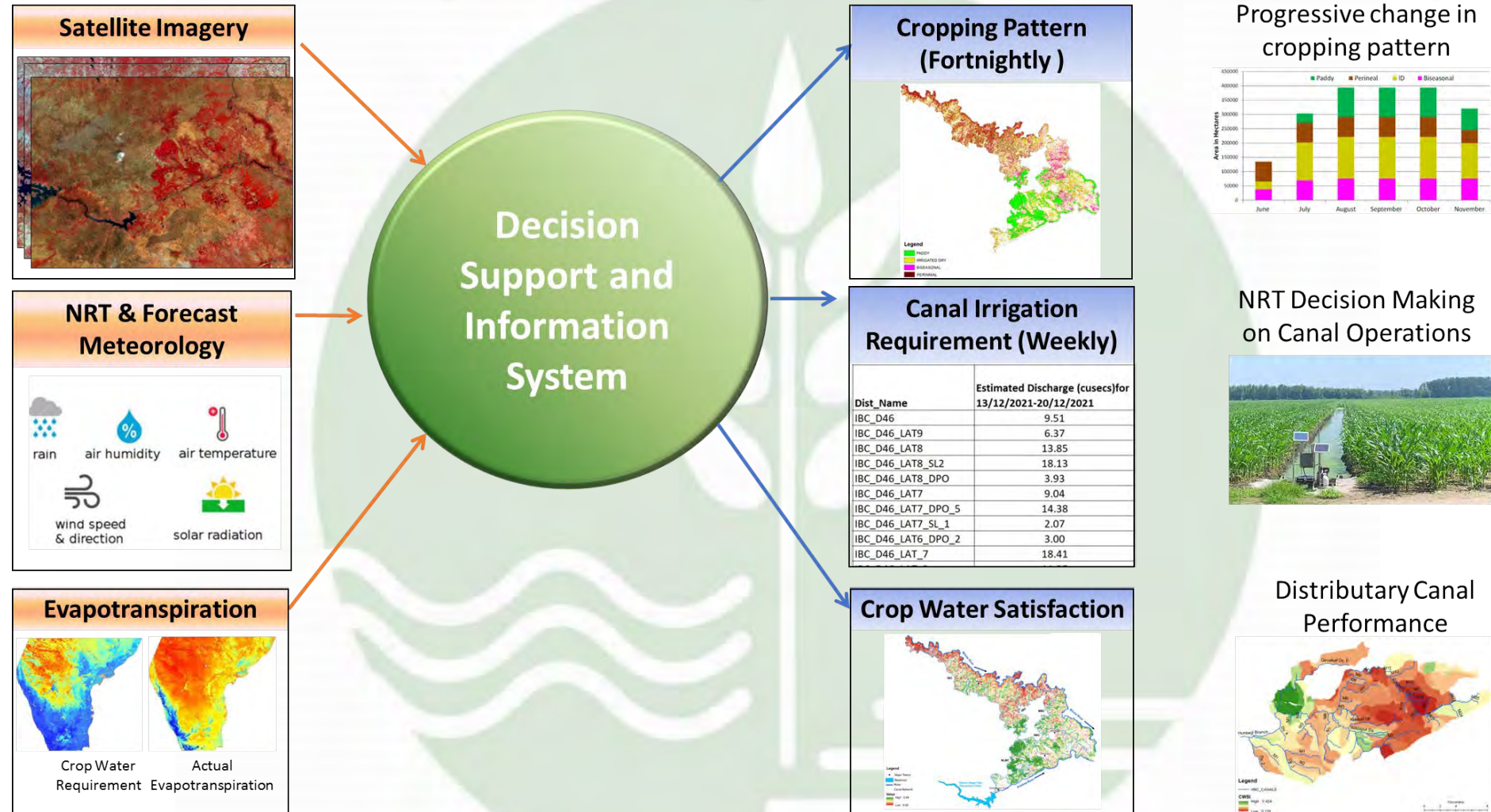
- Soil Water Balance Simulations gives soil moisture status at near real time and forecasted conditions
- Crop information at medium resolution from the satellite through the season
- Scale in between point measurements and satellite measures applicable for agriculture

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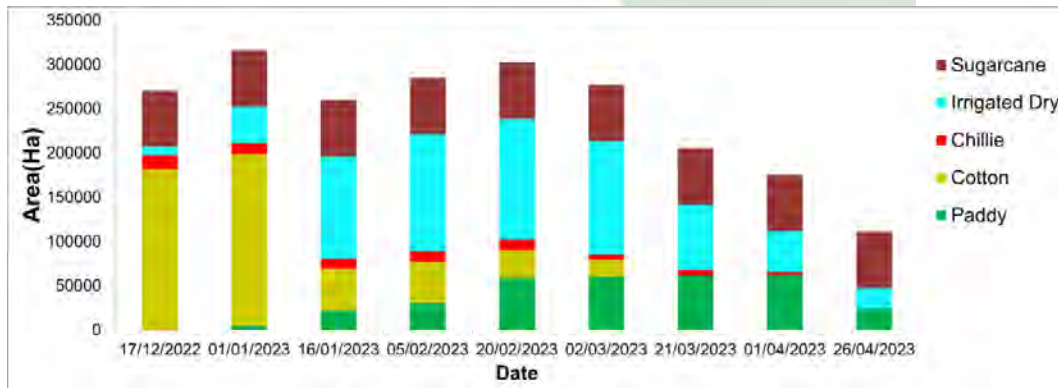
Remote Sensing Driven Irrigation Decision Support System



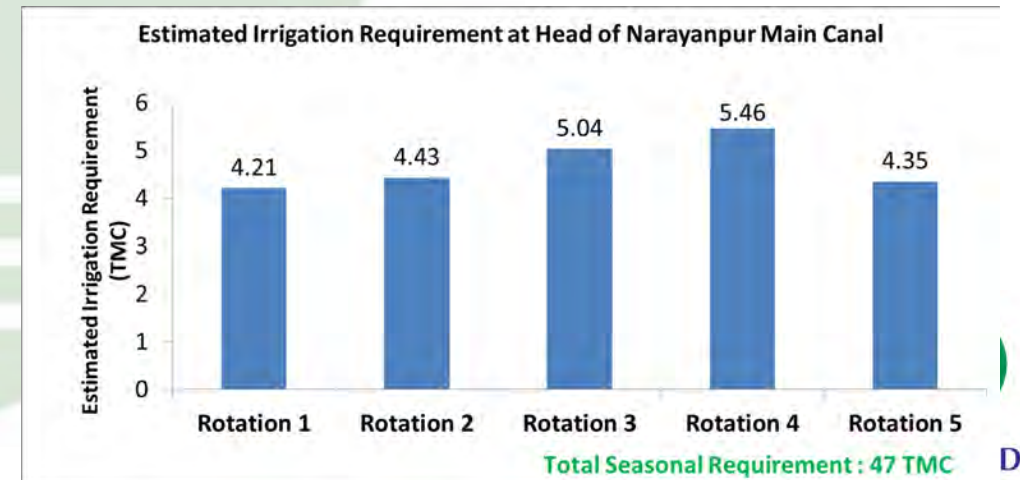
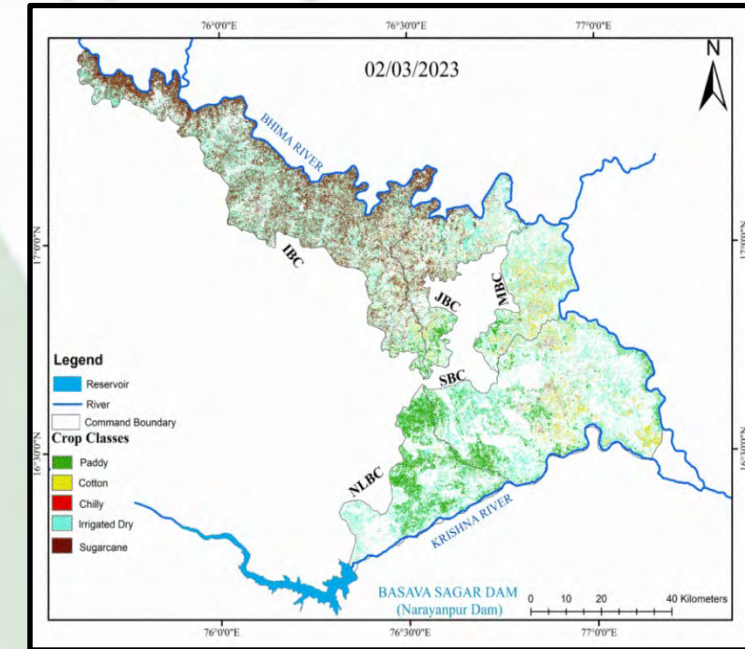
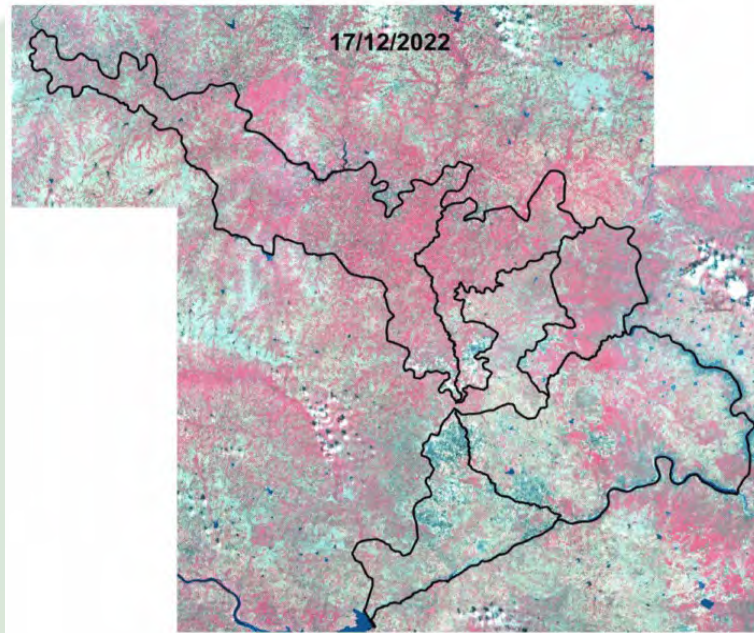
Remote Sensing Driven Irrigation Decision Support System

- ❖ Cropping pattern and crop condition at tertiary canal level (in-season) for Rabi seasons
- ❖ Weekly / Fortnightly irrigation water requirements at tertiary canal (in-season) for Rabi seasons
- ❖ Performance assessment of Irrigation systems using indices derived from satellite data

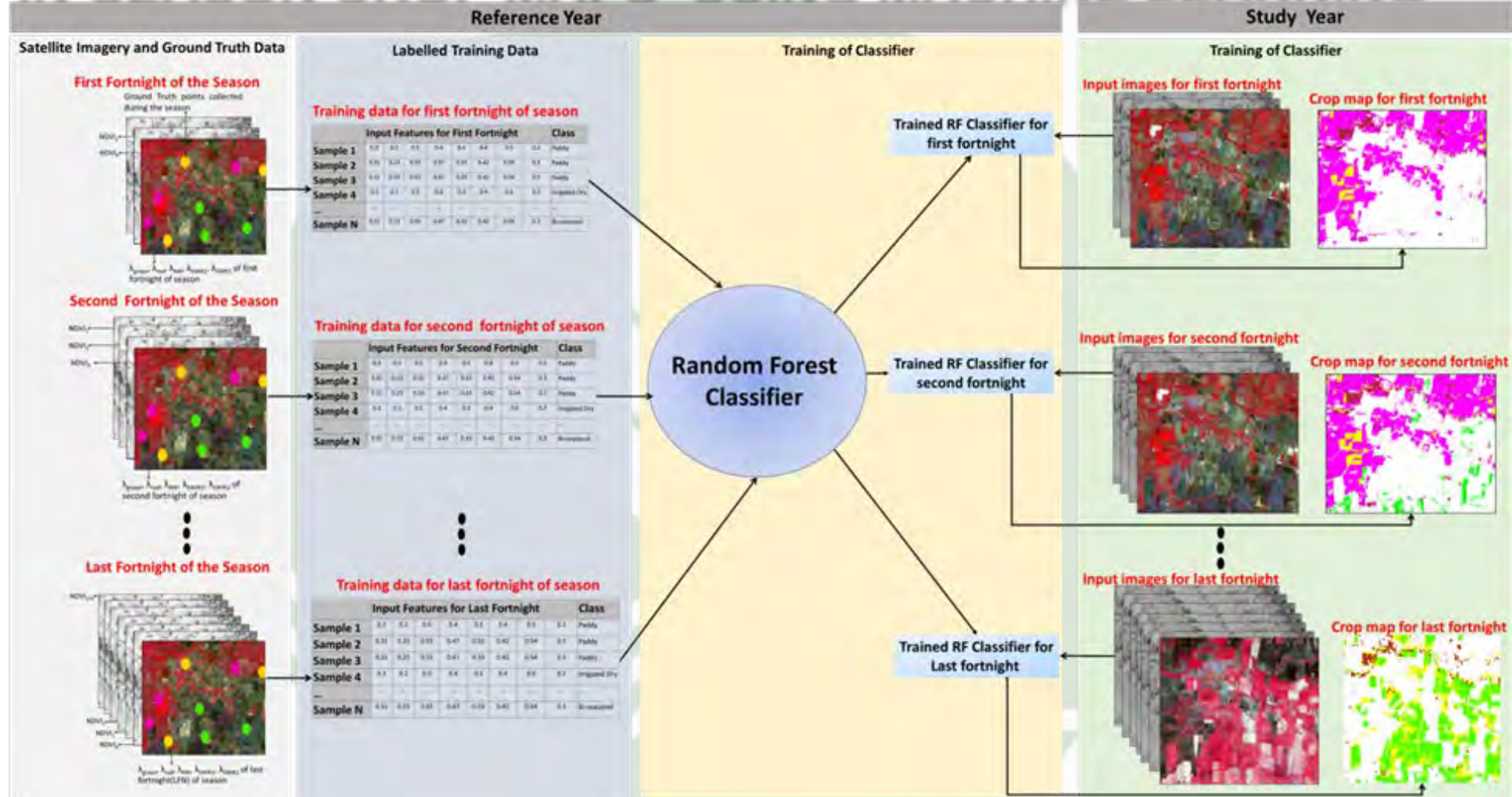
Progressive Crop Area Information



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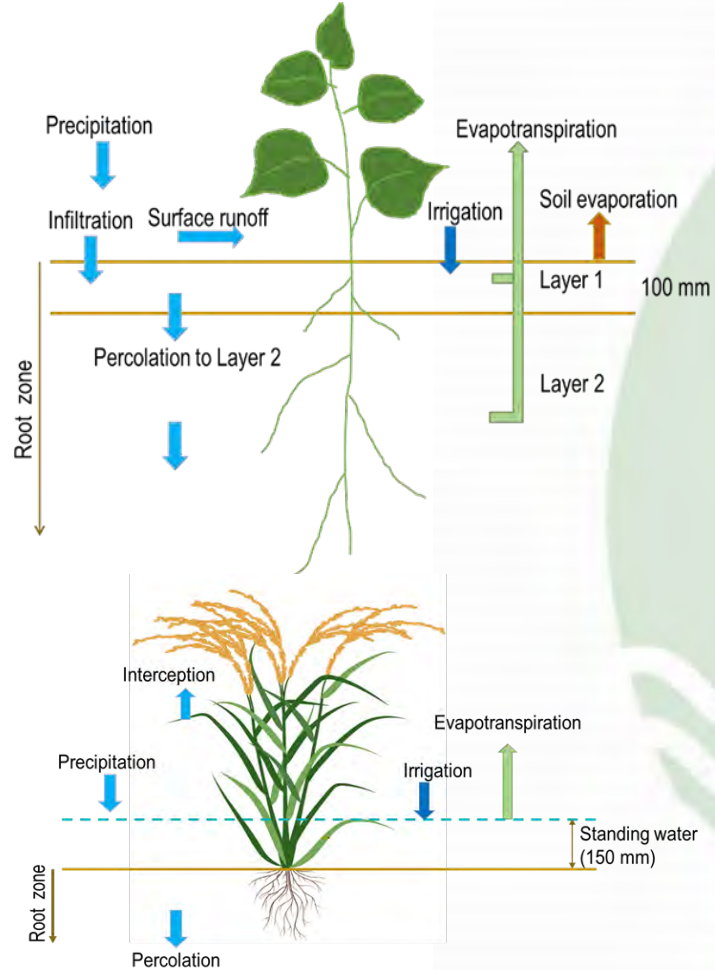


INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE (ICID) IN-SEASON CROP MAPS USING MACHINE LEARNING

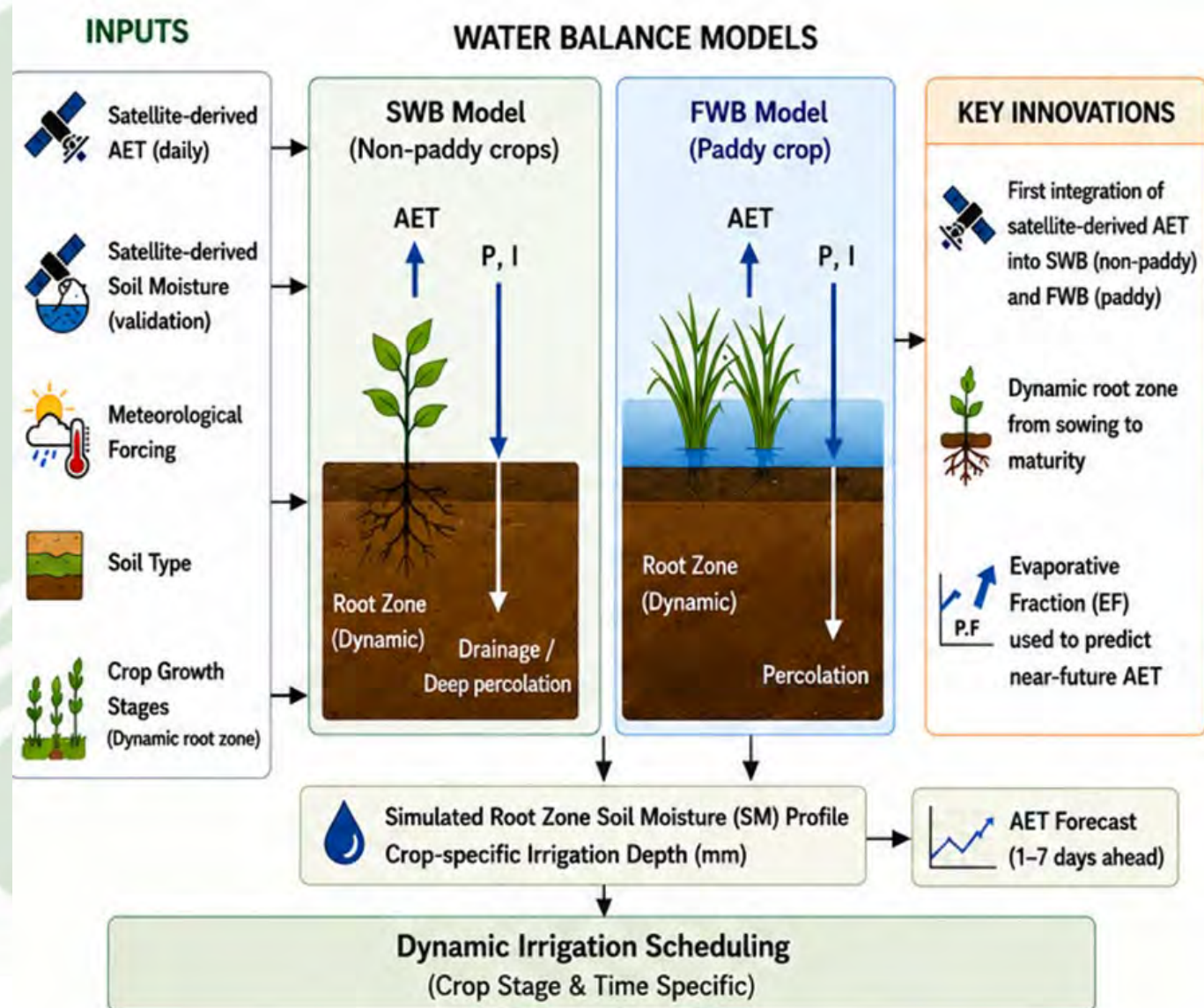


INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE (ICID) IRRIGATION REQUIREMENT ESTIMATION

Conceptualization



Overall Framework

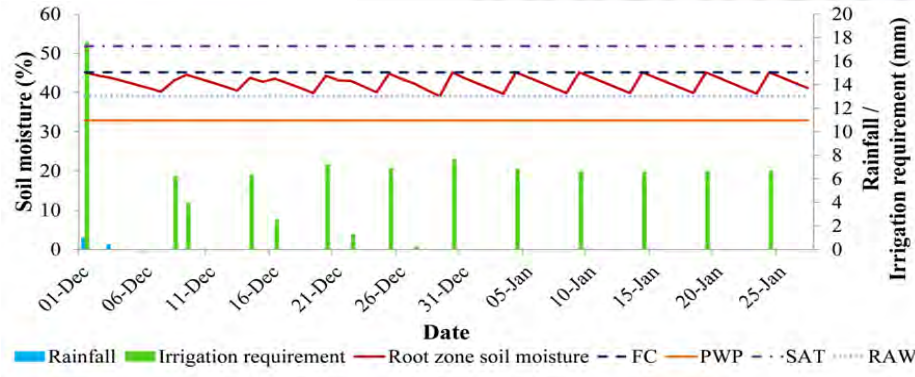


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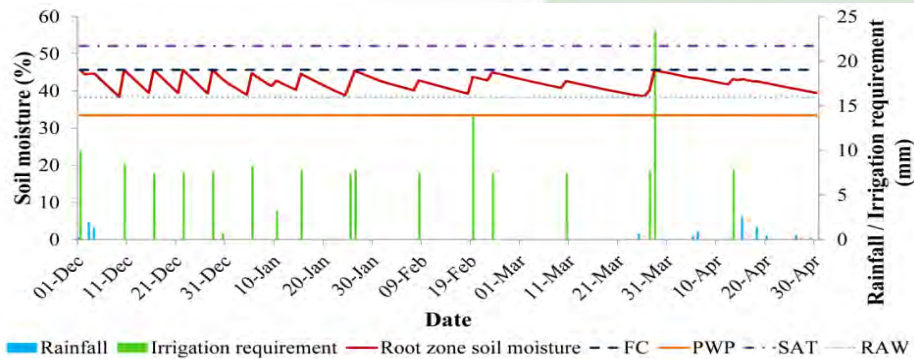


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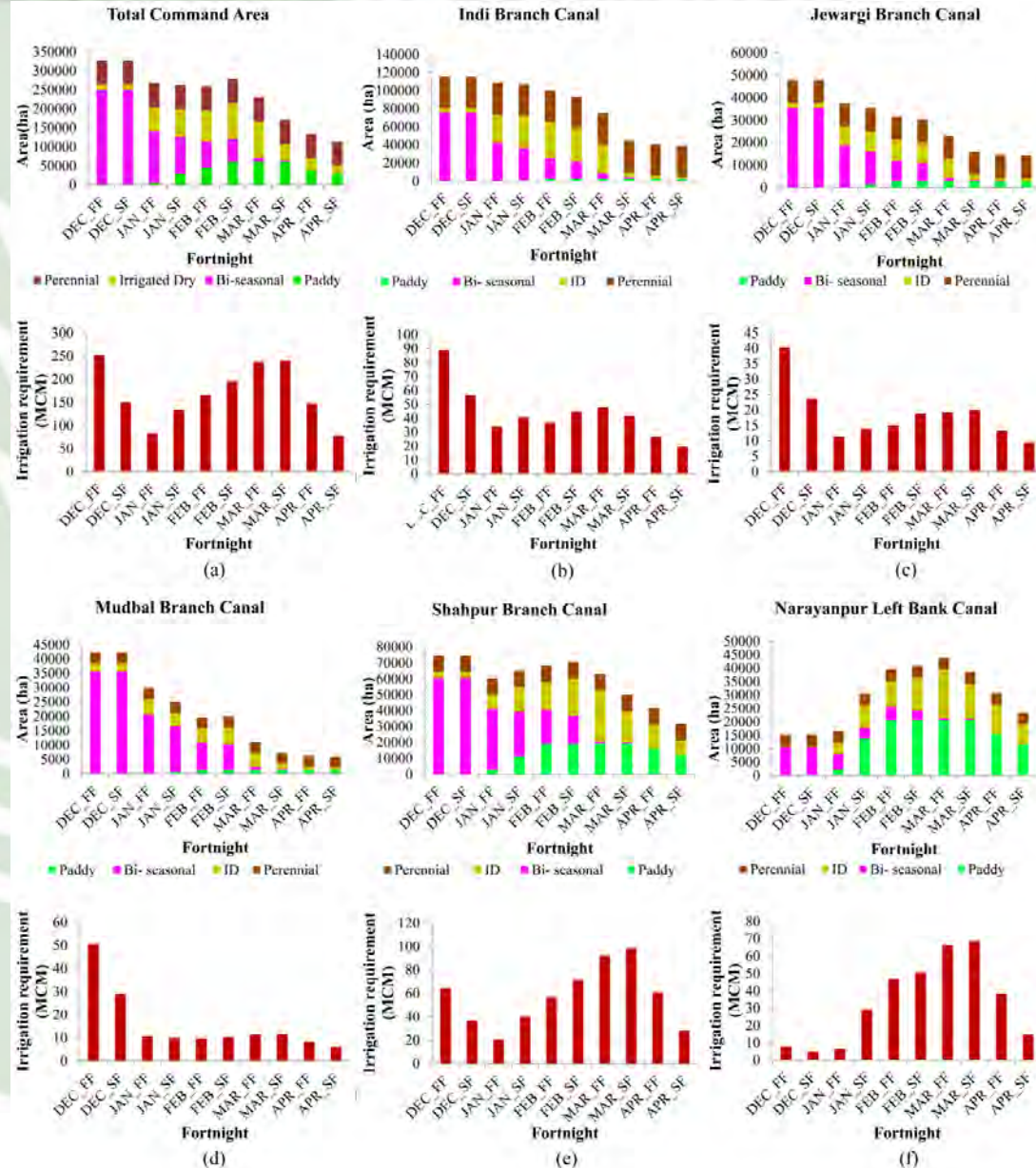


Irrigation requirement for Chilli along with rainfall and soil moisture variation



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

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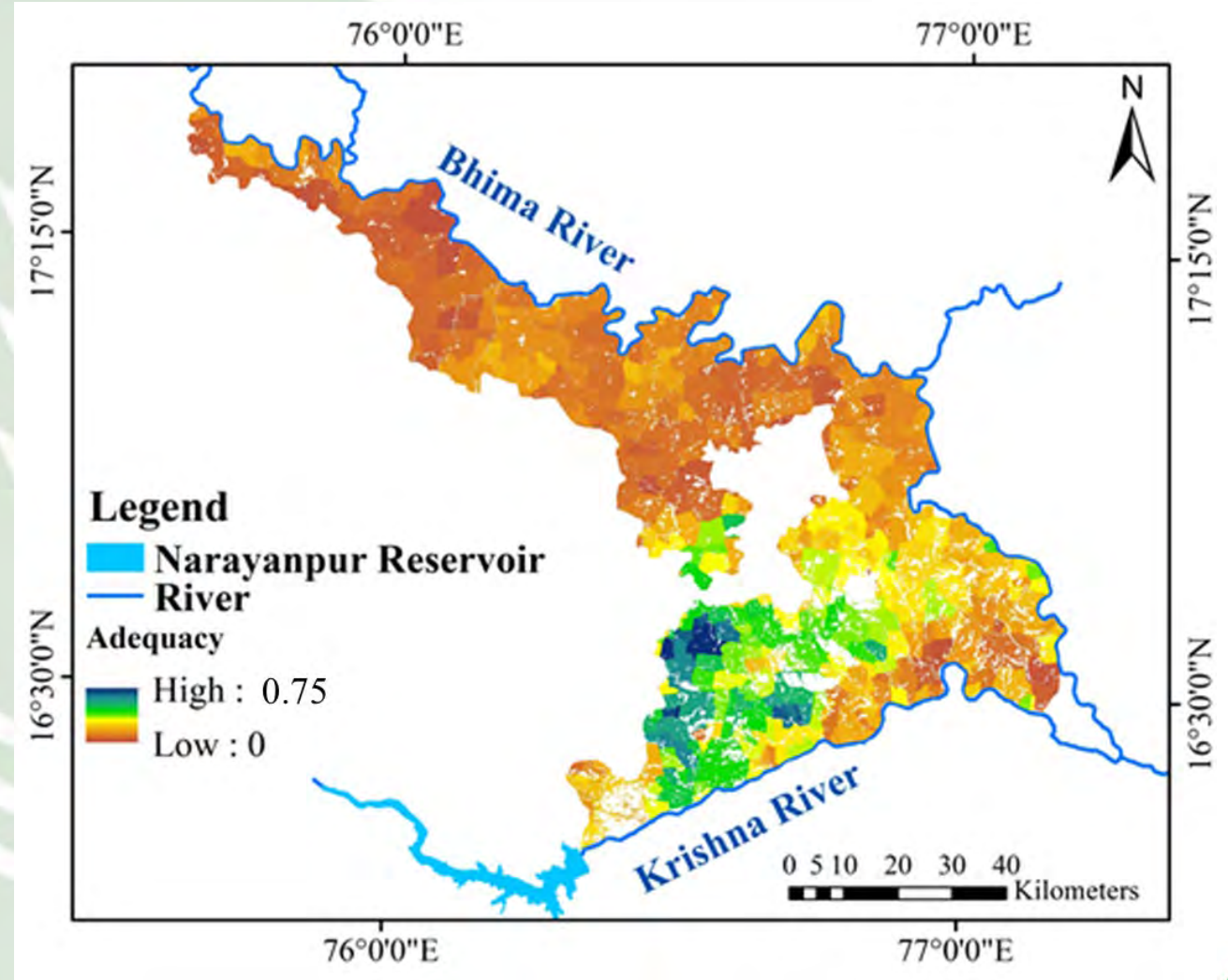
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PERIODIC PERFORMANCE ASSESSMENT OF THE COMMAND AREA

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

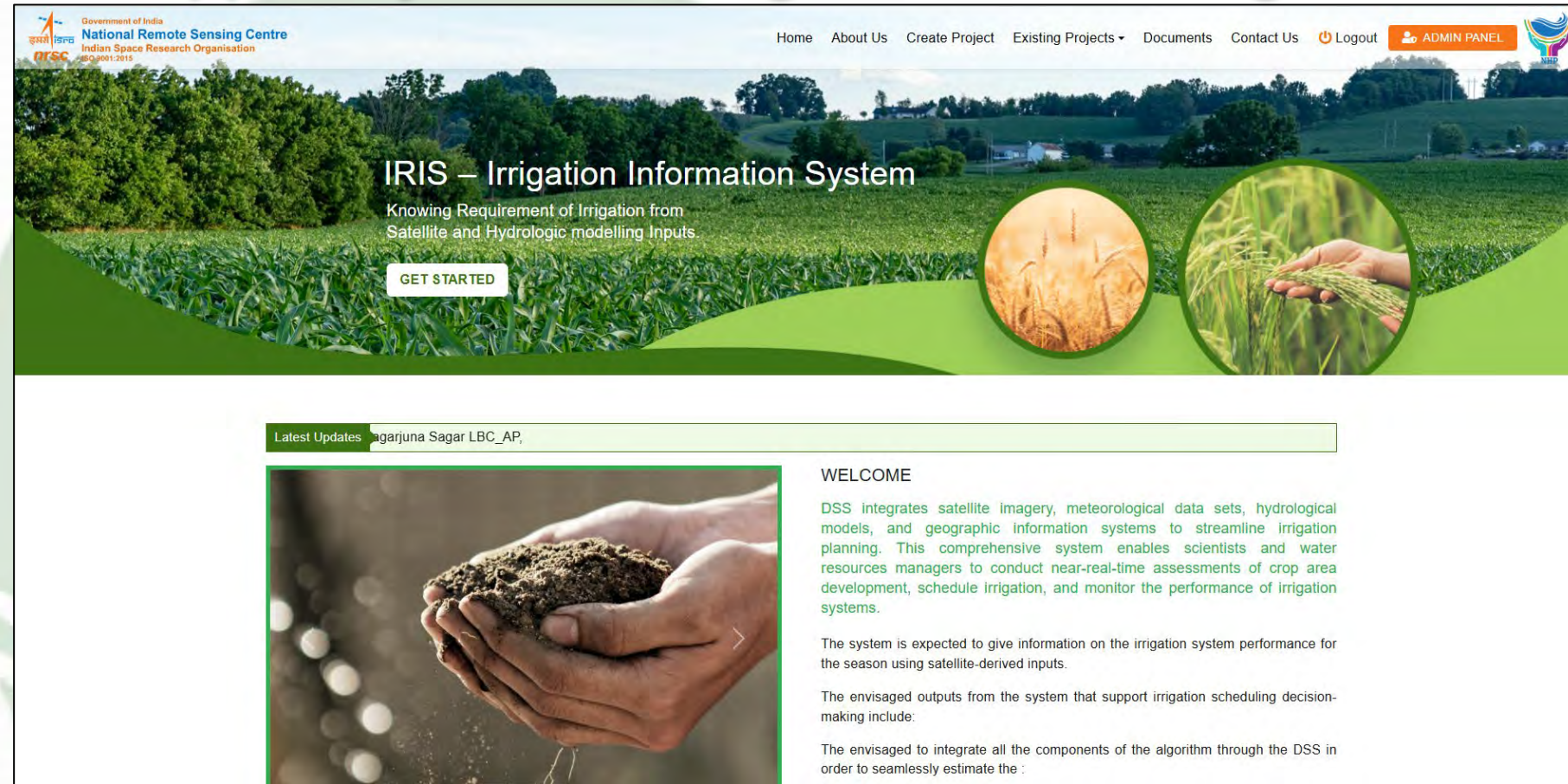
$$CWSI = \frac{\sum AET}{\sum PET}$$

- 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.



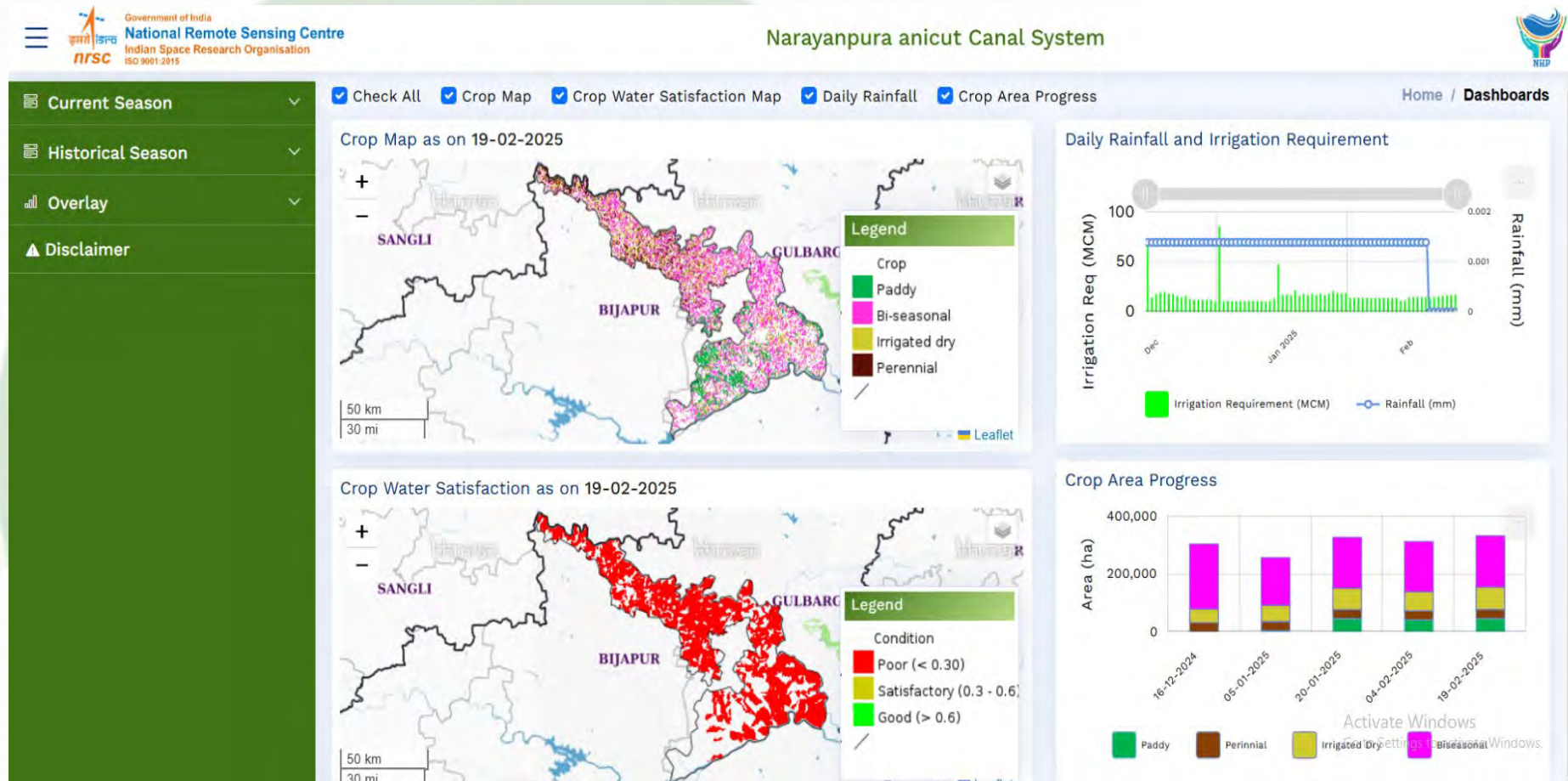
Decision Support System for Irrigation Scheduling

- Decision Support System developed which generates crop maps, irrigation requirement and performance assessment statistics and maps periodically
- Visualization of outputs through portal



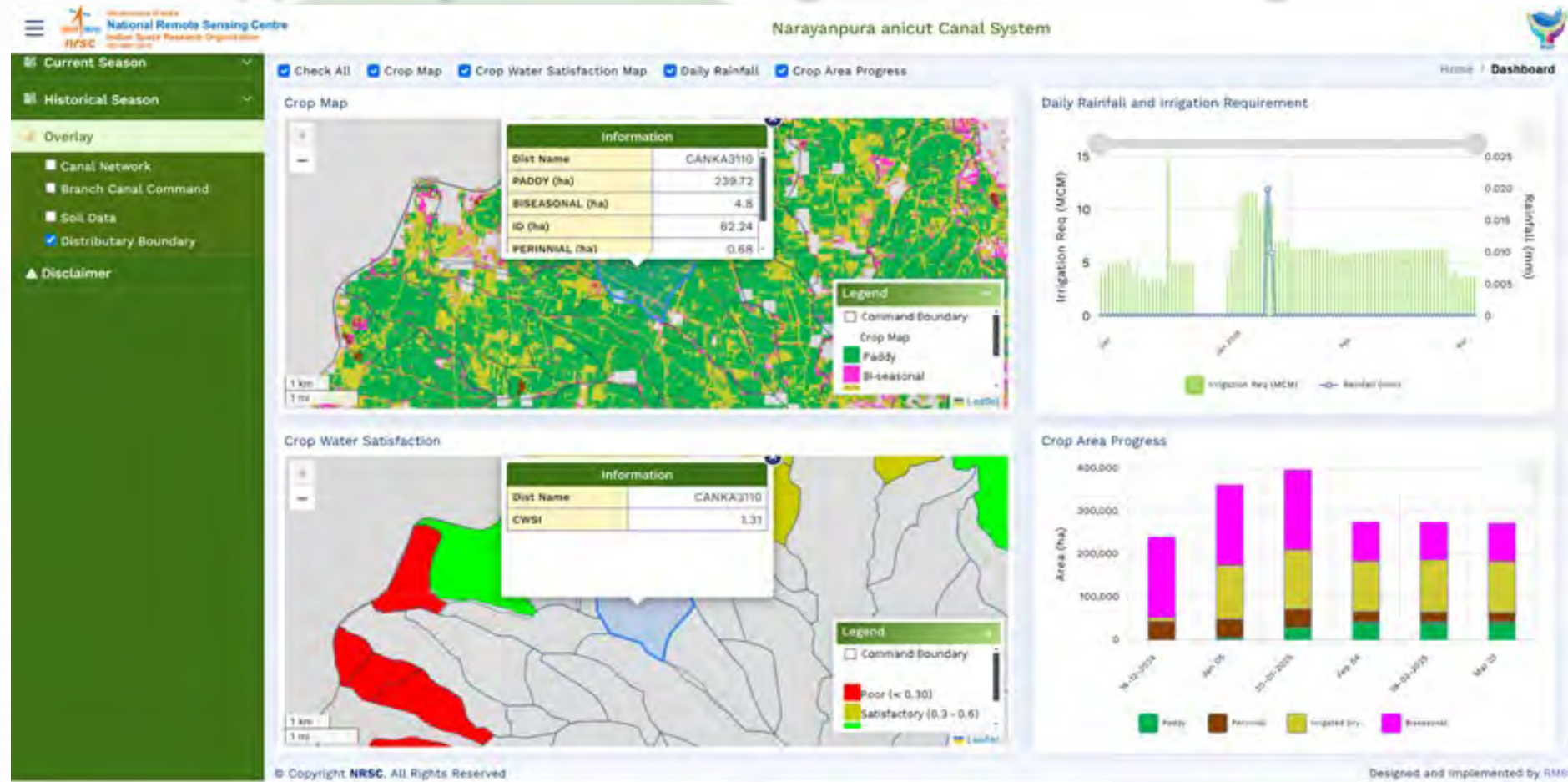
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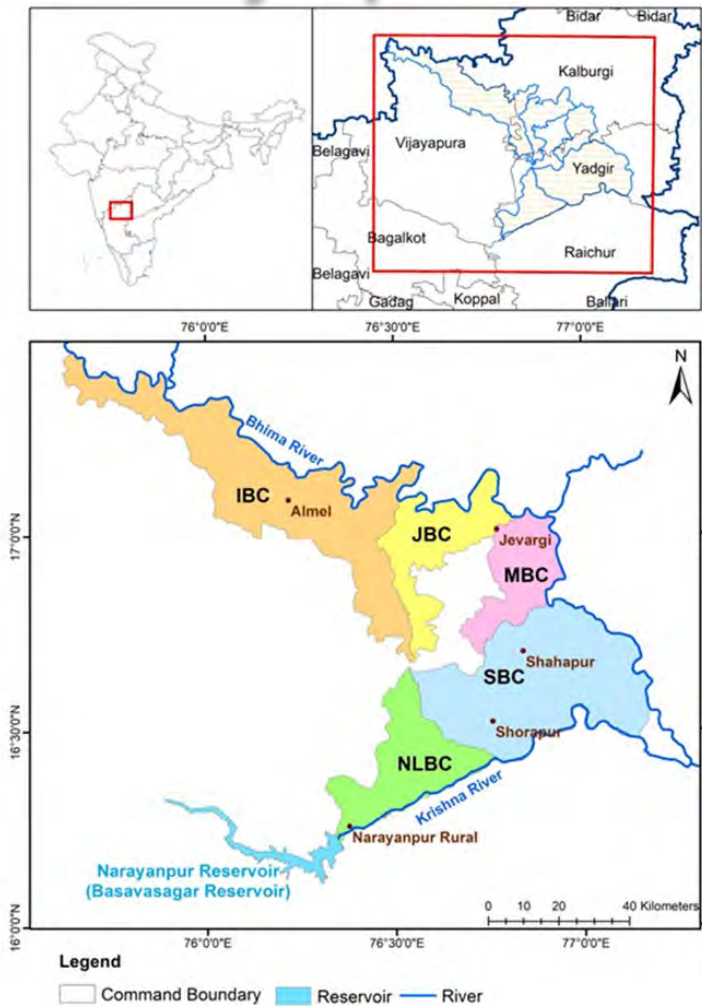
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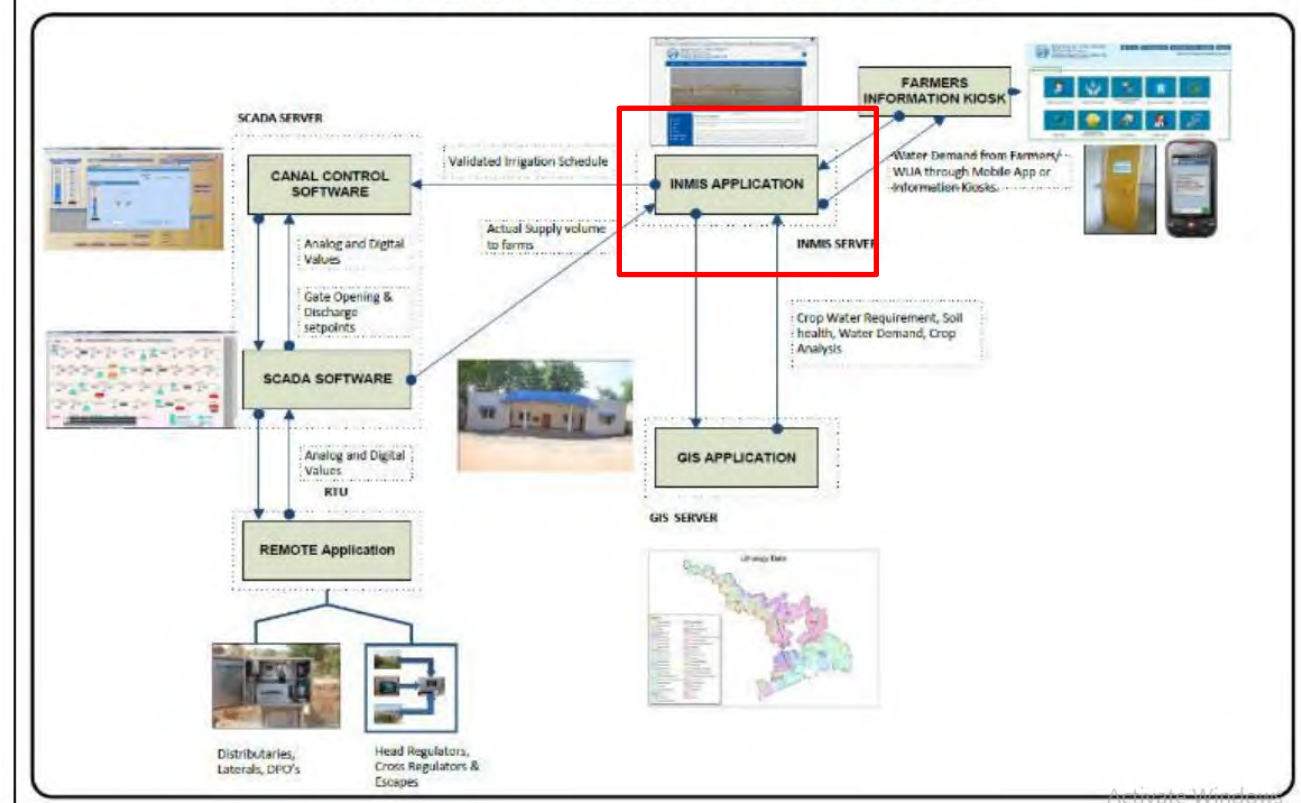


Narayanpur Command Area

Automated canal system for irrigation deliveries



NLBC CANAL AUTOMATION – Overall Architecture



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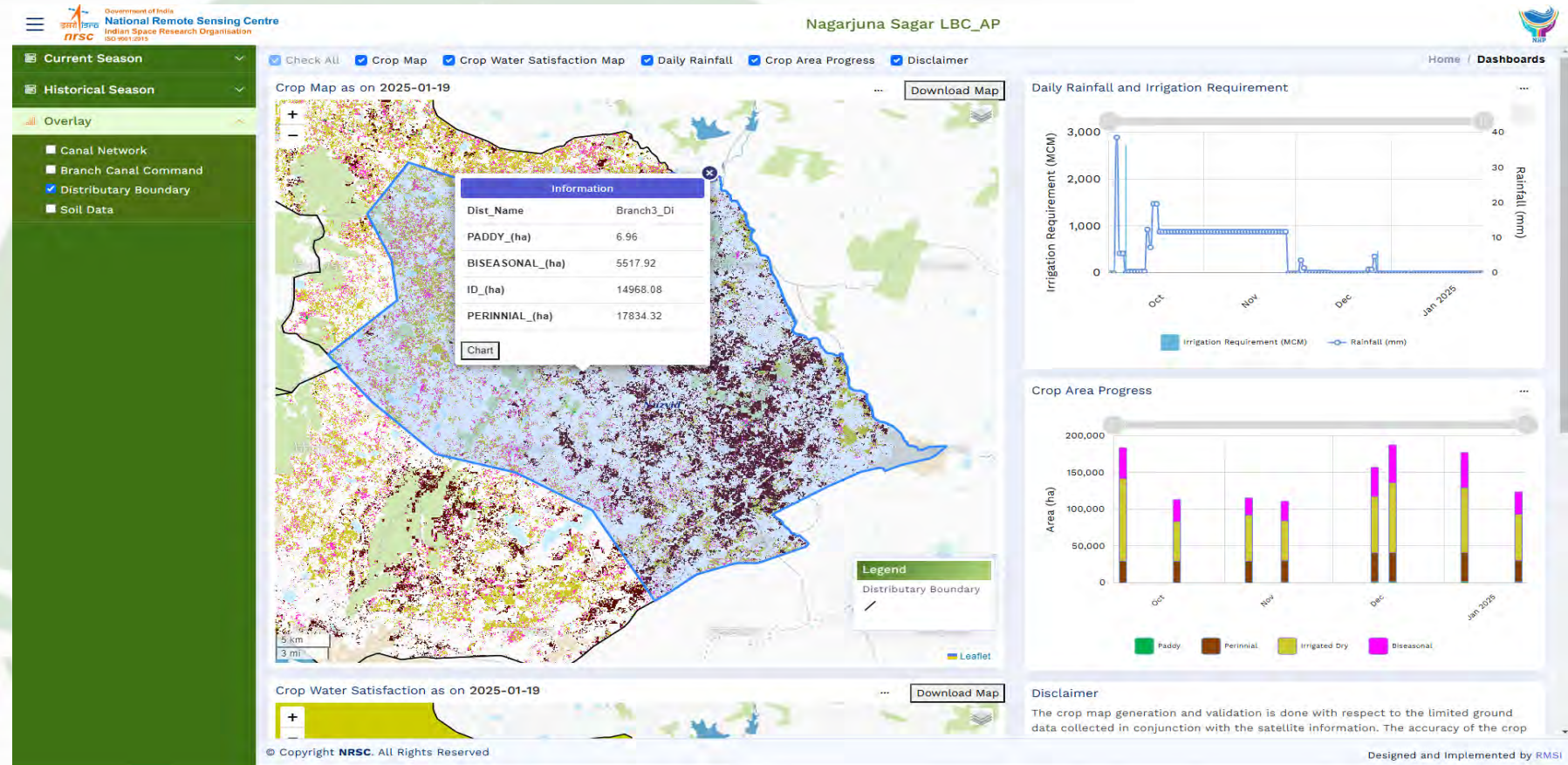
Expansion to Other Irrigation Systems

- Enables creation of the system to other command area with minimal geospatial inputs and field information on crops
- Can be replicated for any other command area of India

The screenshot displays the 'Create New Project' page of the IRIS - Irrigation Information System. The header includes the Government of India, National Remote Sensing Centre, and Indian Space Research Organisation logos, along with navigation links: Home, About Us, Create Project, Existing Projects, Documents, Contact Us, Logout, and an ADMIN PANEL button. The main banner features a landscape image with the text 'IRIS -Irrigation Information System' and two circular insets showing wheat fields. The 'Create New Project' section includes a breadcrumb trail (Home / Dashboard / Create New Project) and a note about data generation from regional datasets. The 'Group 1' section contains the 'PROJECT DATA' form, which includes dropdowns for 'Select State Name of Project' and '* Name of the Project', a file upload section for 'Command Area Boundary' (with a file chosen), and a 'Project Extent' section with four coordinate input fields (Top Left, Top Right, Bottom Left, Bottom Right). A second file upload section for 'Canal Network Polylines' is also present.

Expansion to Other Irrigation Systems

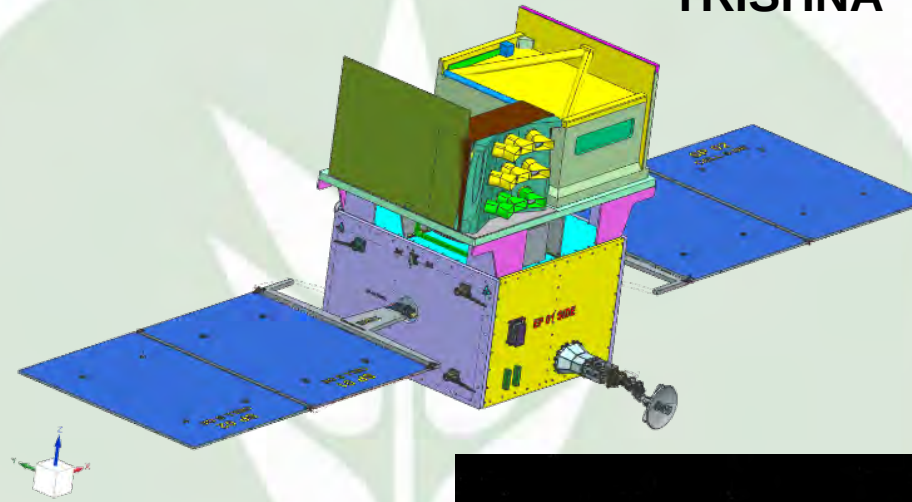
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Example of replication with tentative inputs on crop which are not collected from field

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



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Thank You

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