Gujarat Technological University

School of Engineering and Technology

Report on

Capacity Building Program on

“Application of Remote Sensing in Irrigation Command Area Management”

Date: 21ST – 22ND April 2025

Event Details:

Organizer: GTU – School of Engineering and Technology (GTU-SET) in association with WALMI, Gandhinagar
Date: 21st - 22nd April 2025
Time: 10.30 AM to 5.30 PM
Venue: A-2 Conference Hall, GTU Main Building, Chandkheda Campus, Ahmedabad, Gujarat – 382424
Participants: 26 officers serving as Executive Engineers and Deputy Executive Engineers from the Sardar Sarovar Narmada Nigam Ltd and Kalpsar (SSNNL & K) department of Government of Gujarat.
Event Convener: Dr. Jignesh Amin, Professor GTU-SET
Event Coordinator: Prof. Mridul Seth, & Prof. Rasik Makwana Assistant Professor GTU-SET

Overview of Capacity Building Program:

Gujarat Technological University (GTU) successfully conducted a two-day Capacity Building Program focused on equipping field engineers with practical and advanced knowledge of geospatial tools and remote sensing for improved irrigation command area management. The initiative targeted engineers from Sardar Sarovar Narmada Nigam Limited and Kalpsar (SSNNL & K) Department, Government of Gujarat.

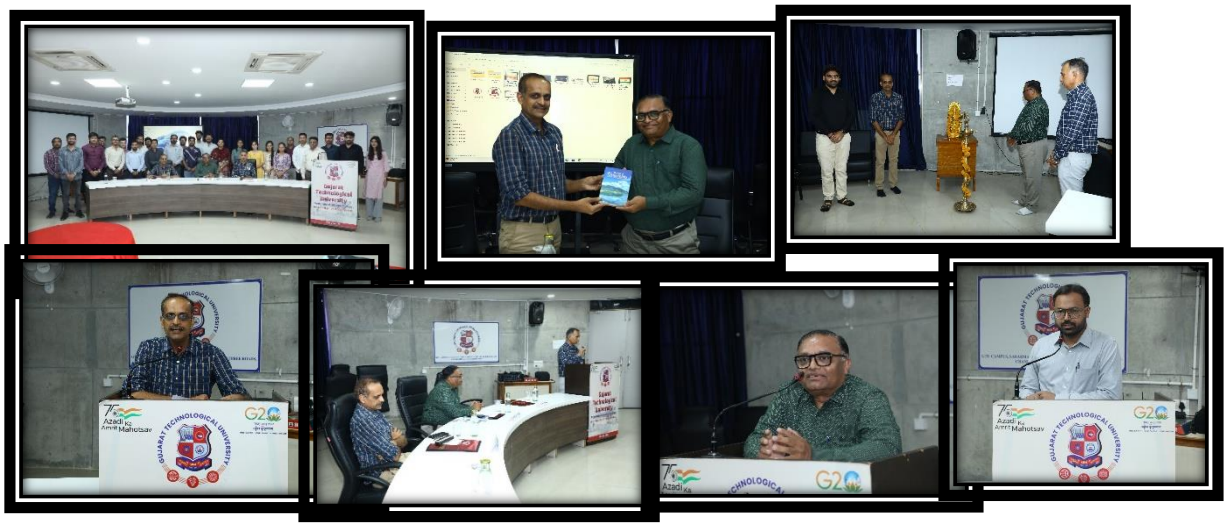
PROGRAM OBJECTIVES

- To enable data-driven decision-making by leveraging satellite imagery and geospatial data for monitoring, planning, and managing irrigation systems.
- To build the technical capacity by introducing the state-of-the-art remote sensing tools and techniques for irrigation command area management.
- To ensure that officers stay aligned with modern engineering and management practices.
- Gain a strong understanding of remote sensing technologies applicable to irrigation management.

List of technical sessions organized at Capacity Building Program:

Date	Time	Topic	Expert Name
21st April	11.30 AM - 1.15 PM	Basics of Remote Sensing and Crop Monitoring	Prof. Mridul Seth
21st April	2.00 PM - 3.45 PM	National Policies and Strategic Framework	Dr. Azaz Pathan
21st April	4.00 PM – 5.45 PM	Practical Applications and Case Studies	Shri Harsh Shah
22nd April	11.00 AM - 12.45 PM	Irrigation and Crop Water Requirement Analysis	Dr. Rucha Dave
22nd April	1.30 PM - 2.45 PM	Enhancing Water Use Efficiency and Productivity	Shri Bhupesh Gupta
22nd April	3.00 PM - 4.45 PM	Data Acquisition and Tools for RS Applications	Dr. P. G. Agnihotri

Session Detail



I. Inaugural Ceremony

Inaugural ceremony was presided by the dignitaries as:

1. Shri K. C. Chauhan – Joint Director (Technical) WALMI, Anand, Chief Guest
2. Dr. Jignesh Amin, Professor GTU-SET
3. Dr. Rajesh Thakkar, Director GTU RDC

The inaugural ceremony commenced with a lamp lighting and warm welcome to the dignitaries, expert speakers, and participants.

Dr. Jignesh Amin, provided insightful remarks on the growing need for digitization in civil engineering practices. He discussed the vital role that Remote Sensing and GIS technologies play in fostering data-driven decision-making. He also introduced the concept of Digital Twin—a virtual replica of physical infrastructure—and illustrated how integrating geospatial data can enhance planning, monitoring, and predictive maintenance in large-scale civil systems. Additionally, he highlighted GTU's initiatives in nurturing practical skills among students and professionals through various interdisciplinary programs and hands-on workshops.

Dr. Rajesh Thakkar, delivered the welcome address and warmly greeted the participants. He emphasized the valuable involvement of government officers in such domain-specific capacity building programs focused on space technology applications in civil engineering. He also highlighted the university's significant progress in the areas of patents and research development, attributing this growth to the consistent efforts in enhancing the skills of faculty members across GTU. These efforts, he noted, have contributed to a stronger culture of innovation, research, and industry collaboration.

Shri K. C. Chauhan, representing WALMI (Water and Land Management Institute), Anand, addressed the gathering by sharing the institutional efforts made by WALMI in enhancing technical capabilities across government departments. He highlighted collaborative opportunities and ongoing capacity-building programs that align with the vision of integrated water and land resource management.

The inaugural session concluded with a vote of thanks delivered by Prof. Rasik Makwana, acknowledging the support of all stakeholders, the contributions of the speakers, and the enthusiastic participation of the officers.

The event was moderated by Ms. Mariya Fakih, student E&C Engineering Department, GTU-SET.

II. Session-1: Basics of Remote Sensing and Crop Monitoring

Delivered By: Prof. Mridul S Seth

About Speaker: Assistant Professor GTU-SET

Topics Covered: This session provided a comprehensive introduction to remote sensing concepts, satellite imagery interpretation, and vegetation indices such as NDVI. Participants received hands-on training using Google Earth Engine (GEE), with exercises from a curated self-study manual.

- Basics of remote sensing and electromagnetic spectrum
- Understanding of vegetation indices like NDVI using Sentinel-2 data
- Live demo and coding walkthrough on Google Earth Engine (GEE)
    - Accessing satellite imagery
    - Filtering image collections
    - Creating composites and mosaics
    - NDVI and other vegetation index computation
    - Supervised classification and area calculation of land cover

III. Session – 2: National Policies and Strategic Framework

Delivered By: Dr. Azaz I Pathan

About Speaker: Senior Hydrologist, AgroCast Analytics Pvt. Ltd.

Topics Covered: This session focused on the policy landscape surrounding geospatial data usage. He detailed how recent initiatives like PM Gati Shakti and the National Geospatial Policy support the integration of remote sensing in irrigation planning.

- National Geospatial Policy 2022 overview
- Use of drones and geospatial technologies in water governance
- Alignment with national flagship schemes and irrigation missions

IV. Session – 3: Practical Applications and Case Studies

Delivered By: Shri Harsh Shah

About Speaker: CEO & CTO, AgroCast Analytics Pvt. Ltd.

Talk Delivery: In this session he shared practical insights into how satellite-based monitoring is being implemented in Gujarat. He showcased the AgroCast platform and mobile apps used for real-time crop and irrigation tracking.

- Analysis of NDVI, NDMI, and EVI across crop types
- Ground truthing through GPS-enabled mobile data
- Crop classification, yield prediction, and irrigation planning with remote sensing

V. Session – 4: Irrigation and Crop Water Requirement Analysis

Delivered By: Dr. Rucha Dave

About Speaker: Associate Professor, Anand Agricultural University, Anand

Talk Delivered: She explained the science behind estimating crop water demand using remote sensing data. She covered evapotranspiration models and their application in scheduling irrigation for various seasons.

- Estimating crop-wise water needs using geospatial inputs
- Soil moisture mapping and temporal analysis
- Use of spectral indices for irrigation scheduling

VI. Session – 5: Enhancing Water Use Efficiency and Productivity

Delivered By: Shri Bhupesh Gupta

About Speaker: Founder, GeoNomads LLP., Gandhinagar

Talk Delivered: This session highlighted inefficiencies in traditional irrigation systems and presented a framework to improve water use efficiency using satellite data and field analytics.

- Identifying leakage and stress zones in canal systems
- Concepts of Crop Water Productivity and Water Use Efficiency (WUE)
- Integration of IoT, sensors, and satellite monitoring

VII. Session – 6: Tools and Techniques for Geospatial Mapping

Delivered By: Dr. P. G. Agnihotri

About Speaker: Associate Professor, SVNIT, Surat

Talk Delivered: He focused on the application of software tools such as ERDAS Imagine, ArcGIS, and Sentinel Hub for LULC mapping, irrigation command delineation, and topographic analysis.

- Sources for satellite data acquisition
- Demonstration of ERDAS, and ArcGIS
- Watershed Delineation and LULC classification along with its application in water resource planning

The End