REPORT

OF

IIRS-ISRO Outreach Program
on
"Remote sensing data analytics for crop production forecasting"

From

16Th June 2025
To
20th June 2025

DETAILS OF THE EVENT

Sl. No.	Description	Details
1.	Name of the Event	**IIRS ISRO Outreach Program on "Remote sensing data analytics for crop production forecasting"**
2.	Number of Participants	33
3.	Event Date	16th June 2025 to 20th June 2025
4.	Person in Charge	Mr. Sagar L Belgaonkar, Coordinator, IIRS ISRO DLP, AITM, Belagavi. Mr. Ravi B Tilaganji, Associate Coordinator, IIRS ISRO DLP, AITM, Belagavi.
5.	Name of the speaker	1. 16.06.2025 – "Fundamentals of Remote Sensing (RS) and Sensors for agriculture" by **Dr. N.R. Patel**. 2. 17.06.2025 – "RS Data Analytics for Crop Discrimination & Acreage Estimation" by **Mr. Dipanwati**. 3. 18.06.2025 – "Principles and Approaches of Crop Production Forecasting" by **Dr. N.R. Patel**. 4. 19.06.2025 – "Advanced Data Analytics for Crop Yield Estimation" by **Mr. Abhishek Danodia.** 5. 20.06.2025 – "UAV based Remote Sensing & Crop Yield Estimation" by **Dr. N.R. Patel**.

CONTENTS

Objectives of Program:

IIRS-ISRO Outreach Program On "Remote sensing data analytics for crop production forecasting."

a) To understand the fundamentals of remote sensing in agriculture.
b) To understand the principles and approaches for crop production forecasting.
c) To have the exposure in Advanced Data Analytics for Crop Yield Estimation.
d) To have the exposure in area of UAV based Remote Sensing & Crop Yield Estimation.

Details of the Program:

IIRS-ISRO Outreach Program On "Remote sensing data analytics for crop production forecasting."

The Department of Civil Engineering AITM, successfully organized the **IIRS-ISRO Outreach Program On "Remote sensing data analytics for crop production forecasting."** from 16th June 2025 to 20th June 2025. Under the supervision of Mr. Sagar L Belgaonkar, Coordinator and Mr. Ravi B Tilaganji Associate Coordinator for IIRS ISRO DLP Courses.

Day-1- 16-06-2025 session on – "Fundamentals of Remote Sensing (RS) and Sensors for agriculture" by **Dr. N.R. Patel**.

Web Link - https://www.youtube.com/watch?v=Emj5qM-Vtcc

The session highlighted the various points listed below:

- Indian Agriculture, Sustainable agriculture – Role of Geospatial technology.
- Geospatial technologies for decision making.
- Types of Remote Sensing and different kinds of imaging technologies.
- Spectral Signatures: Reflectance, passive and Active Microwaves.
- Satellite sensors for agriculture.
- Potential of Remote Sensing in agriculture.
- Information for decision making in agriculture and allied sectors.
- Crop type identification and acreage estimation.
- Crop inventory using satellite data.
- UAV based remote sensing for smart agriculture.
- Limitation & Challenges.
- Emerging geospatial tools for digital agriculture solutions.

Day 2: 17.06.2025 – "RS Data Analytics for Crop Discrimination & Acreage Estimation" by **Mrs. Dipanwita**.
Web Link - https://www.youtube.com/watch?v=KTCrqq57cUc

The session highlighted the various points listed below:

- Agricultural Lan use mapping crop inventory and production forecasting with case studies.
- Land use, Land Cover classes defined by IGBP (T.Hengi)
- Potential of E) data in Agriculture.
- Agriculture statistics in India.
- Spectral Response of vegetation.
- Crop monitoring: Potential of EO data.
- Crop type identification and acreage estimation.
- Canopy characteristics.
- FASAL -**F**orecasting **A**griculture using **S**pace **A**grometeorology and **L**and based observations.
- Forecasting Agricultural output using Space, Agrometeorology and Land based Observations via FASAL.
- Crop emergence progression, Crop discrimination with temporal SAR.
- Multitemporal RISAT SAR data.
- Episodic events: Crop planted may not be crop harvested.
- Agriculture & Food Security: Multiple issues and Challenges.

Day 3: 18.06.2025 – "Principles and Approaches of Crop Production Forecasting" by **Dr. N.R. Patel**.
Web Link - https://www.youtube.com/watch?v=Sl-Lnzx4dSA

The session highlighted the various points listed below:

- Food Security: How Climate affects agriculture.
- Remote Sensing of crop yield modeling approaches & Crop forecasting systems.
- Spectral Response of vegetation.
- Crop Monitoring: potential of EO data.
- Nation-wide crop forecasting: objectives & approach.
- CAPE Project (Geographical coverage and crops).
- Institutionalization for agricultural monitoring.
- Crop yield estimation.
- RS based crop yield modeling approaches.

- Single date regression spectral yield model.
- Examples of spectral yield models.
    - Zone 1 – Ambala, Panchkula, Yamina Nagar & Kurukshetra.
    - Zone 2 – Karnal, Kaithal, Zind, Panipat, Sonipat & Rohtak.
    - Zone 3 – Mahenergarh, Rewari, Jhajjar, Gurgaon & Faridabad.
    - Zone 4 – Sirsa, Fatehbad, Hisar & Bhiwani.
- Field scale yield estimation: Statistical.
- Wheat crop yield variability & Validation.
- Sugarcane yield prediction in Mill catchment.
- Incorporation of RS into Biomass Production Model.
- Semi-Physical growth model: Light Use efficiency concept.
- Spatial wheat yield map over different states.
- Simulation crop models.

Day 4: 19.06.2025 – "Advanced Data Analytics for Crop Yield Estimation" by **Mr. Abhishek Danodia.**

Web Link - https://www.youtube.com/watch?v=GeLyclDTKDo

The session covered various points

- Spectral information analytics for crop yield estimation and different wavelength.
- Advanced data analytics: advantages.
- Crop yield estimation.
- Field- Based (Conventional) Methods.
- RS based crop yield modeling approaches.
- Crop phenology assessment using RS.
- Cotton yield estimation using phenological metrics derived from Long-Term MODIS data.
- Spatial variation in phenolgical metrics during 2011-2017 crop seasons.
- Stepwise linear regression model constructed using phenological parameters.
- ML based regional crop yield modelling: Random Forest approach.
- LUE model-based yield prediction.
- CSM-CROPGRO – based yield prediction.
- Crop yield prediction of sugarcane: ML Algorithms.

- Rabi pulses yield modeling techniques using geospatial technology.
- Modern tools of early crop yield forecasting.
- Integration of remote sensing and crop models.

Day 5: 20.06.2025 – "UAV based Remote Sensing & Crop Yield Estimation" by **Dr. N.R. Patel**.

1. Web Link - https://www.youtube.com/watch?v=Emj5qM-Vtcc
2. https://www.youtube.com/watch?v=k5Lw1P4cCSo

The session covered various points –

- Indian Agriculture, Indian Earth observation satellites.
- Spectral response vegetation.
- Application of RS driven LUE model.

We Thank the Management, Principal & Director, Dean Academics, IQAC, Training and Placement officers, all HODs, Faculties of Department of Civil Engineering and Participants for giving us opportunity to host, Organize the IIRS ISRO Outreach Program at AITM.

1. **Relevance to PO:**

The following PO's are relevant to the Outreach Program.

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. **Audience** (Faculty and Students):

   Faculty members and Students of Angadi Insititute of Technology and Managament, Belagavi.

3. **Budget of the Event (Part of Budget or New):**

4. **Details of Resource person/Speaker**

   1. **Dr. N.R. Patel**
   2. **Mrs. Dipanwita**.
   3. **Mr. Abhishek Danodia.**

5. **Proposal Provided:**

   Mr. Sagar L. Belgaonkar, Assistant Professor and Head, Department of Civil Engineering.

6. **Fees of the Event, if Any:** No fees.

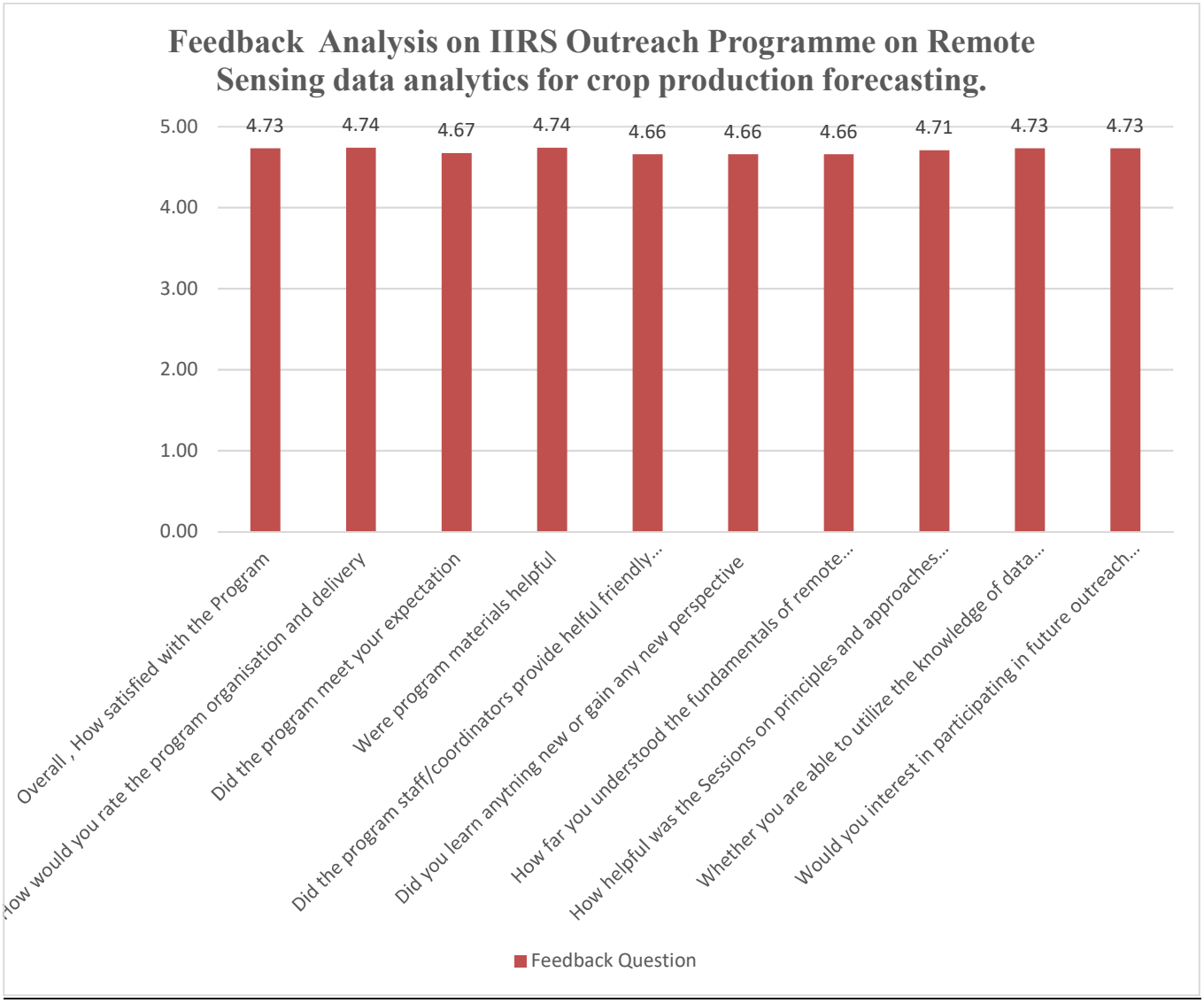
7. **Venue, Date and Time:**
   Seminar Hall-2, Second floor, AITM.
   16.06.2025 to 20.06.2025, 3:30PM to 5:30PM.

8. **Feedback Methodology:**

Feedback from Participants (Faculty and students).

a) Feedback was provided and submitted by program participants.

The analysis is carried out from the feedback form submitted by the participants. The analysis is done in MS EXCEL spreadsheet and is represented in graph.



Graph represents the analysis of the given feedback by the participants.

9. Computation for Attainment of PO:

The following PO's are relevant to the Faculty Development Program (FDP)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Attainment	Assessment	
PO1	4.73	95%
PO2	4.74	95%
PO4	4.67	93%
PO5	4.74	95%
PO6	4.66	93%
PO7	4.66	93%
PO8	4.66	93%
PO9	4.71	94%
PO10	4.73	95%
PO12	4.73	95%

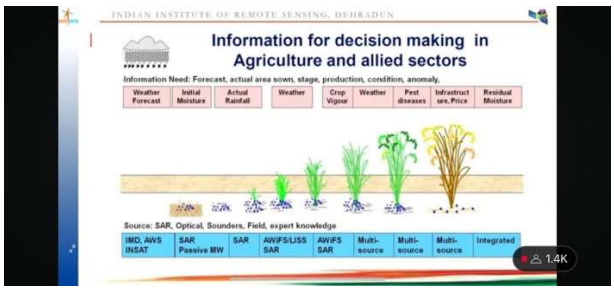
The table represents the attainment of POs based on the Feedback given by the participants

Attainment		
FDP Feedback Form		
PO1 (Q1-10)	94.6%	3
PO2(Q 4,6,7,8,9)	94.8%	3
PO4(Q4,6,7,8,9)	93.5%	3
PO5(Q4,6,7,8,9)	94.8%	3
PO6(Q 4,5,6,7,8,9)	93.2%	3
PO7(Q4,7,8,9)	93.2%	3
PO8(Q2,4,6,7,8,9)	93.2%	3
PO9(Q2.5,6)	94.2%	3
PO10(Q1,2,3,4,5,6,,910,11,12)	94.6%	3
PO12 (Q 1,2,3,4,5,6,7,8,9,10,12)	94.6%	3

Note: PO attainment are represented in values from 1 to 3

1 – Slight
2- Moderate
3 – High

10. Photos of Faculty Development Program conducted for evidence:



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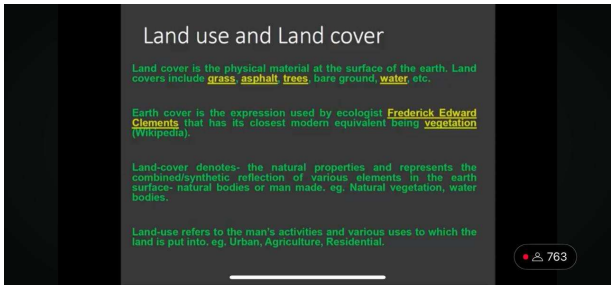

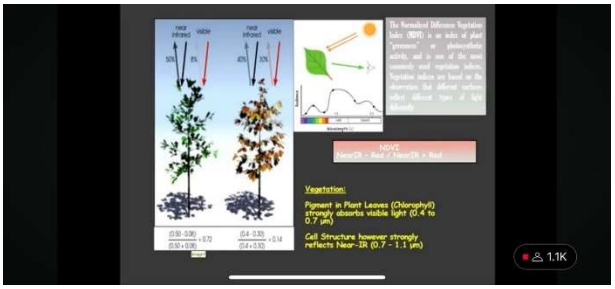

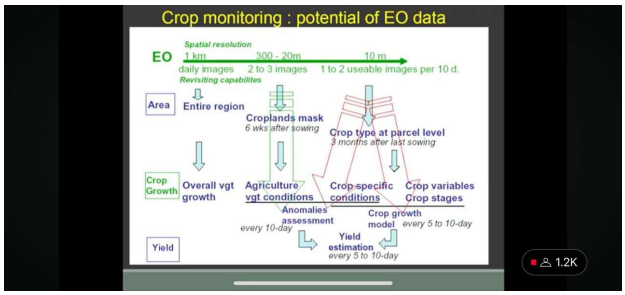

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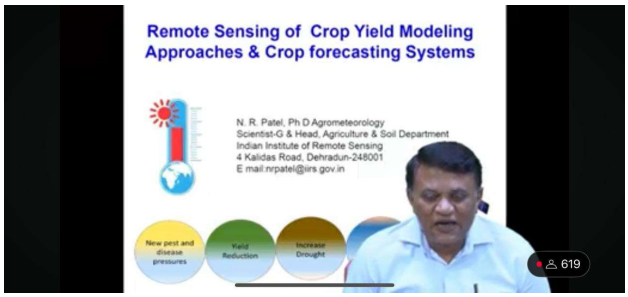

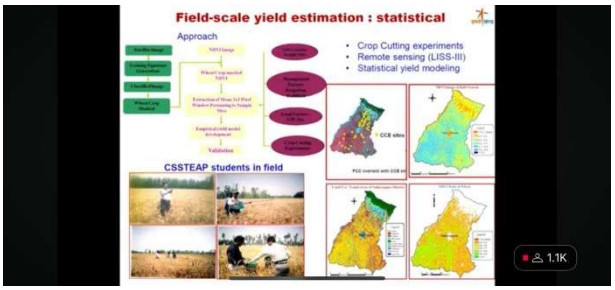

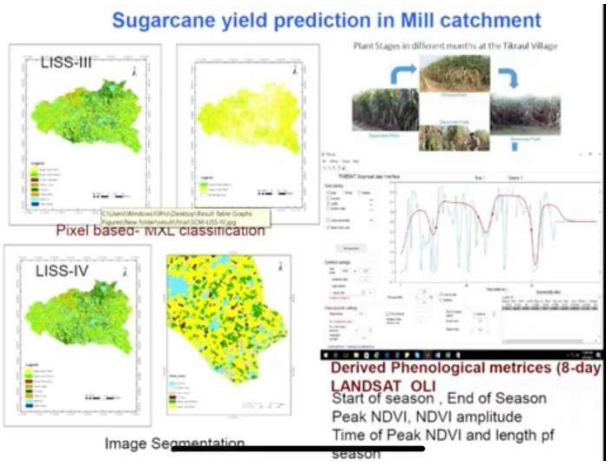

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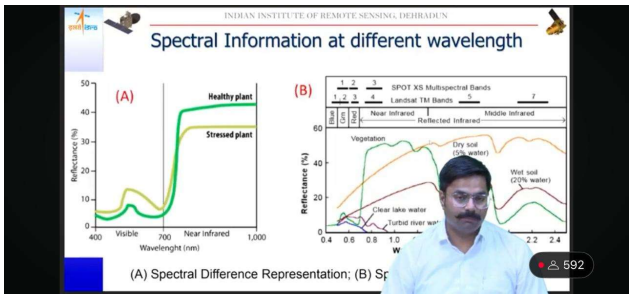

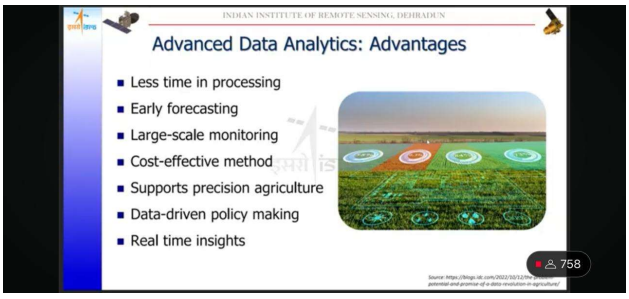

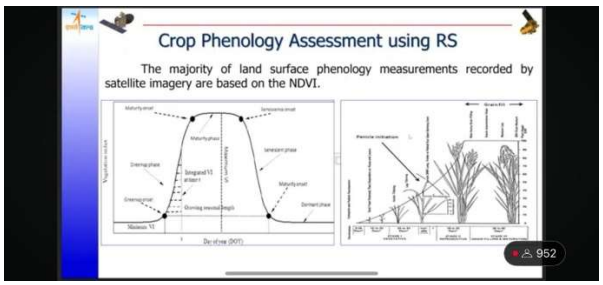

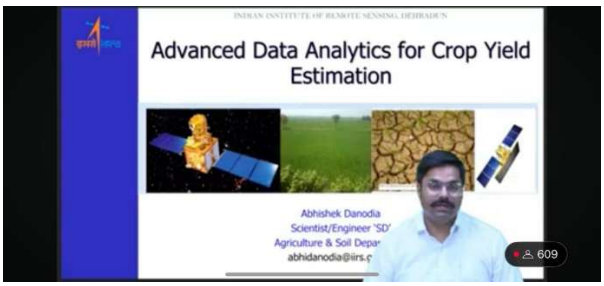

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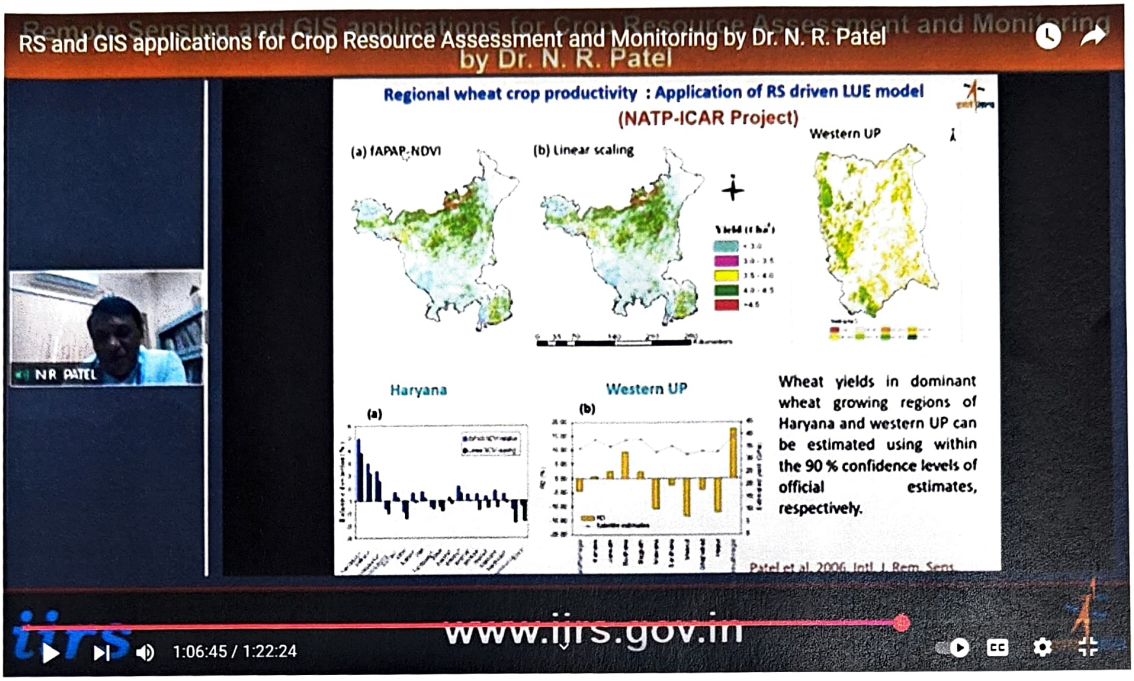

Day 5: 20.06.2025 – "UAV based Remote Sensing & Crop Yield Estimation" by **Dr. N.R. Patel**.

Coordinator	HOD	IQAC	Principal & Director
25/07/2025	25/07/2025		
	Head of the Department Civil Engineering Angadi Institute of Technology And Management Savagaon Road, Belagavi-590 009	IQAC ANGADI INSTITUTE OF TECHNOLOGY & MANAGEMENT, BELAGAVI - 09.	Principal & Director Suresh Angadi Education Foundation Angadi Institute of Technology & Management Savagaon Road, Belagavi-590 009