REPORT

OF

IIRS-ISRO Outreach Program
on
"Recent Trends in Ecological Modelling and Simulation"

From

19th May 2025
To
23rd May 2025

DETAILS OF THE EVENT

Sl. No.	Description	Details
1.	Name of the Event	**IIRS ISRO Outreach Program on "Recent Trends in Ecological Modelling and Simulation"**
2.	Number of Participants	06
3.	Event Date	19th May 2025 to 23rd May 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. 19.05.2025 – "An Overview on Advances in Ecological Modelling" by **Dr. Hitendra Padalia**. 2. 20.05.2025 – "Advances in modelling forest carbon stock using EO data" by **Mr. Subrata Nandy**. 3. 21.05.2025 – "Advances in biodiversity assessment using geospatial technology" by **Dr. Ishwari Datt Rai**. 4. 22.05.2025 – "Advances in modelling forest carbon and water fluxes using In-Situ, satellite and models." by **Dr. Taibananba Watham.** 5. 28.03.2025 – "Advances in soil erosion modelling using Geospatial Technology" by **Dr. Suresh Kumar**.

CONTENTS

Objectives of Program:

IIRS-ISRO Outreach Program On "Recent Trends in Ecological Modelling and Simulation."

a) To Familiarize the ecologist, forest managers, academicians and researchers on utility of ecological models and simulation for ecosystem studies. .

Details of the Program:

IIRS-ISRO Outreach Program On "Recent Trends in Ecological Modelling and Simulation."

The Department of Civil Engineering AITM, successfully organized the **IIRS-ISRO Outreach Program On "Recent Trends in Ecological Modelling and Simulation."** from 19th May 2025 to 23rd May 2025. Under the supervision of Mr. Sagar L Belgaonkar, Coordinator and Mr. Ravi B Tilaganji Associate Coordinator for IIRS ISRO DLP Courses.

1. Day-1- 19-05-2025 session on – "An Overview on Advances in Ecological Modelling" by **Dr. Hitendra Padalia**. Web Link - https://www.youtube.com/watch?v=aJklnASfUbE
   The session highlighted the various points listed below:
   - Introduction to RS, GIS, and GNSS
   - Application Areas: Current Trends & Future Prospects.
   - Vegetation Characterization and Mapping.
   - Deforestation, Degradation and Regrowth.
   - Biodiversity Assessment and Monitoring.
   - Forest Biomass/Carbon Stock Assessment.
   - Wildlife Tracking and Habitat Assessment.
   - Assessment of Ecosystem Services.
   - Assessment of Non-Timber Forest Produce.
   - Forest Boundary Survey and Digitization.

Day 2: 20.05.2025 – "Advances in modelling forest carbon stock using EO data"

by **Mr. Subrata Nandy**.

Web Link - https://www.youtube.com/watch?v=xvRi3a5bOnE

The session highlighted the various points listed below:

- Forest Carbon Pools.
- Forest Biomass Assessment: Simple Linear Regression.
- Correlation between NDVI and Biomass.
- Forest Biomass Assessment: Machine Learning Algorithm.
- Forest Biomass Assessment: Multiple Learning Algorithm.
- LIDAR.
- Data Acquisition using TLS.
- TLS Applications in Forest Ecology.
- Forest Biomass Assessment: LiDAR Remote Sensing.

Day 3: 21.05.2025 – "**Advances in biodiversity assessment using geospatial technology**" by **Dr. Ishwari Datt Rai**.

Web Link - https://www.youtube.com/watch?v=LerT8Juop-A

The session highlighted the various points listed below:

- Biodiversity Assessment Needs.
- Parameters needful in biodiversity assessment.
- Geoinformatics in biodiversity assessment.
- Forest Cover classes.
- Important Landscape Elements.
- Vegetation type characterization
- Delineation of gregarious indicator species.
- Biodiversity assessment – Landscape Level.
- Species level mapping with VHR satellite data.

Day 4: 22.05.2025 – "Advances in modelling forest carbon and water fluxes using In-Situ, satellite and models." by **Dr. Taibananba Watham.**

Web Link - https://www.youtube.com/watch?v=lEyh59NPsyc

The session covered various points

- EC System.
- EC and Meteorological instruments.
- Environmental control on forest productivity.
- Light Response Curve.
- Temperature Greenness model.

- Estimation of GPP using LUE-based model.
- AI/ML for ET Modelling.

Day 5: 23.05.2025 – "Advances in soil erosion modelling using Geospatial Technology" by **Dr. Suresh Kumar**.

Web Link - https://www.youtube.com/live/GscFDO2U_Q8

The session covered various points –

- Soil Erosion. - Erosion Process, Mechanism
- Factors affecting erosion and types.
- Remote sensing data – Land Use / Land Cover Type.
- Remote Sensing data – standard false colour composite (FCC).
- USLE – Universal Soil Loss Equation.
- Erosion Modelling.
- Indian Remote sensing satellite Cartosat 3 : 1.13 m spatial resolution.
- Revised Universal Soil Loss Equation (RUSLE).
- Soil Erodibility Factor (K).
- Methodology for estimation of soil loss using USLE model.
- Soil Erosion rate and risk assessment – A case study.
- SWAT – VSA 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. Hitendra Padalia**.
   2. **Mr. Subrata Nandy**.
   3. **Dr. Ishwari Datt Rai**.
   4. **Dr. Taibananba Watham.**
   5. **Dr. Suresh Kumar**.

5. **Proposal Provided:**

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

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

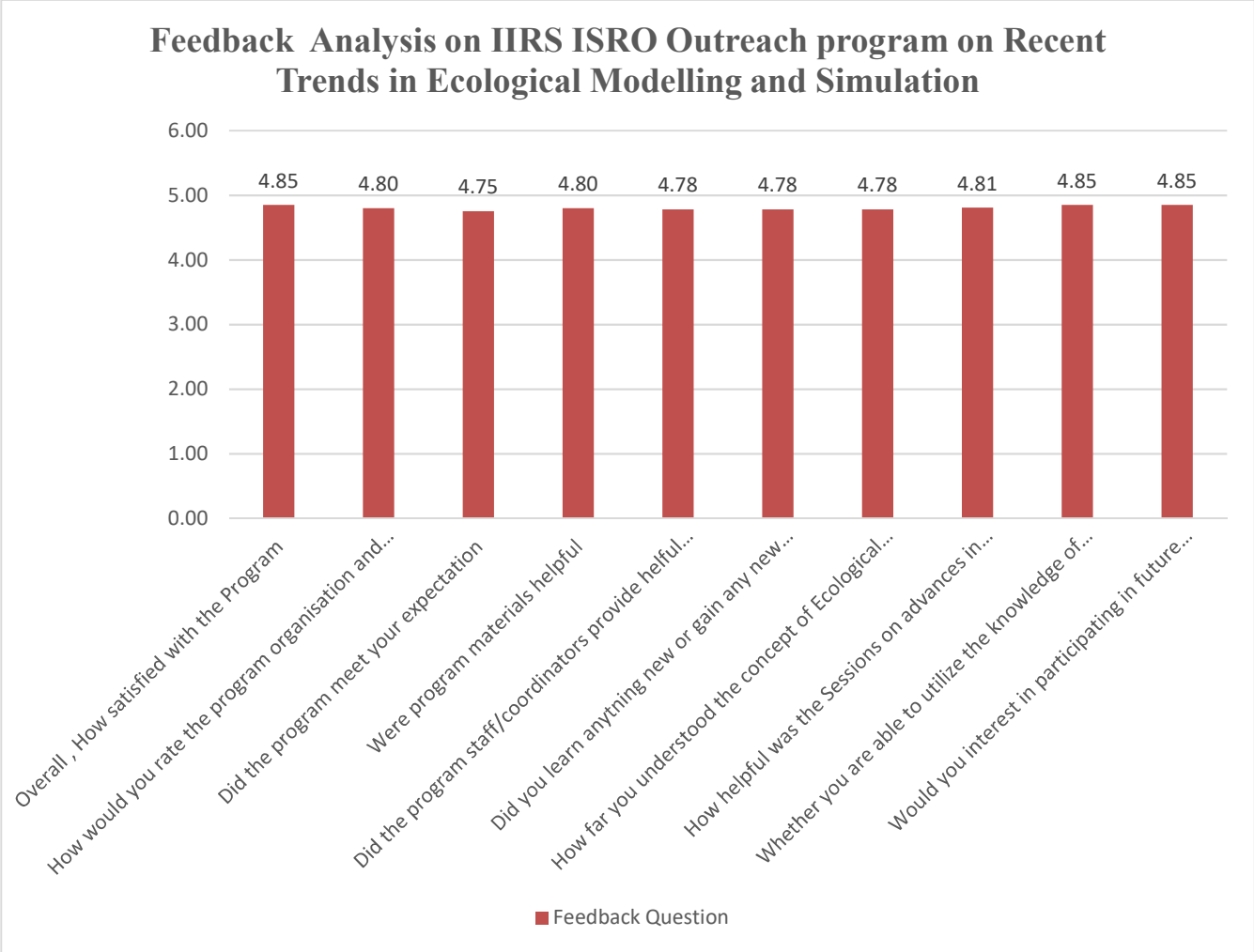
7. **Venue, Date and Time:**
   HOD Chamber, Department of Civil Engineering, AITM.
   19.05.2025 to 23.05.2025, 3:30PM to 5:30PM.

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.
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.
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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	4.85	97%
PO2	4.80	96%
PO4	4.75	95%
PO5	4.80	96%
PO6	4.78	96%
PO7	4.78	96%
PO8	4.78	96%
PO9	4.81	96%
PO10	4.85	97%
PO12	4.85	97%

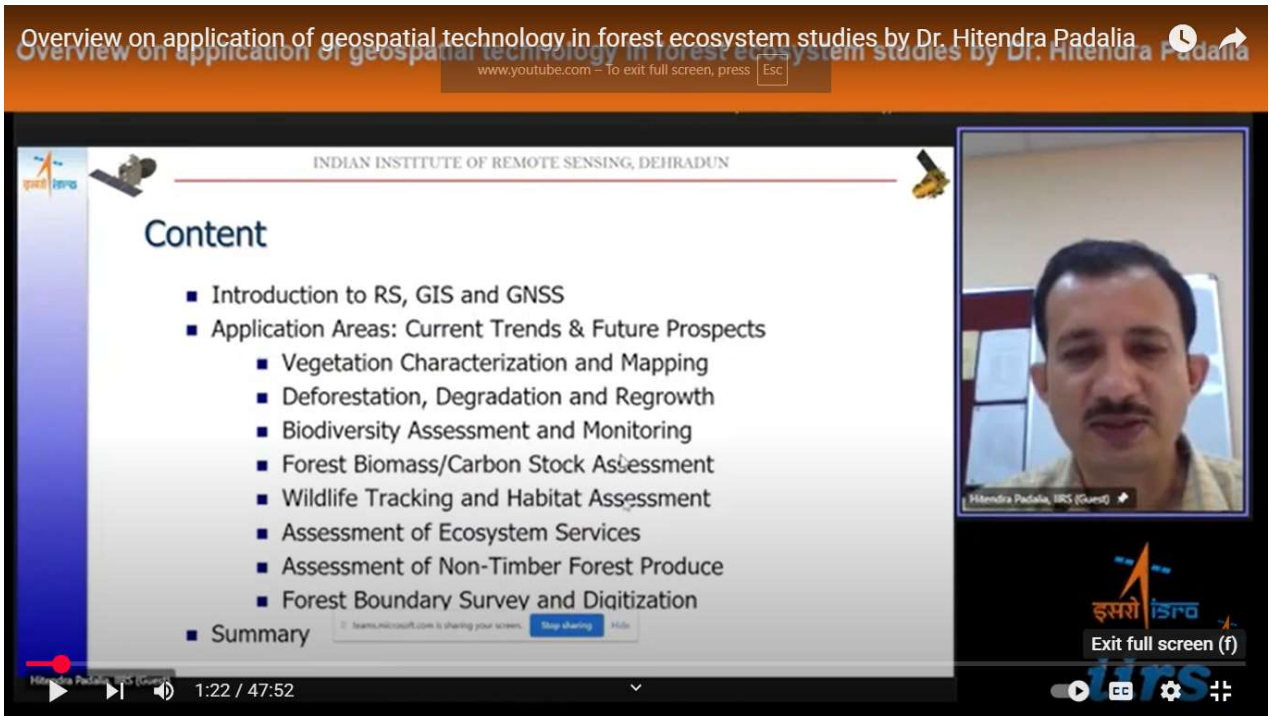
The table represents the attainment of POs based on the Feedback given by the participants

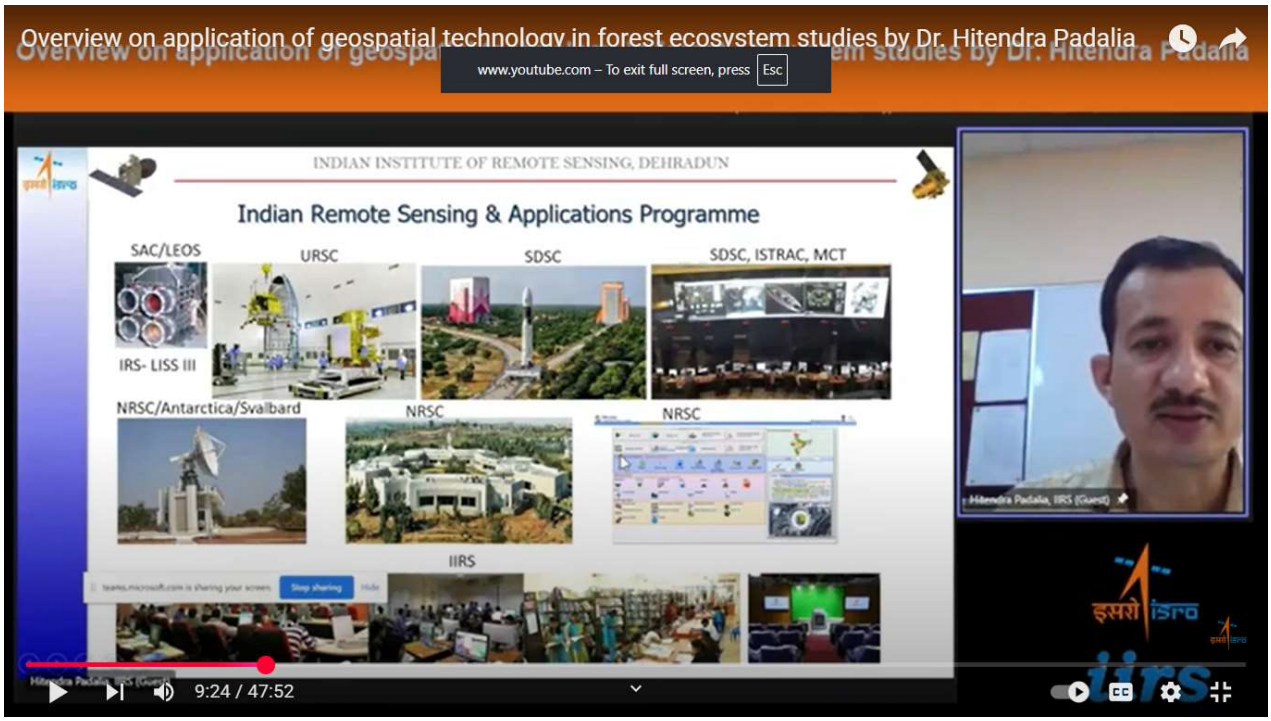
Attainment		
IIRS ISRO Outreach Program Feedback		
PO1 (Q1-10)	97.0%	3
PO2(Q 4,6,7,8,9)	96.0%	3
PO4(Q4,6,7,8,9)	95.0%	3
PO5(Q4,6,7,8,9)	96.0%	3
PO6(Q 4,5,6,7,8,9)	95.6%	3
PO7(Q4,7,8,9)	95.6%	3
PO8(Q2,4,6,7,8,9)	95.6%	3
PO9(Q2.5,6)	96.2%	3
PO10(Q1,2,3,4,5,6,,910,11,12)	97.0%	3
PO12 (Q 1,2,3,4,5,6,7,8,9,10,12)	97.0%	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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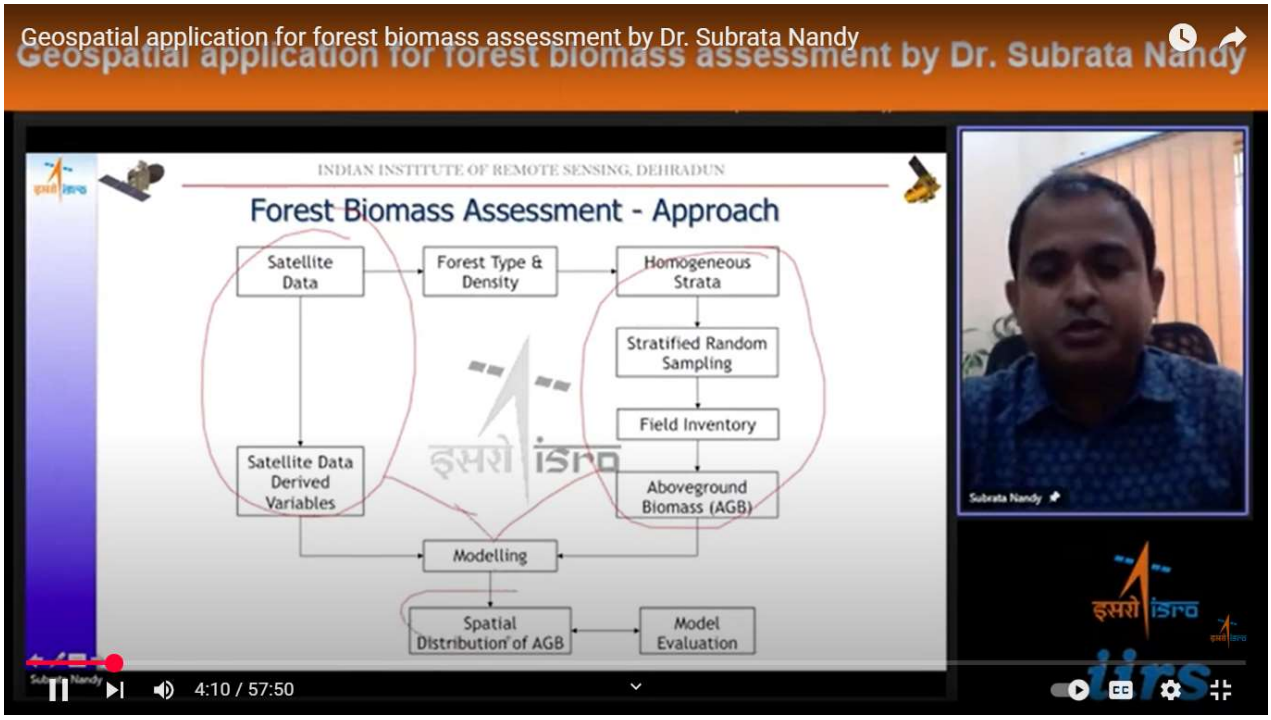

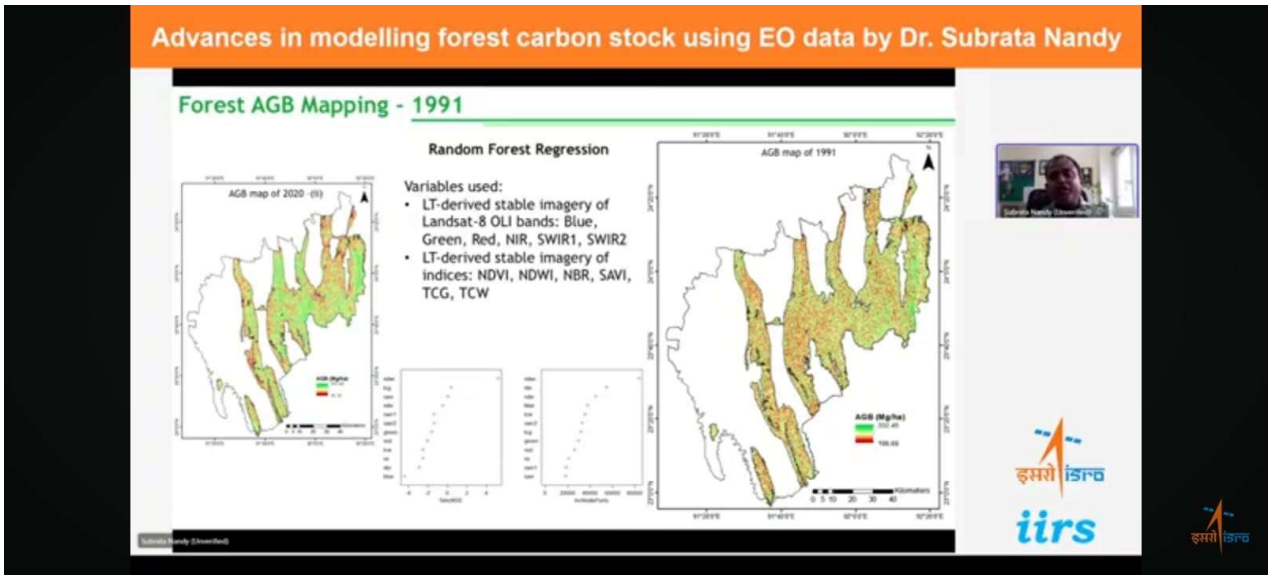

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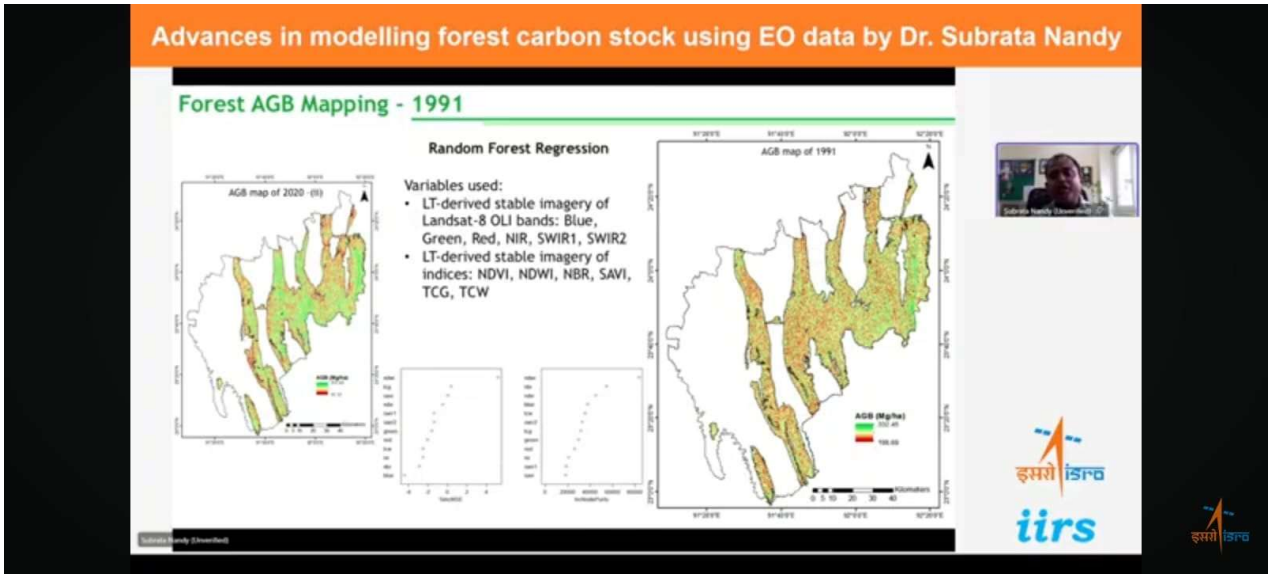

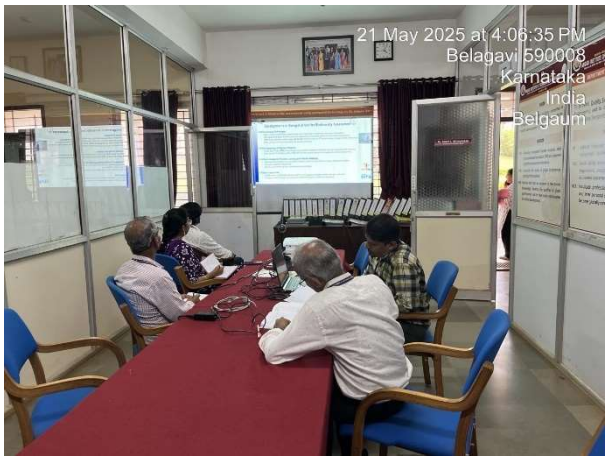

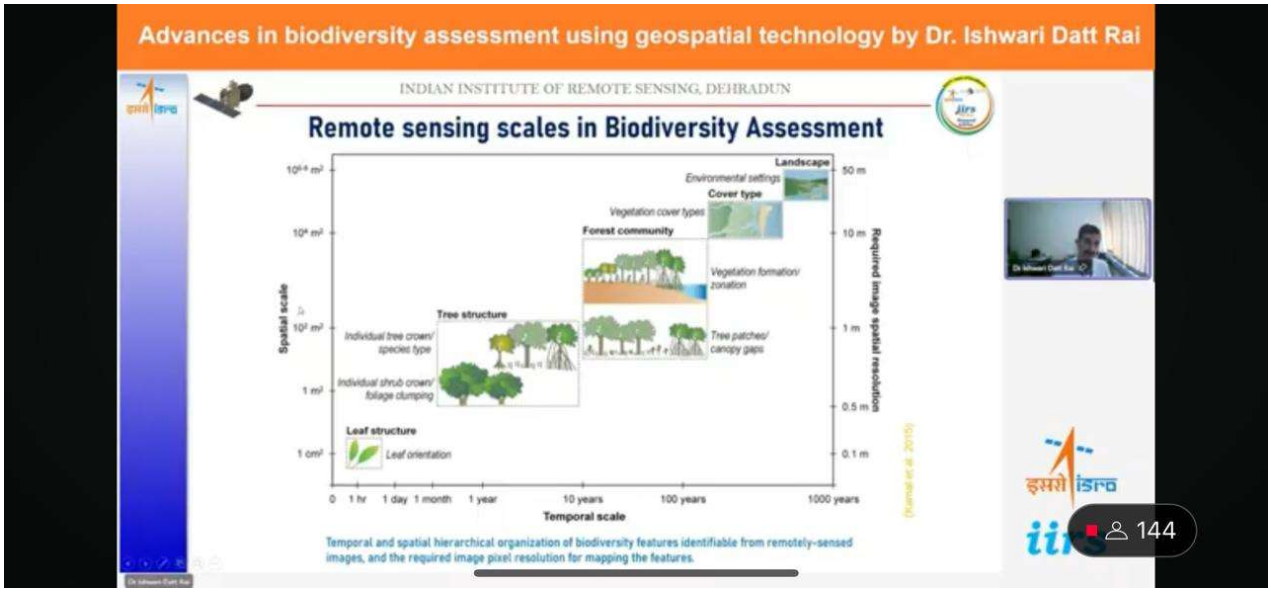

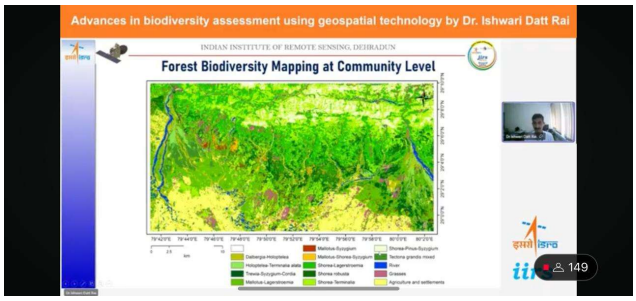

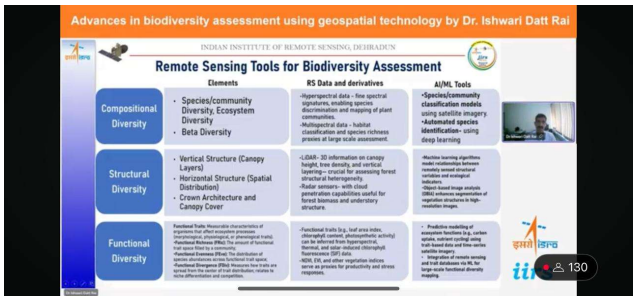

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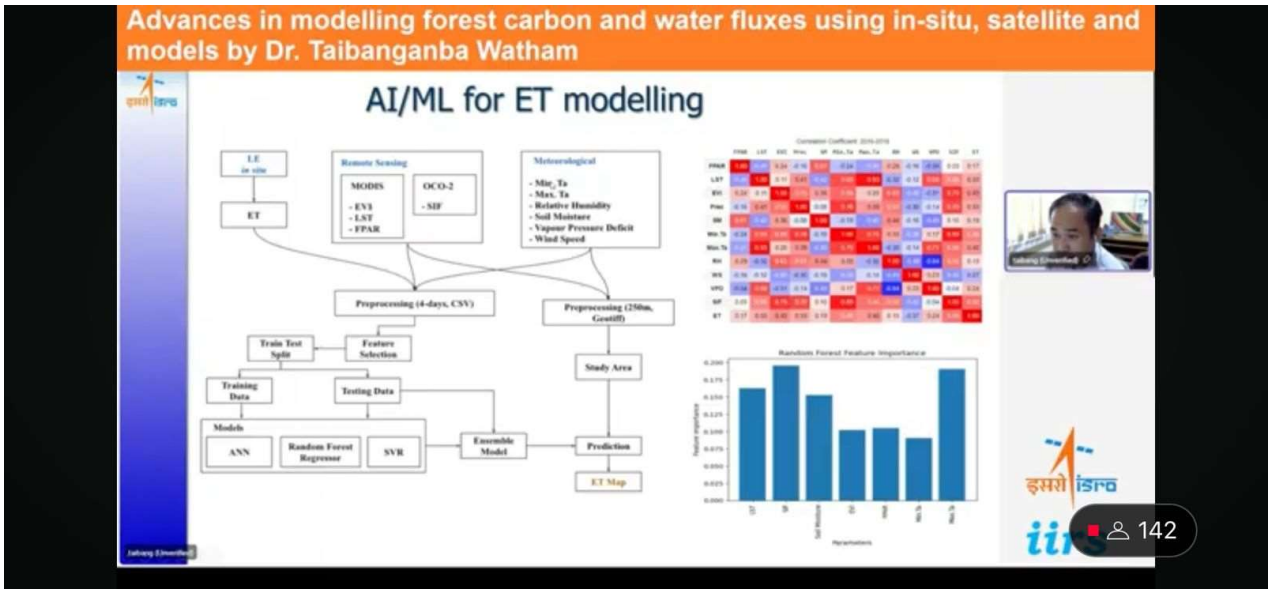
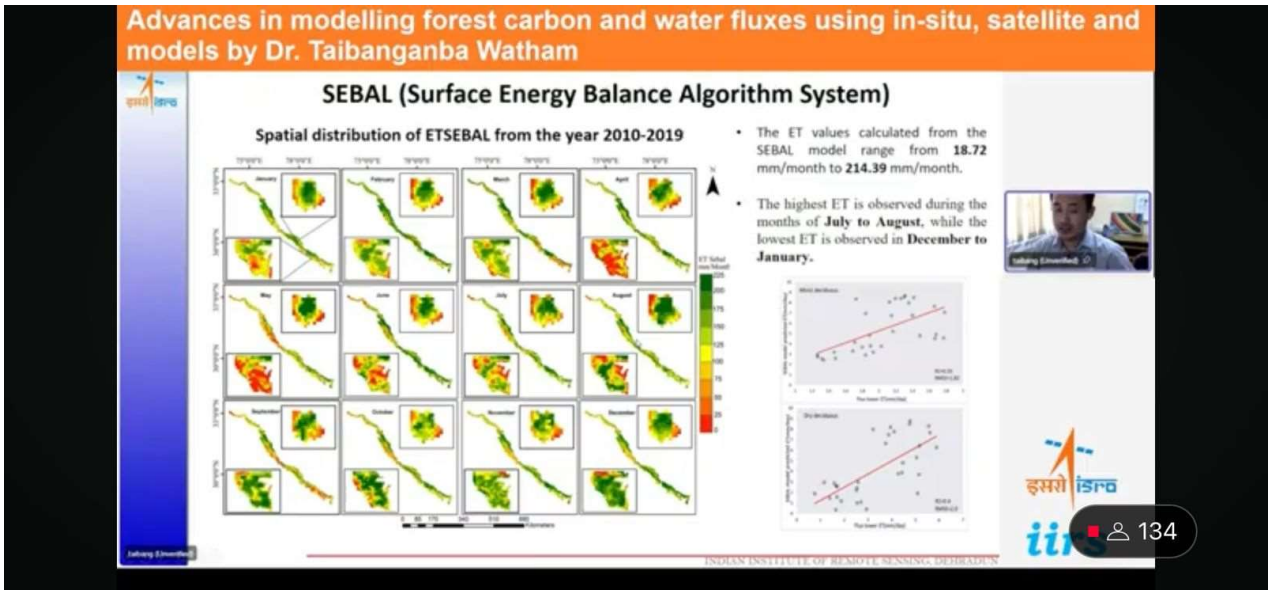
22 May 2025 at 4:42:10 PM
Belagavi 590008
Karnataka
India
Belgaum


Advances in modelling forest carbon and water fluxes using in-situ, satellite and models by Dr. Taibanganba Watham
AI/ML for ET modelling
LE
ET
Remote Sensing
MODIS
- EVI
- LST
- FPAR
OCO-2
- SIF
Meteorological
- Min_Ta
- Max. Ta
- Relative Humidity
- Soil Moisture
- Vapour Pressure Deficit
- Wind Speed
Preprocessing (4-days, CSV)
Preprocessing (250m, Geotiff)
Train Test Split
Feature Selection
Training Data
Testing Data
Study Area
Models
ANN
Random Forest Regressor
SVR
Ensemble Model
Prediction
ET Map
Random Forest Feature Importance
142



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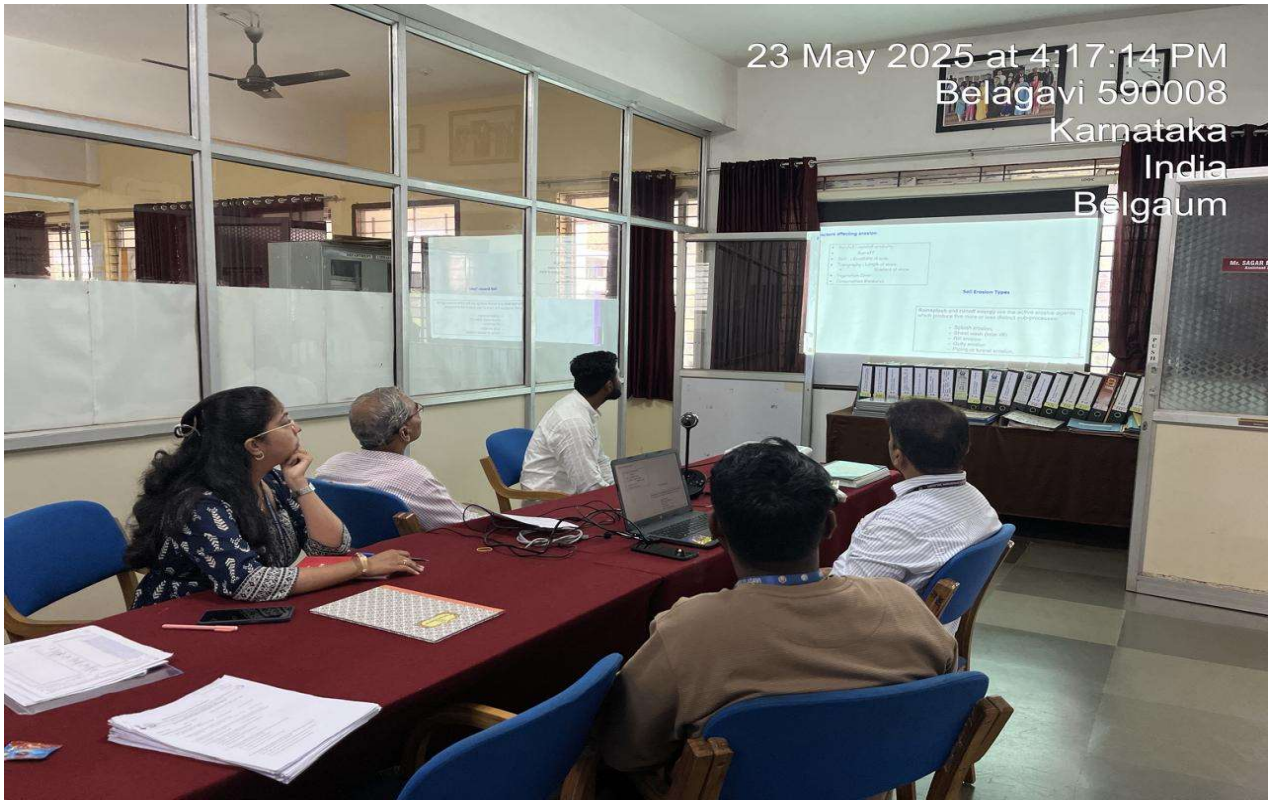

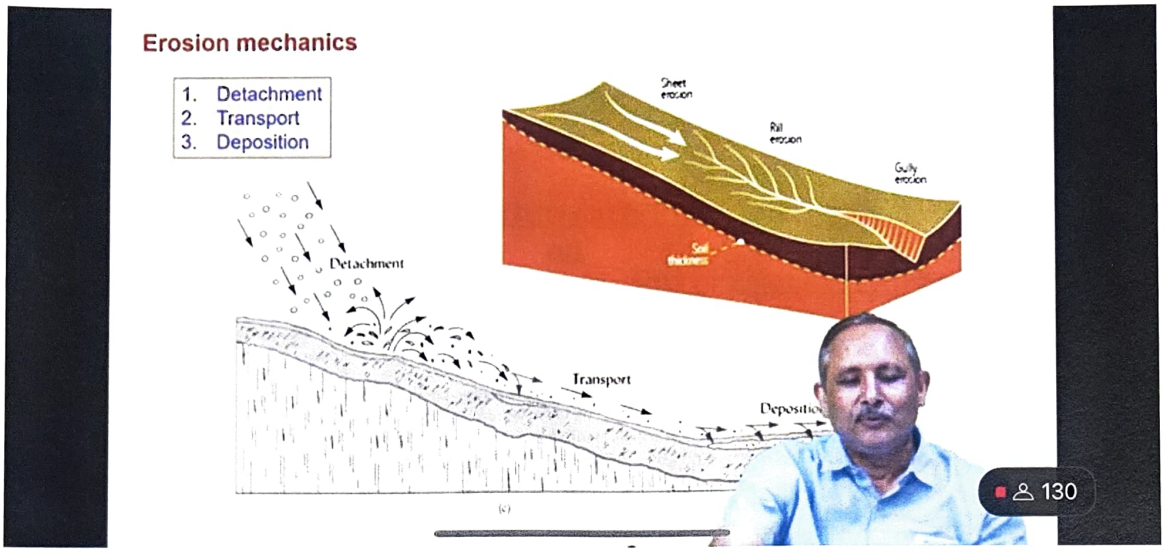

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12.6.25

12/06/2025 12/06/2025 12/6/25

Coordinator	HOD	IQAC	Principal & Director

Head of the Department, Civil Engineering
Angadi Institute of Technology And Management
Savagaon Road, Belagavi-590 009

IQAC COORDINATOR
ANGADI INSTITUTE OF TECHNOLOGY & MANAGEMENT
BELAGAVI - 09.

Principal & Director
Suresh Angadi Education Foundation
Angadi Institute of Technology & Management
Savagaon Road, Belagavi-590 009