



SOUVENIR

14th NATIONAL WORKSHOP

OF JICA ASSISTED FORESTRY PROJECTS IN INDIA



Climate Resilience, Digital Transformation
& Sustainable Wood Economies



Organised by

ODISHA FORESTRY SECTOR DEVELOPMENT PROJECT PHASE - II

Odisha Forestry Sector Development Society

Forest, Environment and Climate Change Department,
Government of Odisha



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OF

JICA ASSISTED FORESTRY PROJECTS IN INDIA



**Climate Resilience, Digital Transformation
& Sustainable Wood Economies**



**11th to 13th
February, 2026**



**Hotel Mayfair Convention
Bhubaneswar, Odisha**

Organized By

Odisha Forestry Sector Development Project | Phase II

Odisha Forestry Sector Development Society

Forest, Environment and Climate Change Department, Government of Odisha

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MESSAGE

Shri Ganesh Ram Singkhuntia

MINISTER OF STATE (IND.)

Forest, Environment & Climate Change,
Labour & Employees' State Insurance,
Government of Odisha



It gives me immense pleasure to note that the Odisha Forestry Sector Development Society (OFSDS), in collaboration with the Japan International Cooperation Agency (JICA), has successfully organized the 14th National Workshop of JICA Assisted Forestry Projects in India. This workshop comes at a pivotal time when the world is increasingly looking toward sustainable and climate-resilient models for resource management.

Odisha has long been a pioneer in participatory forest management. The deliberations during this national event, particularly on the transition toward a resilient and green wood economy, reaffirm our commitment to balancing ecological integrity with economic prosperity.

I am delighted to see the active involvement of Vana Surakshya Samiti (VSS) and Self-Help Group (SHG) members as part of community participation in forest fringe areas under OFSDP project. Their participation ensures that the benefits of our focussed intervention through international cooperation and technical innovation reach the grassroots level, empowering those who are the true custodians of our forests.

Furthermore, the project's commitment to augmenting alternate livelihoods for the poorest households and forest-dependent communities is a laudable action under OFSDP-II, having mobilized many infrastructural and livelihood activities through inter-sectoral convergence and established strategic product clusters benefitting over 26.53 lakh beneficiaries. It is heartening to see the active involvement of Women Self-Help Groups (SHGs) and the coverage of 3.28 lakh VSS members across the state.

I congratulate the entire organizing team of OFSDP-II for hosting this significant event and wish this souvenir success in disseminating the rich insights and collaborative spirit of the workshop.

Ganesh Ram Singkhuntia





MESSAGE

Shri Bhaskar Jyoti Sharma, IAS

Principal Secretary
Forest, Environment & Climate Change Department
Government of Odisha



The 14th National Workshop of JICA Assisted Forestry Projects in India organised at Bhubaneswar served as a vibrant platform for a shared vision: building a climate-resilient forestry sector through coordinated efforts and innovation. I am delighted to witness the power of collaboration among participating states, research institutions and international partners like Japan International Cooperation Agency (JICA) for driving the OFSDP project.

Odisha is committed to translating the workshop's recommendations such as integrating indigenous traditional knowledge into climate planning and developing interoperable decision-support systems into actionable initiatives. My interactions with the VSS and SHG community members during the exhibition further reinforced the importance of these livelihoods in our ecological restoration agenda.

I extend my appreciation to the JICA India team, the PCCF & HoFF and the Project Director of OFSDP for their leadership in making this workshop a resounding success. May this souvenir serve as a valuable reference for practitioners and policymakers across the country.

Bhaskar Jyoti Sharma

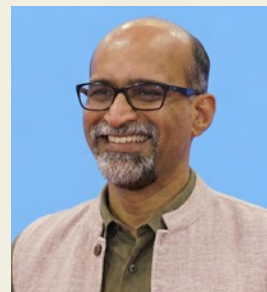




FOREWORD

Shri Rajesh Gopalan, IFS

Additional PCCF & Project Director
OFSDP, Phase-II, Odisha Forestry Sector
Development Society



It gives me immense pleasure to write this Proceedings-Souvenir on 14th National Workshop of JICA Assisted Forestry Projects in India, which was successfully hosted by the Odisha Forestry Sector Development Project Phase-II (OFSDP-II) at Bhubaneswar.

The workshop formed an excellent platform for a diverse group of stakeholders, including representatives from JICA-assisted forestry projects across various states, policymakers, domain experts, and practitioners. The theme **“Future Ready Forestry”** provided a timely opportunity to deliberate on emerging challenges and synthesis in the forestry sector, particularly in the context of climate resilience, digital transformation and sustainable wood economies in tandem with technological advancements.

This Souvenir captures the collective insights, experiences, and best practices shared during the workshop. The technical sessions, enriched by ideation of eminent speakers from premier institutions across India, senior policy makers of forest departments and international organizations, facilitated meaningful discussions on climate-resilient forestry, digital forest management systems, carbon markets, and community-led conservation approaches.

OFSDP-II has made notable progress in advancing sustainable forest management through a participatory and convergence-based approach. The project strengthened the community institutions such as Vana Surakshya Samitis (VSS), promoted livelihood interventions for forest-dependent communities, and enhanced forest productivity through site specific plantation and assisted natural regeneration. The integration of MIS and GIS-based monitoring systems, digital tools, and evidence-based planning has contributed to improved transparency and efficiency in project implementation.

Significant strides were also made in climate adaptation and ecosystem restoration, including the rehabilitation of degraded forest landscapes, promotion of biodiversity conservation, and enhancement of carbon sequestration potential. Capacity-building initiatives undertaken at various levels have empowered stakeholders and strengthened institutional mechanisms for sustainable forest governance.



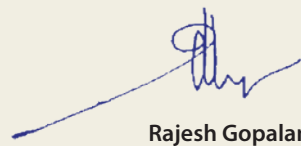
The deliberations during the workshop—including sessions on climate change adaptation and mitigation, digital transformation in forest management, wood transformation and forest certification and community-based resource management—closely resonated with the interventions and outcomes of OFSDP-II. The valuable contributions of esteemed speakers from premier institutions such as Indian Institute of Science(IISc), Bengaluru, Indian Institute of Technology (IIT), Kharagpur, The Energy and Resources Institute (TERI), Kerala Forest Research Institute(KFRI), Institute of Forest Genetics and Tree Breeding (IFGTB), Indian Institute of Forest Management (IIFM), Bhopal, Institute of Wood Science and Technology (IWST), Bengaluru, alongside senior Indian Forest Service officers from different JICA project states, research organizations and international agencies enriched the discussions and provided actionable insights for future programmes.

The theme “*Future Ready Forestry*” underscored the need for a paradigm shift towards adaptive, technology-enabled, and community-centric forestry systems. The workshop highlighted the importance of integrating traditional ecological knowledge with modern scientific approaches, leveraging innovation, and fostering inter-state collaboration to address future challenges effectively.

This Proceedings-Souvenir stands as a testimony to the knowledge shared and partnerships strengthened during the workshop. It is expected to serve as a valuable reference for policymakers, practitioners and researchers engaged in forestry and natural resource management.

I extend my sincere gratitude to all participating states, esteemed speakers, experts, and partners for their valuable contributions. I also acknowledge the dedicated efforts of the organizing team of OFSDP-II and all stakeholders who contributed to the successful conduct of this national workshop.

I am confident that the insights and recommendations emerging from the workshop will go a long way in shaping future-ready, resilient, and inclusive forestry practices in India.



Rajesh Gopalan



PREFACE

It is a distinct privilege to present this Proceedings-Souvenir, which encapsulates the collective wisdom, rich deliberations, and collaborative spirit of the 14th National Workshop of JICA-Assisted Forestry Projects in India. Hosted by the Odisha Forestry Sector Development Project Phase-II (OFSDP-II) in the vibrant city of Bhubaneswar from 11 to 13 February 2026, this landmark gathering emerged as a dynamic national platform for knowledge exchange among forestry professionals, policymakers, and practitioners from across the country.

Anchored in the *forward-looking* theme, “*Future-Ready Forestry: Climate Resilience, Digital Transformation & Sustainable Wood Economies*,” the workshop provided a timely and strategic platform to address the evolving challenges of the forestry sector through the lens of technological innovation and community-centric governance. Over three days of intensive engagement, the programme seamlessly combined high-level technical sessions with field-based learning, enabling deeper insights into climate-resilient forestry, AI-enabled predictive systems, and the rapidly evolving green wood economy.

As underscored by the Project Director, the deliberations resonated strongly with the core interventions of OFSDP-II-particularly the emphasis on participatory forest management through Vana Surakshya Samitis (VSS) and the integration of GIS-based monitoring systems to enhance transparency, accountability, and decision-making. The perspectives shared by distinguished experts from premier institutions, senior forest policymakers across India, and officials from JICA and various State Forest Departments have collectively shaped a forward-looking and actionable roadmap for advancing inclusive, resilient, and sustainable forestry practices.

This Proceedings-Souvenir transcends not just being a mere record of proceedings, it stands as a testament to strengthened partnerships, shared learning, and a unified commitment to a sustainable and climate-resilient future. It is envisaged as a valuable reference for researchers, practitioners, and stakeholders engaged in steering the transformation of India’s forestry sector.

I extend my sincere appreciation to the organizing team, our esteemed delegates, and our valued partners at the Forest, Environment & Climate Change Department, Government of Odisha, and the Japan International Cooperation Agency (JICA), whose unwavering commitment and collaborative efforts ensured the resounding success of this national workshop.

Shri Swayam Mallick, IFS
Joint Project Director, OFSDP-II



ACKNOWLEDGEMENT

The successful culmination of the 14th National Workshop of JICA Assisted Forestry Projects in India, held at Bhubaneswar, stands as a landmark in our collective pursuit of environmental excellence. As the Odisha Forestry Sector Development Project, Phase-II (OFSDP-II) presents this Proceedings-Souvenir, we recognize it not merely as a record of proceedings, but as a dynamic tool for cross-learning and institutional growth. The publication of this document will significantly enrich the workshop's deliberations, ensuring that the exchange of innovative project activities across different states inspires a national adoption of best practices.

We extend our deepest gratitude to Shri Ganesh Ram Singkhunita, Hon'ble Minister, Forest, Environment and Climate Change Department, Govt of Odisha for his visionary leadership in hosting this national forum. We also acknowledge the strategic oversight provided by the Shri Bhaskar Jyoti Sharma, IAS, Principal Secretary (FE&CC) and Shri K. Murugesan, IFS, Principal Chief Conservator of Forests & Head of Forest Force, Odisha, whose administrative backing was pivotal to the project's recognized success as a replicable model.

Our sincere thanks go to the Japan International Cooperation Agency (JICA). The guidance from senior JICA officials, including Mr. Eiji Wakamatsu, Senior Representative, JICA India and Shri Vineet Sharin, Chief of Development Operations ensured our themes of climate change response and green transformation remained at the forefront of the agenda.

The technical depth of this workshop was made possible by the eminent speakers and panellists who shared actionable insights across three critical domains:

- **Climate Change Adaptation:** We thank experts from Indian Institute of Science (IISc), Bengaluru, The Energy and Resources Institute (TERI), Marubeni, Japan and the Tamil Nadu Forest Department for their deliberations on Dynamic Global Vegetation Models and Nature-Based Solutions, Integrated Climate Change Frameworks for Forests and Climate Change Mitigation and Adaptation.
- **Digital Transformation:** The presentations on "Forest Stack" by the Rajasthan Forest Department & Boston Consulting Group, alongside Open-source Technology case study from Gujarat and AI-enabled mapping from Indian Institute of Technology, (IIT) Kharagpur and Kerala Forest Research Institute (KFRI) showcased the power of digital public infrastructure in smart forest governance.



- Sustainable Wood Economies: The insights into forest certification and value addition provided by Forest Development Corporation, Maharashtra, Indian Institute of Forest Management (IIFM), Bhopal, Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore, Institute of Wood Science and Technology (IWST), Bengaluru, Nomura Research Institute, Japan and JK Paper Mill highlighted the transition toward wood certification and market-linked sustainability.

We highly appreciate the Project Directors and senior IFS officers from the participating states of West Bengal, Uttarakhand, Himachal Pradesh, Gujarat, Rajasthan, Punjab, Tamil Nadu, Tripura, Telangana and Nagaland. Their willingness to share specialized models—from Nagaland’s Jhum restoration to Uttarakhand’s Chisan technology—is what will inspire other states to replicate these successes through meaningful cross-learning.

I commend the dedicated efforts of the organizing team at OFSDP, Phase-II for the meticulous planning, curation, and hosting of this National Workshop. This forum has enabled all our stakeholders to advance by adopting new methodologies and engaging in the cross-learning of best practices initiated by states across the country. The inclusion of premier domain experts in forest, environment and climate change from both India and abroad has been central to this deliberation.

The leadership of Shri G. Rajesh, IFS, Project Director, OFSDP, Phase-II is highly commendable in successfully hosting this significant national assembly. Further appreciation is extended to the team operating under his guidance, including the Joint Project Directors, Deputy Project Directors, State Programme Managers, PMC experts and all organizing members. Their collective contribution was essential in managing every facet of this event, from the inaugural sessions to the field visits.

We are confident that the insights documented within this Proceedings-Souvenir will serve as a definitive resource in shaping future-ready, resilient and inclusive forestry practices across India.

Ms. Rinku Kumari, IFS
Joint Project Director, OFSDP-II



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Executive Summary

14th National Workshop of JICA Assisted Forestry Projects in India

Future-Ready Forestry: Climate Resilience, Digital Transformation & Sustainable Wood Economies

11th – 13th February 2026, Hotel Mayfair Convention, Bhubaneswar, Odisha

Background

The 14th National Workshop of JICA Assisted Forestry Projects in India was held in Odisha from 11th to 13th February 2026 at Hotel Mayfair Convention, Bhubaneswar. The workshop was organized by the Odisha Forestry Sector Development Project, Phase-II (OFSDP-II), under the Forest, Environment & Climate Change Department, Government of Odisha, in collaboration with the Japan International Cooperation Agency (JICA). The event continued the long-standing tradition of providing a national forum for knowledge exchange, peer learning, and collaborative deliberation among forestry professionals drawn from across India.

Anchored to the overarching theme of *“Future-Ready Forestry: Climate Resilience, Digital Transformation & Sustainable Wood Economies,”* the workshop brought together senior forest officials, technical experts, project managers, field practitioners, and representatives from all over India covering the states implementing JICA assisted Forestry Projects and the representatives from JICA India Office. The deliberations were oriented towards fostering innovative, climate-responsive, and technology-enabled approaches to forest management, with particular emphasis on building resilient ecosystems and sustainable livelihoods.

The workshop’s thematic framework revolved around three interconnected pillars, each reflecting a critical dimension of the future-ready forestry agenda. The first pillar — **Climate Resilience, Adaptation, Mitigation, and Carbon Financing** — addressed the urgent need to align forestry interventions with climate science, explore carbon finance opportunities, promote nature-based solutions, and build ecosystem resilience. The second pillar, **Digital Transformation**, examined how digital tools, AI-powered analytics, modular technology architectures, and open-source platforms could be harnessed to improve decision-making, governance, and livelihood outcomes across JICA-assisted forestry projects. The third pillar, **Wood Transformation and Sustainable Wood Economies**, focused on unlocking value from wood-based supply chains through processing, certification, agroforestry, and market linkages, contributing to both rural income generation and sustainable resource management.

The workshop was convened at a critical juncture for India’s forestry sector, as the country navigated the intersecting challenges of climate change, biodiversity loss, rural poverty, and the imperative to transition towards green and sustainable economies. JICA-assisted forestry projects, spread across multiple states in India, had over the years made significant strides in strengthening community-based forest management, improving ecological outcomes, and enhancing the livelihoods of forest-dependent communities. The workshop served as a platform to consolidate these learnings, identify gaps, and chart a collective path forward.



Bhubaneswar, as the host city and the location of the OFSDP-II project, offered a fitting backdrop for the workshop. Odisha's forest sector has been recognized as one of the highly progressive and sustainable models among JICA-assisted states, with demonstrated achievements in digital adoption, community engagement, and sustainable forestry practices. The choice of Odisha as the venue thus lent both symbolic and practical significance to the deliberations.

Workshop Structure and Programme:

The workshop was structured as a three-day event, carefully designed to balance strategic deliberations, technical learning sessions, and field-level exposure.

Day 1 – 11th February 2026: Inaugural Session and Technical Deliberations

Commenced with the inaugural session, which featured addresses by Hon'ble Minister for Forests Environment and Climate Change Department and Senior officials from the Government of Odisha and JICA, setting the tone for the three days of deliberations.

The Workshop was inaugurated by **Sri Ganesh Ram Singkhuntia, Hon'ble Minister, Forest Environment and Climate Change, Government of Odisha** in presence of **Mr. Eiji Wakamatsu, Senior Representative, JICA India**, **Dr. K Murugesan IFS, Principal Chief Conservator of Forests and Head of Forest Force, Odisha**, **Mr. K B Singh IFS, Inspector General of Forests, Ministry of Environment Forest and Climate Change, Govt. of India**, **Mr Vineet Sarin, Chief of Development Operations, JICA India Office**, and **Shri G. Rajesh IFS, Project Director, Odisha Forestry Sector Development Project**.

The inaugural session was followed by two substantive technical sessions. **Technical Session 1-** focused on **Climate Change Adaptation and Mitigation: with Theme I : Climate Science, Forest Dynamics and Decision Support for Climate-Resilient Forestry**, covering the science of climate change, forest dynamics, nature-based solutions, and carbon sequestration pathways and **Theme II - Nature-Based Solutions, Ecosystem Adaptation and Carbon Pathways**.

The Technical Session the speakers were Prof. Dr. N. H. Ravindranath, IISc, Bangalore, Dr. Sayanta Ghosh, from TERI, Dr. Ashok Kumar Singh (ASCERT NETWORK) and Ms. Geetanjali S., IFS, from Tamil Nadu Forest Department.

Technical Session 2 - Digital Transformation in Forest Management addressed two themes i.e. **Theme I: Digital Field Technologies and Scalable Forest Governance** and **Theme II: AI, Spectral Analytics and Predictive Systems for Climate-Smart Forestry** highlighting the innovations in digital field technologies, AI-enabled analytics, and predictive systems for improved forest governance. The speakers of the sessions were: **Shri V Karthik, IFS, CCF IT, Odisha Forest Department**, **Shri Sanjay Kumar Srivastava, IFS, CPD, Project for Eco restoration in Gujarat (PERG)**, **Dr. M D Behera, IIT, Kharagpur** and **Dr K A Sreejith, Kerala Forest Research Institute, Peechi**.

Day 2 – 12th February 2026: Technical Sessions, Group Discussions, and Valedictory

Technical Session 3 - Wood Transformation and Forest Certification with three themes i.e. **Theme I: Strengthening Sustainable Wood Supply Systems through Value Addition and Certification**, **Theme III: Agroforestry, Genetics and Industry Linkages for Expanding Wood Supply** and **Theme**



III: The Green Wood Economy – Industry, Investment and Policy Pathways. The session examined sustainable wood supply chains, certification systems, agroforestry models, genetic improvement of planting material, industry linkages, and the broader vision of green wood economies. The speakers in the session are: Shri Sanjeev Gaur, IFS, Dr. Anvita Pandey from IIFM Bhopal, Dr. A Sethy and Ms. Sujatha D., IWST, Bangalore, Dr. R. Yasodha and Dr. A Nicodemus, IFGTB, Coimbatore, Sr. Technical Officer from J K Paper Mill, Odisha, and Senior representative of Nomura Research Institute, Japan.

The Technical Sessions was followed by one **Structured Group Discussions** in which all the participants were organized into four thematic groups namely ***Climate Resilience, Adaptation, Mitigation and Carbon financing, Digital Transformation and Wood Transformation and Sustainable Wood economies***. The Groups consolidated the key learnings from all three technical sessions and worked towards finalizing workshop recommendations. Each group presented its recommendations with thematic and practical suggestions to implement.

The day concluded with the Valedictory Session Chaired by the Principal Secretary, FE&CC Department, Govt. of Odisha. In the valedictory session, Mr. Vineet Sarin, Chief of Development Operations, JICA India, highlighted the outcomes of the workshop and the Joint Project Director, OFSDP-II thanked and acknowledged the contributions of all participants before formally closing the workshop.

Day 3 – 13th February 2026: Field Visit

Field tour / visit for the interested participants to Puri Wildlife Division was organized on the third day to see the departmental intervention sites near the pilgrimage city of Puri and heritage site of Sun Temple, Konark. Participating delegates gained first hand insights into forest management initiatives, community engagement models, and on-ground implementation practices, complementing the theoretical and strategic discussions of the preceding two days.

Participation

The workshop was attended by a diverse range of stakeholders including Principal Chief Conservators of Forests, Chief Conservators of Forests, senior state forest department officials from multiple JICA-assisted states, Project Directors, Technical Advisors, JICA India Representatives, experts from research institutions, and specialists from Boston Consulting Group (BCG) who supported the JICA DX Lab digital transformation track. The diversity of participants enriched the quality of discussions and ensured that recommendations reflected a wide range of field realities and institutional perspectives from across the country.





14TH NATIONAL WORKSHOP OF JICA ASSISTED FORESTRY PROJECTS IN INDIA



Climate Resilience, Digital Transformation & Sustainable Wood Economies



11th to 13th
February, 2026



Hotel Mayfair Convention
Bhubaneswar, Odisha

PROGRAM SCHEDULE

Day 1 | 11th February, 2026

Registration Time: 09.00 am-10.00 am

TIME	PROGRAM
INAUGURAL SESSION	
10.00 am – 10.10 am	Felicitation of Guests
10.10 am – 10.12 am	State Anthem
10.12 am – 10.20 am	Welcome Address by Shri G Rajesh, IFS, APCCF (Projects) & Project Director, OFSDP
10.20 am – 10.25 am	Video on OFSDP-II
10.25 am – 10.30 am	Address by Mr. Vineet S Sarin, Chief of Development Operations, JICA India
10.30 am – 10.35 am	Address by Wakamatsu Eiji, Senior Representative, JICA India
10.35 am – 10.50 am	Address by Shri K.B. Singh, IFS, IG EAP, MoEFCC, Government of India
10.50 am – 11.00 am	Address by Dr. K. Murugesan, IFS, PCCF & HoFF, Odisha
11.00 am – 11.20 am	Address by Shri Ganesh Ram Singhkhuntia, Hon'ble Minister, Department of Forest, Environment and Climate Change, Government of Odisha
11.20 am – 11.40 am	Address by Shri Mohan Charan Majhi Hon'ble Chief Minister, Odisha
11.40 am – 11.50 am	Vote of thanks by Shri Swayam Mallick, IFS, Joint Project Director, OFSDP-II
11.50 am - 12.20 pm	Group Photograph & Coffee Break
12.20 pm - 12.50 pm	Opening Presentation by Mr. Vineet S Sarin, Chief of Development Operations, JICA India -Forestry Assistance in India: JICA perspective
12.50 pm – 1.05 pm	Presentation by Smt. Rinku Kumari, IFS, Joint Project Director, OFSDP-II

TECHNICAL SESSION 1

CLIMATE CHANGE ADAPTATION AND MITIGATION

Theme 1: Climate Science, Forest Dynamics and Decision Support for Climate-Resilient Forestry

Chairperson: **Dr. C. Suvarna**, IFS, PCCF & HoFF, Telangana Forest Deptt.

Co-Chairperson: **Mr. Wakamatsu Eiji**, Senior Representative, JICA India

1.05 PM -2.00 PM

PANELISTS

1. **Prof. Dr. N. H. Ravindranath, IISc, Bangalore**

Applying Dynamic Global Vegetation Models to improve Forest management, Carbon Stocks and Climate Outcomes-applicability in climate change mitigation and climate financing

2. **Marubeni**- Carbon Trading in Japan – A perspective from Japan & its potential in India.

3. **Mr. Sayanta Ghosh and Ms. Afrin Zaidi, TERI**

Integrated Climate Change Framework for Forests: Vulnerability assessment, Mitigation Strategy, MRV Systems and FREL Development from the Assam Experience.

Discussion

2.00 PM -2.45 PM

LUNCH BREAK

Theme 2: Nature-Based Solutions, Ecosystem Adaptation and Carbon Pathways

Chairperson: **Mr. Rajesh Kumar Gupta**, IFS, Project Director, Climate Change Response and Ecosystem Services Enhancement Project (CRESEP), Rajasthan

Co-Chairperson: **Ms. Shimojo Hitomi**, Deputy Assistant Director, JICA

2.45 PM -3.45 PM

PANELISTS

1. **Dr. Ashok Kumar Singh (ASCERT NETWORK)**

Climate Resilient Horizon: Adaptation, Mitigation and Innovation in Odisha Forestry

2. **Tmt. K. Geetanjali, IFS, Tamil Nadu Forest Department**

Climate Change Mitigation and Adaptation: A case study from Tamil Nadu

Discussion

TECHNICAL SESSION 2

DIGITAL TRANSFORMATION IN FOREST MANAGEMENT

Theme 1: Digital Field Technologies and Scalable Forest Governance

Chairperson: **Dr. Sanjay Sood**, IFS, PCCF & HoFF cum CPD, Himachal Pradesh

Co-Chairperson: **Mr. Vineet S Sarin**, Chief of Development Operations, JICA India

3.45 PM -4.45 PM

PANELISTS

1. **Shri V Karthik, IFS, Odisha Forest Department**

The role of technology in enabling action at scale in Odisha.

2. **Shri Sanjay Kumar Srivastava, IFS, CPD, Project for Eco Restoration in Gujarat (PERG)**

Use of Open-source Technology in Project management - A case from Gujarat

3. **Rajasthan Forest Department-BCG**

Forest Stack and Digi Van: Building a Digital Public Infrastructure for Smart Forest Governance

Discussion

4.45 PM -5.00 PM

COFFEE BREAK

Theme 2: AI and Predictive Systems for Climate-Smart Forestry

Chairperson: **Smt. Banumathi G**, IFS Project Director, Tripura

Co-Chairperson: **Ms. Ito Fumi**, Project Formulation Advisor, JICA India

5.00 PM-5.45 PM

PANELISTS

1. **Dr. M D Behera**, IIT, Kharagpur

Species-Level Mangrove Mapping for Management and Conservation: An AI-Enabled Remote Sensing Approach

2. **Dr K A Sreejith**, Kerala Forest Research Institute, Peechi

Using Long-Term Ecological Monitoring to Guide Climate-Resilient Forest Management.

Discussion

7.00 PM ONWARDS CULTURAL PROGRAM

and Dinner at Hotel Mayfair Convention

Day 2 | 12th February, 2026

TECHNICAL SESSION 3

WOOD TRANSFORMATION AND FOREST CERTIFICATION

Theme 1: Strengthening Sustainable Wood Supply Systems through Value Addition and Certification

Chairperson: **Shri Naresh Kumar**, IFS Chief Project Director & APCCF, Uttarakhand Forest Department

Co-Chairperson: **Mr. Siddharth Parmeshwaran**, Development Specialist, JICA India

09.30 AM-10.15 AM

PANELISTS

1. **Shri Sanjeev Gaur**, IFS

Forest Certification as a Driver of Sustainable Wood Transformation: Lessons from the Forest Development Corporation of Maharashtra

2. **Anvita Pandey**, IIFM

PRAMAN and Beyond: Building Credible Sustainability Assurance Systems for India's Forest and Wood Sectors

Discussion

Theme 2: Agroforestry, Genetics and Industry Linkages for Expanding Wood Supply

Chairperson: **Shri Dharamdeo Rai**, IFS, CCF & Project Director, West Bengal Forest Department

Co-Chairperson: **Ms. Iha Chinatsu**, Deputy Director, JICA

10.15 AM -11.30 AM

PANELISTS

1. **Dr. A Sethy and Ms. Sujatha D.**, IWST, Bangalore

Challenges, Technologies and Business Pathways for Strengthening Wood-Based Industries and Forest Corporations

2. **Dr. R. Yasodha and Dr. A Nicodemus**, IFGTB, Coimbatore

Operationalizing State Agroforestry Policies through Genetics-Driven Expansion: Translating IFGTB Models from Tamil Nadu to Field-Level Adoption in Odisha

Discussion

11.30 AM-11.45 AM

COFFEE BREAK

Theme 3: The Green Wood Economy – Industry, Investment and Policy Pathways

Chairperson: **Smt. N. Kshitija**, IFS, CCF & CEO, CAMPA, Telangana Forest Department

Co-Chairperson: **Mr. Nishihara Ryosuke**, Representative, JICA India

11.45 AM-1.00 PM	PANELISTS
	1. J K Paper Mill Challenges and Pathways for Expansion of Wood-Based Industries: A Private Sector Perspective 2. Nomura Research Institute, Japan Wood Transformation – New perspective 3. Presentation on the experiences of country focused training in Japan. Shri Swayam Mallick, IFS Joint Project Director, OFSDP-II Discussion

1.00 PM-1.30 PM	GROUP DISCUSSION
1.30 pm-2.15 pm	LUNCH BREAK
2.15 PM-03.15 PM	Group discussion & Presentation of the Recommendations
3.15 pm-3.30 pm	COFFEE BREAK
VALEDICTORY SESSION	
3.30 pm - 3.35 pm	Welcome address by Shri G. Rajesh, IFS, APCCF(Projects) & Project Director, OFSDP-II
3.35 pm - 3.45 pm	Highlight of outcomes of the workshop by Mr. Siddharth Parmeshwaran, Development Specialist, JICA India
3.45 pm – 4.00 pm	Address by the Guest of Honor: Dr. K Murugesan, IFS, PCCF & HoFF, Odisha
4.00 pm – 4.10 pm	Address by Chief Guest: Shri Bhaskar Jyoti Sharma, IAS, Principal Secretary, Forest, Environment & Climate Change Department, Govt. Of Odisha.
4.10 pm – 4.15 pm	Vote of thanks by Shri Swayam Mallick, IFS, Joint Project Director, OFSDP-II

7.00 PM ONWARDS CULTURAL PROGRAM
and Dinner at Hotel Mayfair Convention

Day 3 | 13th February, 2026

FIELD VISIT	GROUP DISCUSSION
7.30 am-8.30 am	Breakfast and assembly at hotel
8.30 am	Departure from hotel and arrival at Puri (10.00 am)
10.00 am-1.00 pm	Visit to Departmental Intervention Sites
01.00 pm-2.00 pm	Lunch
2.00 pm-4.00 pm	Return to Bhubaneswar via Konark

Organized By
Odisha Forestry Sector Development Project | Phase II

In collaboration with
Forest, Environment & Climate Change Department, Govt. of Odisha
and **Japan International Cooperation Agency (JICA)**

Glimpses of Inaugural Session









Day 1 | 11th February 2026 INAUGURAL SESSION

The inaugural session of the workshop was graced by the august presence Hon'ble Shri Ganesh Ram SingKhuntia, Minister, Department of Environment and Climate Change, Government of Odisha, Shri K. B. Singh,

Inspector General of Forests, Ministry of Environment, Forest and Climate Change, Government of India, Dr. K Murugesan, Principal Chief Conservator of Forest and Head of Forest Force, Shri K. B. Singh, Inspector General of Forests, Ministry of Environment, Forest and Climate Change, Government of India, Shri Vineet S. Sarin, Chief of Development Specialist, JICA India , Shri Wakamatsu Eiji ,Senior Representative of JICA, and Shri G. Rajesh, IFS, Project Director, Odisha Forestry Sector Development Society (OFSDS).



The session also marked with distinguished presence of all participants for JICA assisted Forestry project states, dignitaries from the various departments, and media personals.

Shri G. Rajesh, IFS, Project Director, Odisha Forestry Sector Development Society (OFSDS), warmly welcomed the Hon'ble Minister, senior officials from the Government of India, JICA representatives, heads of forest departments from various states, distinguished delegates, experts, and participants to the 14th National Workshop of JICA-Assisted Forestry Projects in India held at Bhubaneswar. He expressed his gratitude to JICA, the Ministry of Environment, Forest and Climate Change, Government of India, and all participating states for their continued support and cooperation in strengthening sustainable forestry initiatives across the country.



Shri Rajesh also underlined the significance of the workshop theme focusing on Future-Ready Forestry through digital transformation, climate resilience, and sustainable wood economies. He expressed confidence that the workshop would provide a valuable platform for sharing experiences, innovations, and best practices among states, thereby strengthening collaborative efforts towards sustainable and community-based forest management in India.

Shri Vineet Sarin, Chief of Development Operations, JICA India, highlighted the strong partnership between JICA and India in promoting sustainable forestry and natural resource management through community participation and climate-resilient approaches. He informed that JICA is currently supporting forestry and NRM projects in ten states, namely Rajasthan, Himachal Pradesh, Uttarakhand, Punjab, West Bengal, Nagaland, Meghalaya, Odisha, Tamil Nadu, and Gujarat, along with a national-level Capacity Development Project being implemented in collaboration with the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India.



He emphasized that these projects have evolved from traditional afforestation programmes to integrated initiatives focusing on biodiversity conservation, climate change adaptation, sustainable livelihoods, digital transformation, and technology-enabled forest governance. He highlighted the increasing use of GIS, MIS, remote sensing, and digital platforms for better planning, monitoring, transparency, and decision-making in forestry projects. He also informed that new projects are under discussion in Telangana, Jharkhand, and Uttarakhand Phase-II, reflecting JICA's continued commitment towards sustainable forestry development in India.

Shri Sarin appreciated the commendable efforts of the Odisha Forest Department and OFSDS in successfully organizing the 14th National Workshop of JICA-Assisted Forestry Projects in Bhubaneswar. He acknowledged the excellent coordination, hospitality, and arrangements made for the workshop, which provided an effective platform for knowledge sharing, exchange of best practices, and collaborative learning among participating states and institutions.

Shri Wakamatsu Eiji, Senior Representative of JICA highlighted the long-standing partnership between Japan and India, particularly Odisha, in the forestry and natural resource management sector. He appreciated the Government of Odisha and the Odisha Forest Department for successfully organizing the 14th Annual Workshop of JICA-Assisted Forestry and NRM Projects in Bhubaneswar. He noted that Odisha's forestry projects have become a model for community-based sustainable forest management in India. He stated that the success of OFSDP inspired the Government of Odisha to expand similar initiatives across the state through schemes like Ama Jungle Yojana.



Shri Wakamatsu highlighted JICA's evolving approach towards fifth-generation forestry projects focusing on Climate Resilience, Digital Transformation (DX), and Wood Transformation (WX). He stressed the importance of advanced technologies such as GIS, MIS, remote sensing, and Digital Forest Stack systems for improving transparency, monitoring, and data-driven forest governance.

He concluded by expressing confidence that the workshop discussions would generate practical recommendations for strengthening sustainable, technology-driven, and community-based forestry initiatives across India.

Shri K. B. Singh, Inspector General of Forests, Ministry of Environment, Forest and Climate Change, Government of India, emphasized that such workshops provide an important platform for sharing experiences, innovations, and best practices among states implementing JICA-supported forestry projects. He further stressed the significance of biodiversity conservation, climate resilience, and livelihood improvement through active community participation and collaborative approaches. He appreciated the Government of Odisha for successfully organizing the workshop and showcasing the achievements of OFSDP Phase-II, which effectively integrates forest conservation with livelihood promotion through participatory approaches involving VSSs, EDCs, SHGs, and forest-dependent communities with the technology driven roles of GIS, MIS, remote sensing, and digital monitoring systems for improving transparency and effective implementation.



Mr. Singh acknowledged JICA's continued support in strengthening forestry initiatives in India and emphasized the need for continued collaboration among governments and development partners to address climate change, forest degradation, biodiversity conservation, and livelihood security through sustainable and community-based forestry initiatives.

Dr. K Murugesan, Principal Chief Conservator of Forest and Head of Forest Force, Odisha welcomed the participants to the 14th National Workshop of JICA-Assisted Forestry Projects in India and highlighted Odisha's rich cultural heritage and strong commitment to sustainable forest management. He shared that the Odisha Forestry Sector Development Project Phase-II (OFSDP-II), implemented since 2017–18 across 12 Forest Divisions and 2 Wildlife Divisions, is a major community-based initiative focused on sustainable forest management, biodiversity conservation, and livelihood promotion through participatory approaches rooted in Joint Forest Management principles.



The PCCF and HOFF highlighted that OFSDP-II has been recognised by JICA as one of the well-managed forestry projects in the country. He also emphasized the growing role of digital technologies such as



GIS, MIS, remote sensing, and mobile-based applications in improving forest governance, monitoring, and evidence-based decision-making. Concluding the address, he expressed gratitude to JICA and the Government of Japan for their continued support and hoped for continued collaboration in future forestry and climate resilience initiatives beyond 2027.

Hon'ble Shri Ganesh Ram Singkhuntia, Minister, Department of Environment and Climate Change, Government of Odisha welcomed all participants to Odisha for the 14th National Workshop of JICA Assisted Forestry Projects in India and highlighted Odisha's rich biodiversity, cultural heritage, and long-standing tradition of community-based forest management. He emphasized the deep relationship between forests and forest-dependent communities in Odisha, particularly Scheduled Tribes and other traditional forest dwellers whose livelihoods, culture, and identity are closely linked with forests. He noted that sustainable forest management through community participation is essential for improving forest health, biodiversity conservation, and livelihood security.



He appreciated the significant progress made in plantation activities, forest protection, farm forestry, biodiversity initiatives such as the Satoyama Initiative, and the use of GIS and MIS technologies for monitoring under OFSDP-II supported by JICA. He also acknowledged the extensive livelihood support provided through SHGs, CIGs, revolving funds, and income-generating activities benefiting lakhs of forest-fringe communities.

He further shared the success of state initiatives such as Ama Jangala Yojana and upcoming programmes like Ama Similipal Yojana and Ama Bana O Jibika Prakalpa aimed at strengthening community-based forest management and sustainable livelihoods. He expressed gratitude to JICA and the Government of Japan for their continued support and conveyed hope for continued collaboration through a future Phase-III project beyond 2027 for forest conservation and livelihood improvement in Odisha.

An exhibition of the Multi-Product Cluster (MPC) was also organized which was inaugurated prior to the formal inaugural session by the Hon'ble Minister, Forest, Environment & Climate Change, Government of Odisha. The exhibition showcased a wide range of value-added MPC products prepared by Self-Help Groups (SHGs) from forest fringe communities. These products reflected the rich traditional knowledge, skills, and entrepreneurship of the local communities



and demonstrated how MPC-based livelihood activities are significantly augmenting household incomes and promoting sustainable livelihoods among forest-dependent families.



A four-minute documentary film on the Odisha Forestry Sector Development Project Phase-II (OFSDP-II) was screened during the workshop, showcasing the project's achievements in sustainable forest management, biodiversity conservation, and livelihood promotion through community participation.

Shri Swayam Mallick, IFS, Joint Project Director, OFSDS, delivered the Vote of Thanks and expressed his sincere gratitude to the Hon'ble Minister, dignitaries, representatives from the Government of India, JICA officials, delegates from various states, experts, and participants for their valuable presence and contributions to the 14th National Workshop of JICA Assisted Forestry Projects. He also acknowledged the continued support of JICA and the Government of Japan towards sustainable forestry and livelihood initiatives in Odisha and other states. He expressed confidence that the deliberations and knowledge-sharing during the workshop would further strengthen community-based sustainable forest management practices across the country.



Opening Presentation

Three Decades of JICA Support to India's Forestry Sector

Vineet S. Sarin, Chief of Development Operations, Japan International Cooperation Agency, India

The presentation by Mr. Vineet S Sarin highlighted the long-standing partnership between India and Japan International Cooperation Agency in the forestry and natural resources management sector. The presentation emphasized that JICA has emerged as the largest development partner in India's forestry sector with substantial investments aimed at environmental sustainability, biodiversity conservation, institutional strengthening, and livelihood enhancement.

The presentation traced the evolution of JICA supported forestry projects through five generations of interventions. The first generation mainly focused on afforestation, reforestation, soil and water conservation, and capacity building. The second generation introduced participatory forest management through Joint Forest Management (JFM) and livelihood integration for forest-dependent communities. The third generation emphasized biodiversity conservation, sustainable community development, and the adoption of GIS and MIS technologies for planning and monitoring. During the fourth generation, climate change mitigation, digital transformation, remote sensing, AI-based monitoring systems, and scaling-up of successful interventions became major focus areas. Moving into the fifth generation, the strategy is cantered around co-creation, innovation, digital transformation, agroforestry, climate resilience, carbon finance, and stronger collaboration with private sector institutions and academia.

A major focus of the presentation was the changing global scenario of Official Development Assistance (ODA). Shri Sarin explained that declining ODA budgets in Japan and other developed countries have created the need for more strategic, impact-oriented, and partnership-driven development cooperation models. The presentation highlighted that future ODA support must increasingly function as a catalyst for mobilizing private investment, ESG financing, carbon markets, blended finance, and innovative partnerships to achieve sustainable development goals.

The presentation also elaborated on Japan's Development Cooperation Charter 2023, which provides the strategic direction for future cooperation. The Charter emphasizes human security, co-creation with developing countries, and adherence to international standards and sustainability principles. Priority sectors identified under the strategy include climate change response, digital transformation, disaster risk reduction, green transformation, and economic resilience.

One of the key highlights of the presentation was **Digital Transformation (DX)** in forestry management. The speaker discussed the **"DigiVan"** initiative implemented in partnership with the Rajasthan Forest Department, which combines **Digital Public Infrastructure (DPI)** and **Artificial Intelligence (AI)** for real-time forest monitoring, biodiversity tracking, carbon stock assessment, and livelihood



- JICA has supported **37 forestry and natural resource management projects** in India since 1991 across 15 states.
- JICA's cumulative commitment to India's forestry sector has reached approximately **JPY 333.40 billion** (around ₹18,000 crore).
- Forestry project interventions have evolved from conventional afforestation activities to **community-based forest management, climate resilience, and digital forestry systems**.

programme management. The Digital Forest Stack currently monitors around 3.3 million hectares of forest land and supports large-scale planning and decision-making processes. The presentation proposed scaling up this initiative to other Indian states and potentially at international levels. Another major theme was **Wood Transformation (WX)**, which focuses on promoting sustainable wood economies, agroforestry, prefabricated wooden housing, and circular economy approaches. The initiative aims to strengthen sustainable timber supply chains, facilitate **Indo-Japan technology transfer**, create rural employment opportunities, and support climate-friendly construction practices. The presentation highlighted the importance of balancing timber utilization with replenishment through agroforestry-based production systems.



12> 5TH GENERATION

Moving to 5th Generation: New Emphasis Areas & JICA's Strategy

Sustainable Japan-India forestry collaboration must evolve beyond traditional ODA loans to foster private sector participation, joint academic research, and long-term capacity building. The 5th generation will prioritize the following strategic areas:

Wood Transformation (WX) Promoting sustainable wood processing industries and prefabricated wood housing technologies	Agroforestry Integrating trees into agricultural landscapes for climate resilience and livelihood enhancement
Digital Transformation (DX) Deploying AI-driven Digital Public Infrastructure for precision forest management	Carbon Stock Assessment and Trading Developing robust carbon accounting and market mechanisms for climate finance
Climate Change Adaptation & Mitigation Strengthening ecosystem-based climate resilience and carbon sequestration	Seed and Wood Certification Systems Establishing quality assurance frameworks for forestry products and genetic material

The presentation further stressed the importance of Indo-Japan collaborative research in areas such as climate resilience, biodiversity conservation, carbon sequestration, ecosystem services, and remote sensing technologies. It emphasized the need for stronger institutional mechanisms and long-term partnerships between Indian and Japanese research institutions for technology transfer and innovation.

An important case study presented during the session was the successful implementation of slope disaster mitigation works in Uttarakhand using Japanese “**Chisan**” technologies under the Uttarakhand Forest Resources Management Project. The initiative demonstrated effective technology transfer and successful replication in other locations, generating interest among other Himalayan states.

The presentation highlighted JICA's long-standing partnership with India in the forestry and natural resources management sector since 1991. JICA has supported 37 forestry and natural resource management projects across India, including 34 ODA loan projects and 3 technical cooperation initiatives. The projects have covered 15 states and have significantly contributed to environmental sustainability, afforestation, biodiversity conservation, livelihood enhancement, and institutional strengthening.

Together, let us continue building a sustainable, resilient, and prosperous future for India's forests and communities.

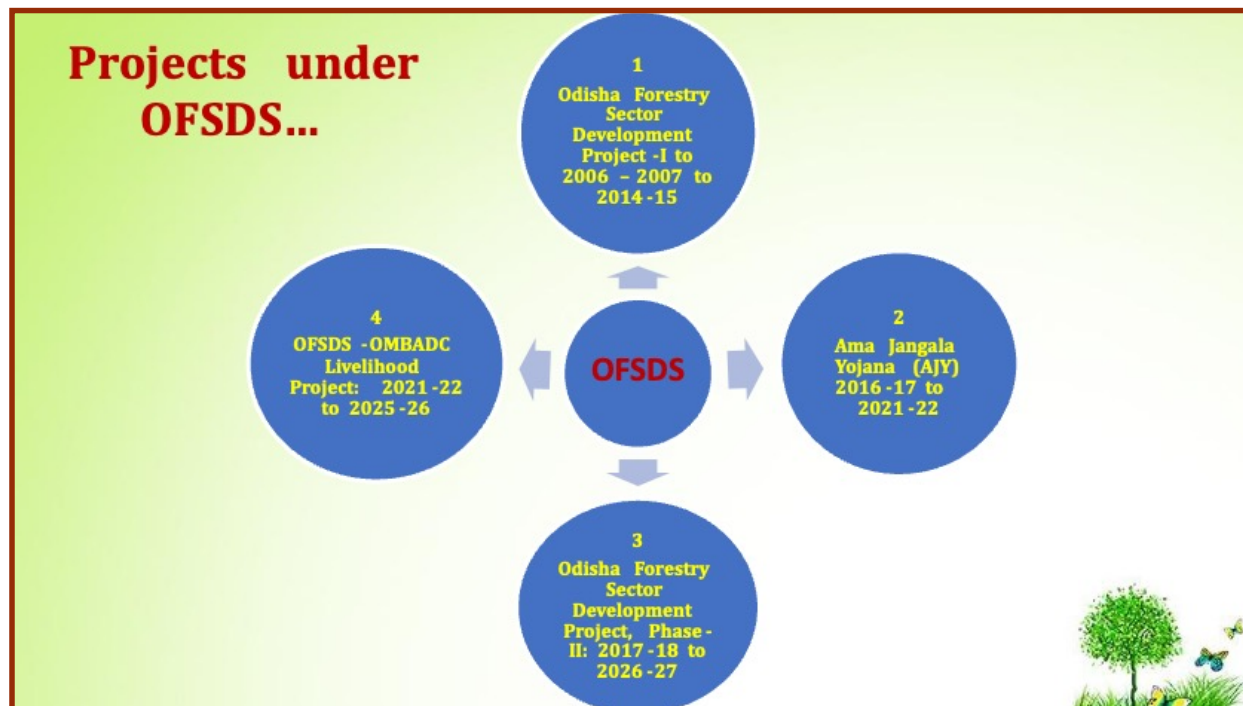
Host State Presentation

Odisha Forestry Sector Development Project – Phase II (OFSDP-II)

Rinku Kumari, IFS, Joint Project Director, OFSDS

The presentation by Rinku Kumari, IFS, JPD OFSDS provided a comprehensive overview of the implementation, achievements, and innovative interventions undertaken under the Odisha Forestry Sector Development Project – Phase II (OFSDP-II).

The presentation emphasized that OFSDP-II has been designed around three core objectives: **Sustainable Forest Management through Community Participation, Livelihood Improvement through Inter-sectoral Convergence, and Experiments in Biodiversity Conservation**. Significant progress has been achieved in plantation activities, forest boundary consolidation, drainage line treatment, fire line creation, and other sustainable forest management interventions across 12 forest divisions. The project demonstrated strong community participation through Vana Surakshya Samitis (VSSs) and promoted climate-resilient models such as pulpwood plantations and horticulture-based Non-Timber Forest Produce (NTFP) activities.



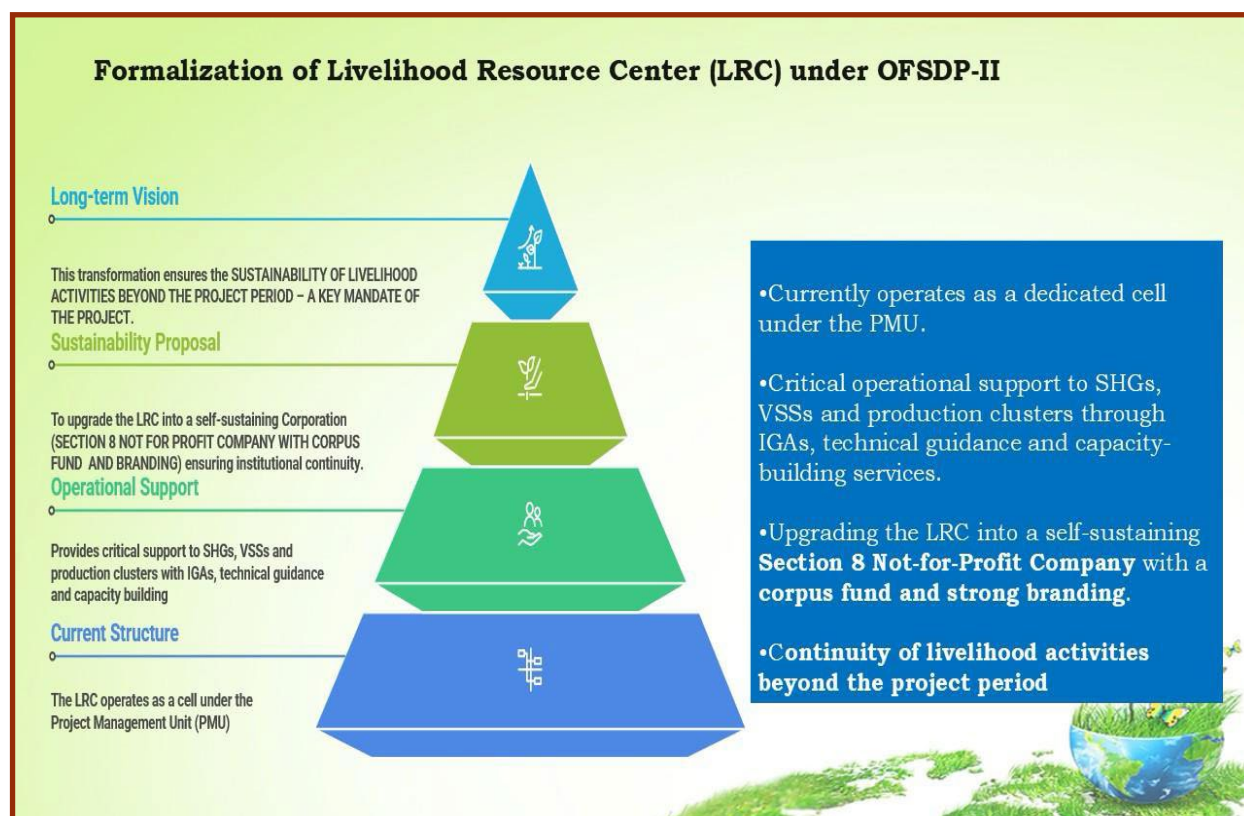
A major focus of the presentation was livelihood enhancement and community empowerment. More than 4,400 SHGs have been covered under livelihood activities, surpassing the original target. The presentation highlighted the formation of multiple product clusters across different divisions to support local enterprises, value addition, branding, and market linkages. The establishment of processing

infrastructure, producer companies, and Livelihood Resource Centres was presented as an important step toward sustaining livelihood activities beyond the project period.

She also highlighted the project's strong emphasis on capacity development and institution building. **More than 5,000 training programmes covering 34 thematic areas have been organized, benefiting over 2 lakh VSS members, SHGs, and Eco-Development Committee (EDC) members.** Participatory micro-planning and convergence with schemes such as MGNREGS, NRLM, agriculture, fisheries, and horticulture departments have strengthened community-owned development planning and improved livelihood opportunities.

The presentation focused on biodiversity conservation initiatives under the **Bhitarkanika Conservation Area (BCA)**. In collaboration with the **National Centre for Sustainable Coastal Management (NCSCM)**, ecosystem health monitoring, greenhouse gas monitoring, microplastic surveys, and scientific assessment studies have been undertaken. The installation of an advanced flux tower at Dangamal for greenhouse gas monitoring and preparation of ecosystem health report cards were highlighted as important scientific achievements under the project.

The presentation highlighted the Satoyama Initiative under OFSDP-II, which promotes community-based conservation through eco-development activities which have improved ecological sustainability, enhanced livelihoods, and reduced dependence on forests.



A key innovation highlighted during the presentation was the introduction of technology-aided interventions for data-driven forest management. GIS and GPS mapping, mobile field applications, drone and satellite imagery, MIS dashboards, and digital monitoring systems are being used for forest

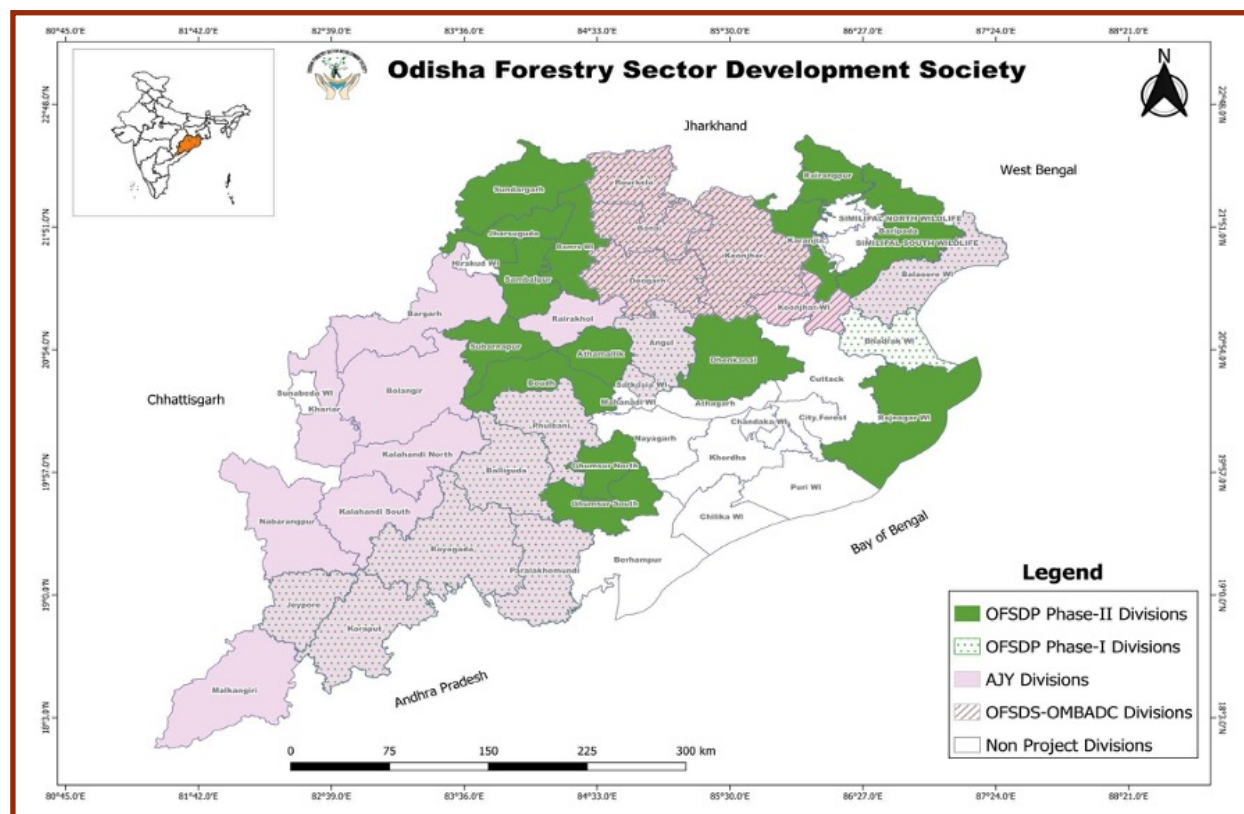
boundary mapping, real-time monitoring, forest health assessment, change detection, and transparent implementation.

The presentation also showcased the **Farm Forestry and Carbon Credit Project** being implemented in partnership with Kosher Climate India Pvt. Ltd.. The project covers nearly 1,500 hectares involving over 1,200 farmers in the process of registration with VERRA Registry for carbon credit generation. The initiative aims to channel climate finance benefits directly to participating farmers and VSS groups while promoting sustainable forestry and environmental conservation.

The presentation concluded by emphasizing that OFSDP-II has successfully integrated sustainable forest management, biodiversity conservation, livelihood enhancement, climate resilience, digital technologies, and inter-sectoral convergence into a comprehensive community-driven forestry model.

Key Highlights of the presentation

- Promoted sustainable forest management, livelihood enhancement, and biodiversity conservation through community participation.
- Provided over ₹30 crore in revolving funds to SHGs, CIGs, and Producer Groups for livelihood development.
- Benefited 4,400+ SHGs and over 2 lakh VSS, SHG, and EDC members through livelihood and capacity-building initiatives.
- Strengthened development through convergence with MGNREGS, NRLM, agriculture, fisheries, and horticulture schemes.
- Established product clusters and processing facilities to support value addition and market access.
- Implemented biodiversity conservation and greenhouse gas monitoring in Bhitarkanika using advanced technologies.
- Introduced GIS, drones, satellite imagery, MIS dashboards, and mobile applications for digital forest governance.
- Developed detailed VSS-level forest density mapping and registered a Farm Forestry Carbon Credit Project covering 1,100 hectares and 1,200 farmers under VERRA.



TECHNICAL SESSION 1

CLIMATE CHANGE ADAPTATION AND MITIGATION

Theme (i): Climate Science, Forest Dynamics and Decision Support for Climate-Resilient Forestry

Chairperson: Dr. C. Suvarna, IFS, PCCF & HoFF, Telangana Forest Deptt.

Co-Chairperson: Mr. Wakamatsu Eiji, Senior Representative, JICA India

Panelists/Speakers

- i. **Prof. Dr. N. H. Ravindranath, IISc, Bengaluru:** Applying Dynamic Global Vegetation Models to improve Forest management, Carbon Stocks and Climate Outcomes-applicability in climate change mitigation and climate financing
- ii. **Marubeni:** Carbon Trading in Japan – A perspective from Japan & its potential in India.
- iii. **Mr. Sayanta Ghosh and Ms. Afrin Zaidi, TERI:** Integrated Climate Change Framework for Forests: Vulnerability Assessment, Mitigation Strategy, MRV Systems and FREL Development from the Assam Experience.



6.1 Applying Dynamic Global Vegetation Models to Improve Forest Management, Carbon Stocks and Climate Outcomes

Professor N.H. Ravindranath
Indian Institute of Science, Bengaluru

The presentation by Prof. Ravindranath focused on the application of **Dynamic Global Vegetation Models (DGVMs)** for improving forest management, enhancing carbon stocks, and strengthening climate resilience in forest ecosystems. The speaker highlighted the critical relationship between forests and climate change, emphasizing that while forests contribute significantly to global carbon

sequestration, they are also highly vulnerable to the impacts of climate change such as rising temperatures, altered rainfall patterns, biodiversity loss, forest degradation, droughts, and wildfires.

India's forest sector currently acts as a net carbon sink and plays an important role in achieving the country's climate commitments under the **Nationally Determined Contributions** (NDCs). However, climate change is increasingly affecting forest ecosystems through shifts in species distribution, changes in ecosystem functioning, and loss of biodiversity. The speaker stressed the urgent need for climate adaptation and resilience-building measures in forestry planning and management.



Prof N.H. Ravindranath, IISc Bengaluru

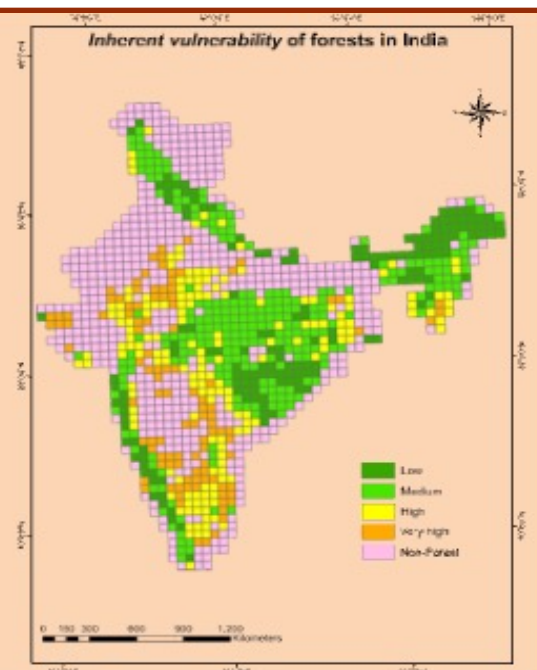
A major focus of the presentation was also on BIOME, IBIS, and LPJ models, which are process-based computer simulation tools used to assess the impact of climate change on vegetation, carbon stocks, and ecosystem productivity. The models use climate parameters such as temperature, rainfall, and cloud cover to project future vegetation changes, carbon dynamics, and net primary productivity under different climate scenarios.

The presentation shared climate projections for Odisha and India based on CMIP-5 CORDEX outputs under RCP 4.5 and RCP 8.5 scenarios for the 2030s and 2080s. Model projections indicated that a significant proportion of forested grids in India are likely to be impacted by climate change in the coming decades. At the same time, changes in net primary productivity and carbon storage capacities were projected, particularly in eastern and southern regions of India.

The presentation highlighted both the limitations and applications of DGVMs and stressed the need for integrating climate science into practical forest management and working plans.

Overall Vulnerability of Forests in India

- **Vulnerability assessment according to IPCC (2014) framework and the indicators selected shows that in India,**
 - **40% of the forested grids - 'High' and 'Very High' vulnerability classes**
- **Except in pockets, the forests in the biodiversity rich hotspots in the Western Ghats, northeast India, and north Himalayas are assessed to have low to medium vulnerability.**
- **'Very high' vulnerability is estimated for parts of southern Karnataka, Tamilnadu, eastern part of Andhra Pradesh and Rajasthan.**



The presentation recommended for mainstreaming climate adaptation into forestry programmes through climate-resilient silvicultural practices, biodiversity conservation, natural regeneration, mixed-species plantations, restoration of degraded forests, and DGVM-based vulnerability assessments. The speaker emphasized the importance of research, capacity building, periodic monitoring, and strengthening institutional preparedness to develop resilient forest ecosystems capable of addressing future climate risks.

Key Highlights

India's forests act as an important carbon sink and contribute to climate change mitigation.

- Climate change is causing biodiversity loss, ecosystem degradation, droughts, and increased wildfire risks.
- DGVMs are valuable tools for assessing climate impacts, carbon stocks, and vegetation changes.
- Climate projections indicate increasing vulnerability of India's forests in the coming decades.
- Nearly 40% of forest areas are classified as highly vulnerable to climate change.
- Climate-resilient forestry, mixed-species plantations, and forest restoration are key adaptation measures.
- Integrating climate adaptation into forest management plans and strengthening institutional capacity are essential for sustainable forest management.

6.2 Carbon trading in Japan - A perspective from Japan & its potential in India.

Marubeni Corporation: Forest Resources Business Department

The presentation by Marubeni Corporation highlighted the company's global forestry business operations, sustainable forest management practices, and emerging opportunities in carbon markets and climate finance. The presentation focused on Marubeni's forestry activities in Indonesia and Australia, including eucalyptus plantations for pulpwood, biomass fuel, and carbon sequestration. The speaker emphasized **the importance of Afforestation, Reforestation, and Revegetation (ARR) projects** as cost-effective and nature-positive solutions for climate change mitigation and biodiversity conservation.

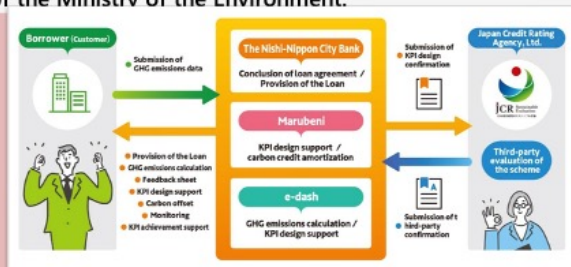


The presentation also showcased **Marubeni's expanding forestry-based carbon credit initiatives in Asia and Oceania**, including the first Joint Crediting Mechanism (JCM) forestry project in the Philippines covering around 14,000 hectares. The project aims to restore degraded landscapes, support biodiversity conservation, and generate carbon credits while promoting local economic development. Innovative green finance initiatives such as the **"Forestrike"** decarbonization finance product and proposed Forest Fund mechanism were also presented as tools for mobilizing climate finance and private sector investment in sustainable forestry projects.

Development of environmentally friendly financing products

Overview

- The decarbonization impact finance product "Forestrike" was jointly developed by Nishi-Nippon City Bank, Marubeni, and e-dash, and began to be offered on May 1, 2024. Over 30 companies have received financing through this product within one year.
- The product provides one-stop support for companies' decarbonization initiatives, starting from product application/financing and covering everything from visualization of GHG emissions and KPI design support to assistance in achieving KPIs.
- Forest Like has obtained a third-party evaluation from JCR as a loan product in line with the concept of "impact finance aimed at realizing specific impacts, established by the ESG Finance High-Level Panel of the Ministry of the Environment.



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The presentation concluded by emphasizing the importance of international collaboration through platforms such as the International Sustainable Forestry Coalition (ISFC) for promoting sustainable forest management, biodiversity conservation, climate action, and development of nature-based solutions globally.

Key Highlights

- Large-scale forestry operations in Indonesia and Australia for pulpwood, biomass fuel, and carbon sequestration.
- ARR projects highlighted as cost-effective carbon removal and biodiversity conservation solutions.
- Implementation of forestry-based carbon credit projects across Asia and Oceania.
- First JCM Forestry Project in the Philippines covering approximately 14,000 hectares.
- Promotion of innovative climate finance and ESG-linked investment mechanisms.
- Strong emphasis on sustainable forest management, climate mitigation, and international collaboration through ISFC.

6.3 Integrated Climate Change Framework for Forests

Mr Sayanta Ghosh and Ms. Afrin Zaidi,
The Energy Resource Institute (TERI)

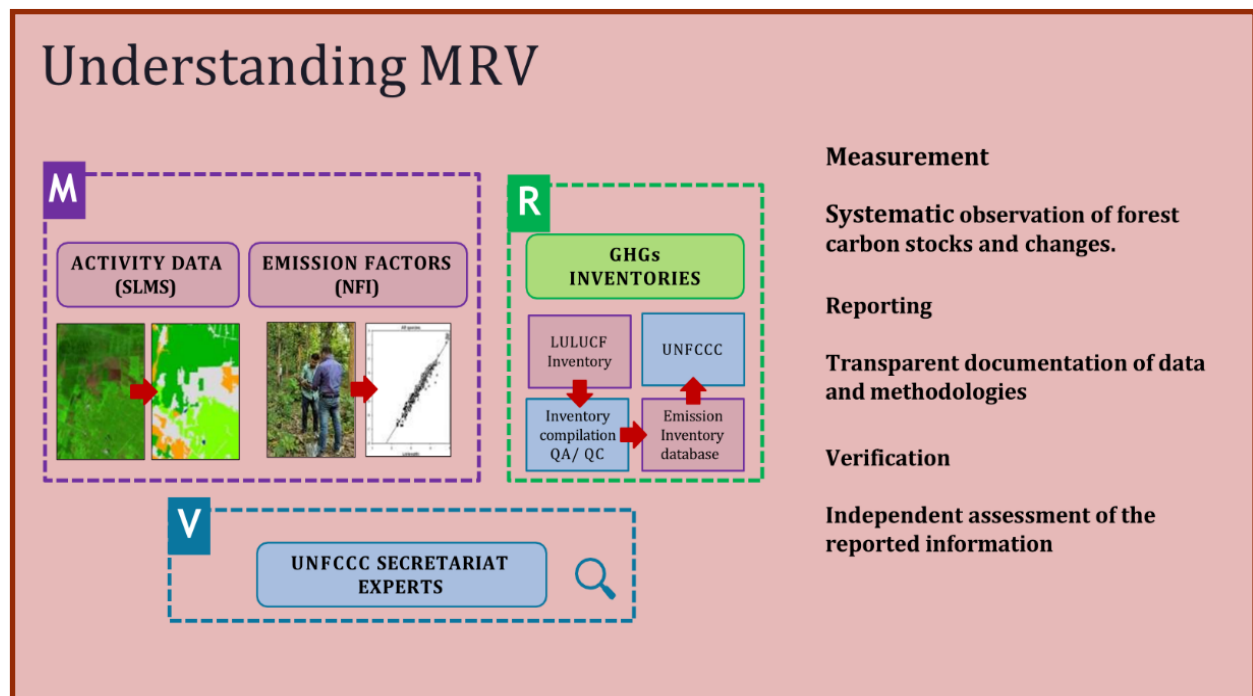
The presentation by Mr. Sayanta Ghosh and Ms Afrin Zaidi focused on developing an **Integrated Climate Change Framework** for forests with special reference to Assam and its possible replication in Odisha under JICA-supported forestry programmes. The presentation highlighted the growing vulnerability of forest ecosystems to climate change impacts such as droughts, floods, forest fires, habitat fragmentation, and biodiversity loss. Based on vulnerability assessments, climate hotspot

analysis, and long-term trend studies, the presentation showed that a significant proportion of Assam's forests are under high ecological stress due to changing climatic conditions and anthropogenic pressures.

The speaker explained the framework for **integrating climate adaptation, mitigation, Sustainable Forest management, biodiversity conservation, and sustainable livelihood approaches into forestry planning**. The presentation also highlighted the role of advanced geospatial technologies, remote sensing, **GIS, LiDAR, AI/ML** tools, and community-based monitoring systems in strengthening forest governance and climate resilience.



A major focus of the presentation was the development of a robust **Measurement, Reporting and Verification (MRV)** framework under **REDD+** for carbon accounting and climate finance readiness. The MRV system includes satellite-based land monitoring, forest inventory, carbon stock estimation, emission factor assessment, and preparation of Forest Reference Emission Levels (FREL/FRL).



The presentation discussed the roadmap for adapting the Assam framework to Odisha through institutional strengthening, vulnerability mapping, climate hotspot identification, digital MRV systems, and phased implementation. The proposed Odisha model includes establishment of steering committees, technical working groups, digital MRV cells, geospatial databases, and partnership platforms involving research institutions, NGOs, and technology partners.

Key Highlights

- Nearly 62% of assessed forest grids in Assam were identified as highly or very highly vulnerable to climate change impacts.
- Forest degradation drivers identified included floods, droughts, encroachment, shifting cultivation, and development pressures.
- Integrated strategies proposed for forest restoration, biodiversity conservation, fire management, and resilient livelihoods.
- Advanced technologies such as RS-GIS, LiDAR, AI/ML, and satellite monitoring highlighted for climate-resilient forest management.
- Comprehensive MRV framework developed for REDD+ carbon accounting and climate finance readiness.
- Forest carbon stock assessment included Above Ground Biomass, Below Ground Biomass, Deadwood, Leaf Litter, and Soil Organic Carbon pools.
- Assam's estimated annual emissions/FREL assessed at approximately 8.42 million tCO₂ equivalent.
- Roadmap proposed for replication of the framework in Odisha under OFSDP/JICA priorities through phased implementation and institutional strengthening.





TECHNICAL SESSION 1

CLIMATE CHANGE ADAPTATION AND MITIGATION

Theme (ii): Nature-Based Solutions, Ecosystem Adaptation and Carbon Pathways

Chairperson: Mr. Rajesh Kumar Gupta, IFS, Project Director, Climate Change Response and Ecosystem Services Enhancement Project (CRESEP), Rajasthan
Co-Chairperson: Ms. Shimojo Hitomi, Deputy Assistant Director, JICA

Panelists/Speakers

i. **Dr. Ashok Kumar Singh, (ASCERT NETWORK)**

Climate Resilient Horizon: Adaptation, Mitigation and Innovation in Odisha Forestry

ii. **Tmt. K. Geetanjali, IFS**

Tamil Nadu Forest Department Climate Change Mitigation and Adaptation:
A case study from Tamil Nadu



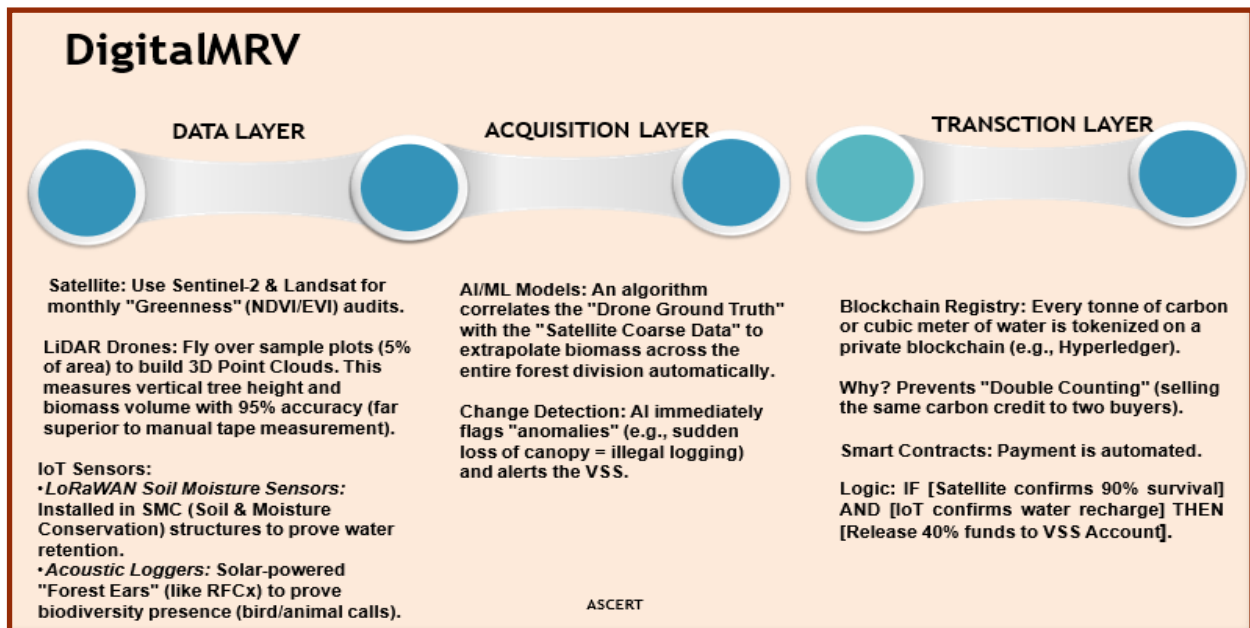
7.1 Climate-Resilient Horizon: Adaptation, Mitigation & Innovation in Odisha Forestry

Dr. Ashok Kumar Singh (ASCERT NETWORK)

Climate Resilient Horizon: Adaptation, Mitigation and Innovation in Odisha Forestry

The presentation by Dr. Ashok K. Singha highlighted the opportunities for transforming Odisha's forestry sector into a climate-resilient and economically vibrant green economy through climate adaptation, mitigation, and technological innovation. The speaker linked the forestry transition with Viksit Bharat 2047, Odisha Vision 2036, and JICA's global sustainability agenda, emphasizing a shift from conventional afforestation towards Nature-based Solutions (NBS), ecosystem services, climate resilience, and green livelihoods.

The presentation highlighted that Odisha Vision 2036 aims to generate nearly 10 lakh green livelihoods and ₹5,000 crore income for tribal communities through NTFP-based enterprises. Existing OFSDP interventions such as Assisted Natural Regeneration (ANR), Soil and Moisture Conservation (SMC), and VSS/SHG-led livelihood programmes were presented as important climate-resilient initiatives generating ecological and socio-economic benefits. Plantation activities contribute to carbon sequestration, while SMC measures support groundwater recharge, drought reduction, and micro-climate regulation. Livelihood diversification through apiculture and sal leaf enterprises was also highlighted as an important climate adaptation strategy.



Major focus of the presentation was the concept of **"Precision Forestry"** through digital technologies such as satellite imagery, drones, IoT, blockchain, and AI-enabled analytics under a proposed "Digital Forest Stack" system. The system would support real-time forest monitoring, biomass estimation, geo-tagging, and carbon accounting while improving transparency and reducing verification costs. The presentation also highlighted opportunities in Blue Carbon, agroforestry, and REDD+ carbon markets, particularly in mangrove ecosystems like Bhitarkanika and the Mahanadi Delta.

The speaker further proposed institutional reforms such as transforming high-performing VSSs into Farmer Producer Organizations (FPOs) for direct participation in carbon markets and climate finance systems. Development of a Payment for Ecosystem Services (PES) framework involving industries was also suggested to support forest communities through ecosystem service-based financing. The presentation concluded with a roadmap for transforming OFSDP into a climate enterprise-oriented forestry programme integrating technology, carbon finance, ecosystem services, and sustainable green growth.

Key Highlights

- Odisha Vision 2036 targets creation of 10 lakh green livelihoods and ₹5,000 crore income generation through NTFP-based livelihoods.
- JICA's forestry agenda promotes a shift from traditional afforestation towards Nature-based Solutions (NBS) for climate resilience and disaster risk reduction.
- Plantation activities under OFSDP estimated to sequester 2–3 tonnes CO₂ per hectare annually.
- SMC interventions contribute to groundwater recharge, drought reduction, and micro-climate regulation.
- Digital Forest Stack proposed using satellite, drone, IoT, blockchain, and AI technologies for real-time forest monitoring and carbon accounting.
- Geo-tagging and digital monitoring systems can reduce carbon verification costs by nearly 40%.
- Blue Carbon opportunities in Bhitarkanika and Mahanadi Delta identified as high-value climate finance assets.
- Agroforestry, REDD+, and mangrove ecosystems highlighted as important carbon market opportunities for Odisha.
- Proposal to convert VSSs into FPOs for direct participation in carbon markets and ecosystem service-based financing.
- State-level Payment for Ecosystem Services (PES) framework proposed for water recharge and watershed services.
- Roadmap includes Digital Readiness Assessment, Blue Carbon feasibility studies, pilot Digital Forest Stack implementation, and long-term transformation of OFSDP into a Climate Enterprise Support Project.

7.2 Climate Change Mitigation and Adaptation, a case study from Tamil Nadu

Tmt. K. Geetanjali, IFS

Tamil Nadu Forest Department

The speaker highlights the innovative and integrated climate change mitigation and adaptation initiatives being implemented by the Tamil Nadu Forest Department under the JICA-assisted **Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response (TBGPCCR)**. The presentation showcased the evolution of JICA-supported forestry projects in Tamil Nadu from the Tamil Nadu Afforestation Project-I to the present TBGPCCR with an investment of Rs. 920.52 crore. The project adopts a comprehensive approach focusing on ecosystem restoration, biodiversity conservation, human-wildlife conflict mitigation, livelihood enhancement, supply chain development, and institutional capacity building for climate-resilient forest management.



A major focus of the presentation was ecosystem-based climate change measures in both marine and terrestrial ecosystems. Significant progress has been achieved in coral reef restoration, seagrass restoration, mangrove rehabilitation, and conservation of flagship marine species such as dugongs and sea turtles in the Gulf of Mannar and Palk Bay regions. The project has also undertaken large-scale invasive alien species removal using AI-enabled drone monitoring and promoted urban and peri-urban forestry through plantation of over 2.05 crore seedlings across Tamil Nadu. These interventions are contributing towards carbon sequestration, ecosystem resilience, shoreline stabilization, and enhancement of green cover.



It was also emphasized successful human-wildlife conflict mitigation measures, including grassland restoration, elephant-proof trenches, augmentation of water availability in wildlife habitats, and establishment of real-time early warning systems through community-based THADAM committees and digital communication platforms. These initiatives have strengthened coexistence between wildlife and local communities while reducing crop and property damage in conflict-prone areas.

The presentation further highlighted the importance of institutional strengthening and technology-driven governance. More than 5,000 forest officials have been trained through reputed institutions. Several digital platforms such as TAMIZHMARAM, TNFD YAANAI, and TNFD SUTRULA have been developed for timber trade facilitation, human-elephant conflict alerts, and eco-tourism management. Collaborative India-Japan research initiatives on urban forestry, climate resilience, and timber value chains were also discussed.

Key Highlights

- Integrated ecosystem-based climate change mitigation and adaptation measures.
- Coral, seagrass, mangrove, and marine biodiversity restoration initiatives.
- AI-enabled invasive species management and urban forestry interventions.
- Community-based human-wildlife conflict mitigation systems.
- Livelihood enhancement through eco-development, eco-tourism, and micro-credit support.
- Capacity building of forest officials and adoption of digital governance platforms.
- Long-term targets for carbon sequestration, restoration of degraded ecosystems, and enhancement of community resilience by 2032.



TECHNICAL SESSION 2

DIGITAL TRANSFORMATION IN FOREST MANAGEMENT

Theme (i): Digital Field Technologies and Scalable Forest Governance

Chairperson: Dr. Sanjay Sood, IFS, PCCF & HoFF cum CPD, Himachal Pradesh

Co-Chairperson: Mr. Vineet S Sarin, Chief of Development Operations, JICA India

Panelists/Speakers

- i. **Shri V Karthik, IFS**, Forest, Environment and Climate Change Department, Government of Odisha
The role of technology in enabling action at scale in Odisha
- ii. **Shri Sanjay Kumar Srivastava, IFS, CPD**, Project for Eco Restoration in Gujarat (PERG)
Use of Open-source Technology in Project management - A case from Gujarat
- iii. **Shri Harshad Naik, Rajasthan Forest Dept. & Principal, BCG**: Forest Stack and Digi Van
Building a Digital Public Infrastructure for Smart Forest Governance



8.1 Role of Technology in Enabling action at scale in Odisha

Shri V. Karthik, IFS

Forest, Environment and Climate Change Department, Government of Odisha

Mr V. Karthik highlighted the transformative role of technology in strengthening forest governance, wildlife management, forest fire response, and citizen engagement in Odisha. The presentation demonstrated how digital technologies are enabling the Odisha Forest Department to effectively manage over 52,000 sq. km of forest area and address more than 20,000 annual fire points through real-time monitoring and data-driven decision-making.



A major highlight was the deployment of nine integrated IT applications supporting forest management, wildlife monitoring, digital land records, timber transit permits, Kendu leaf management, and citizen services. The **Odisha Forest Management System (OFMS)**, **Geo Referencing of Forest Land (GRFL)**, **Wildlife Management System (iWLMS)**, **PRAHAR** wildlife database, and **Mo Jungle** mobile app were showcased as important tools for improving transparency, efficiency, and field-level coordination.



The presentation emphasized the success of the Automated Forest Fire Response System, where integration of FSI alerts, AI-enabled cameras, GPS-enabled mobile applications, and real-time monitoring has reduced fire response time from 24–48 hours to nearly 3 minutes. More than 5,000 field staff are digitally connected for rapid response and field monitoring. Odisha's achievement as the first state in India with a complete Digital Forest Cadastre through DGPS, GIS, and remote sensing technologies was also highlighted.



He further highlighted technology-enabled wildlife tracking, citizen engagement platforms, online permit systems, and plantation monitoring initiatives such as “**Ek Ped Maa Ke Naam,**” which tracks over 75 lakh saplings through GPS-enabled digital monitoring systems.

Key Highlights

- Real-time forest fire monitoring and rapid response system.
- Deployment of nine integrated IT applications for forest governance.
- Odisha becoming the first state with complete digital forest cadastre.
- AI, GIS, DGPS, and mobile technologies for forest and wildlife management.
- Citizen engagement through mobile apps and online platforms.
- GPS-based plantation monitoring and transparent digital governance systems.

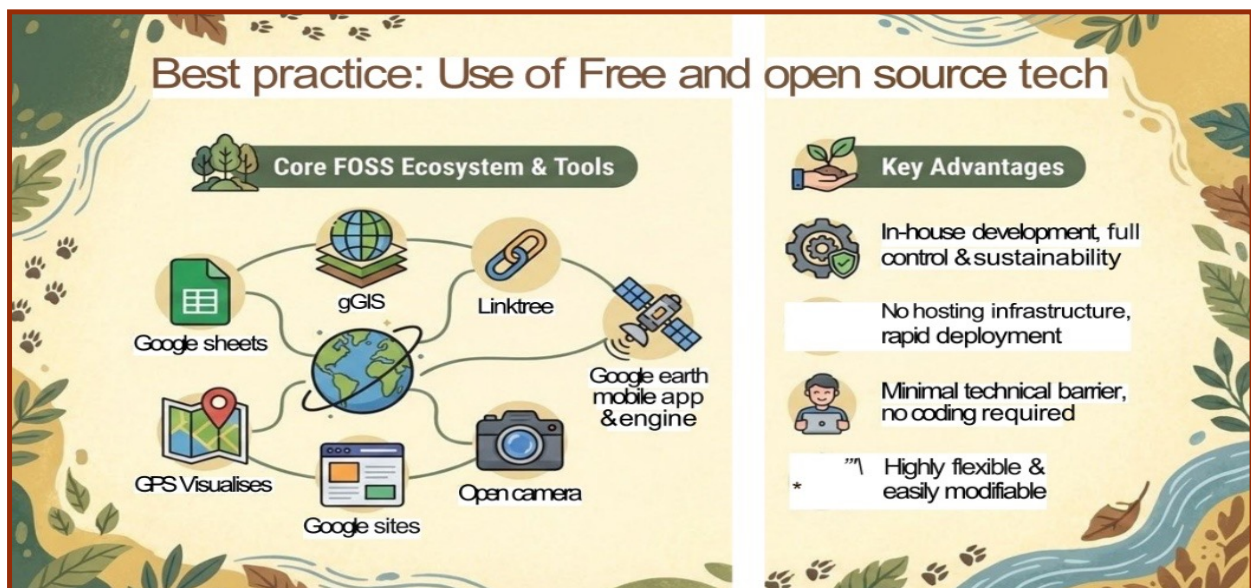
8.2 Use of Open-source Technology in Project Management

Shri S. K. Shrivastava, IFS

Chief Project Director, Project for Eco restoration in Gujarat (PERG)

The presentation provided an overview of the PERG project with special emphasis on the use of Free and Open-Source Software (FOSS) and technology-enabled forest management practices. The presentation highlighted how modern digital tools, GIS applications, and low-cost technological solutions are being integrated into forestry and wildlife management to improve efficiency, monitoring, and decision-making. The project demonstrated the use of LiDAR and KAMLAN technologies for digital elevation modelling, along with field-based interventions.

The emphasis was on that forestry and wildlife management where technology can significantly improve productivity, monitoring, and information flow. The presentation highlighted that though the essential forestry activities continue to require human intervention, digital tools can reduce paperwork, strengthen field monitoring, and support informed decision-making by officers.



The speaker highlighted the advantages of using FOSS-based tools that are free, powerful, easy to deploy, require minimal coding, and can quickly convert innovative ideas into practical field applications.

Overall, the presentation demonstrated a balanced approach where technology complements field-based forestry operations by improving efficiency, transparency, and responsiveness while retaining the critical role of human resources in conservation and ecosystem management.

Key Highlights

- Integration of FOSS and digital technologies in forestry management.
- Use of LiDAR, GIS, and digital tools for monitoring and planning.
- Field interventions including plantations, wetland restoration, eco-tourism, and wildlife rescue infrastructure.
- Recognition that forestry requires both technology and strong field presence.
- Reduction of paperwork and improved decision-making through IT systems.
- Use of low-cost, easy-to-deploy open-source technologies.
- Community outreach through trainings, public meetings, and nature education programmes.

8.3 Forest Stack Initiative: Building a Digital Public Infrastructure for Smart Forest Governance

Shri Harshad Naik,

Rajasthan Forest Department and Principal, Boston Consulting Group (BCG)

The presentation highlighted the concept and implementation roadmap of the **Forest Stack Initiative**, a comprehensive digital ecosystem designed to transform forest governance through data-driven decision-making, interoperability, and technology-enabled management. The initiative demonstrated how a structured digital architecture can support forestry departments in improving planning, monitoring, service delivery, and ecosystem management.

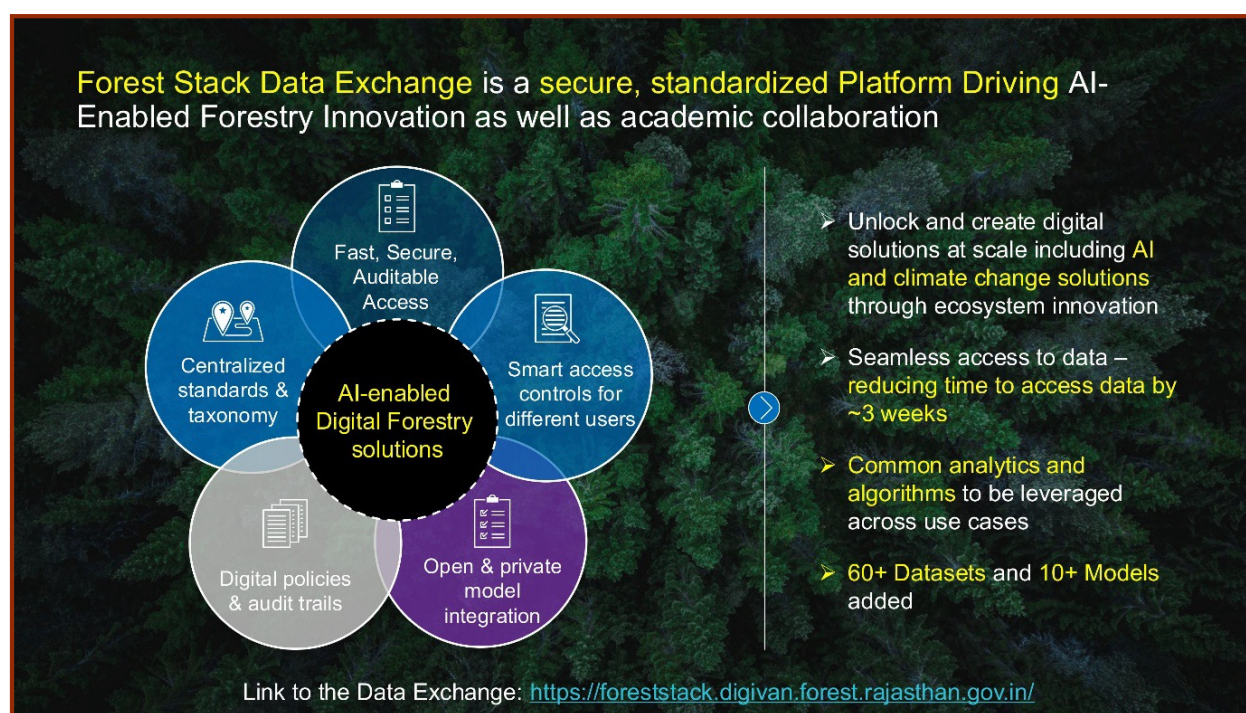
The presentation outlined the key building blocks of the Forest Stack framework, including **data and architecture development, use-case identification and prioritization, artificial intelligence-enabled innovation, ecosystem partnerships, and multi-layer governance mechanisms**. Emphasis was laid on creating a common digital backbone that integrates datasets across departments and stakeholders, thereby enabling seamless data exchange and facilitating AI-driven solutions for forestry applications.

The speakers highlighted the importance of prioritizing forestry use cases based on their potential impact, feasibility, and data readiness. The initiative envisages applications in areas such as forest restoration, afforestation management, biodiversity conservation, livelihood enhancement, eco-tourism development, and forest produce value-chain management. The use of artificial intelligence



and integrated datasets was presented as a means to strengthen planning, monitoring, and evidence-based policy decisions.

The presentation also emphasized the relevance of developing a **National Forest Stack**, which could provide a common digital infrastructure and standardized datasets for all states. Such a platform would facilitate improved centre-state coordination, accelerate implementation of forestry programmes, and support large-scale initiatives related to restoration, afforestation, and climate action.



Key Highlights

- Introduced Forest Stack, a Digital Public Infrastructure (DPI) framework for data-driven forest governance.
- Developed jointly by JICA, Rajasthan Forest Department and BCG to enhance planning, monitoring, and decision-making in forestry.
- Showcased digital solutions for forest health monitoring, project planning, wildlife habitat management, and carbon credit projects.
- Leveraged GIS, remote sensing, satellite imagery, AI, and geospatial analytics for scientific forest management.
- Enabled monitoring of 3.3 million hectares of forests and planning support for nearly 2,000 plantation sites annually.
- Improved efficiency in wildlife monitoring, habitat restoration, and carbon project preparation through technology integration.
- Established a secure Forest Data Exchange Platform integrating datasets from multiple agencies and stakeholders.
- Promoted AI-enabled applications, digital dashboards, and analytics tools for evidence-based decision-making.
- Encouraged innovation through an Open Innovation Challenge, generating solutions in wildlife monitoring, carbon estimation, drone applications, and forest fire prediction.
- Proposed a National Forest Stack to create a common digital backbone for forestry, climate action, and ecosystem restoration across states.
- Emphasized collaborative governance, interoperability, and digital transformation as key enablers of future-ready forestry in India.

TECHNICAL SESSION 2

DIGITAL TRANSFORMATION IN FOREST MANAGEMENT

Theme (ii): AI and Predictive Systems for Climate-Smart Forestry

Chairperson: Smt. Banumathi G, IFS Project Director, Tripura

Co-Chairperson: Ms. Ito Fumi, Project Formulation Advisor, JICA India

Panelists/Speakers

i. Dr. M D Behera, IIT, Kharagpur

Species-Level Mangrove Mapping for Management and Conservation: An AI-Enabled Remote Sensing Approach

ii. Dr K A Sreejith, Kerala Forest Research Institute, Peechi

Using Long-Term Ecological Monitoring to Guide Climate-Resilient Forest Management

**9.1 Species-Level Mangrove Mapping for Management and Conservation: An AI-Enabled Remote Sensing Approach**Dr. M D Behera,
IIT Kharagpur

The presentation has highlighted the growing importance of **Remote Sensing (RS)** and **Artificial Intelligence (AI)** in mangrove conservation, ecosystem monitoring, and climate resilience planning. The presentation emphasized that mangrove ecosystems are among the richest and most productive coastal ecosystems, providing critical ecosystem services such as coastal protection, carbon sequestration, biodiversity conservation, fisheries support, and disaster risk reduction. The speaker referred to the 2004 Indian Ocean Tsunami to demonstrate how healthy mangrove forests helped protect coastal communities and highlighted the urgent need for global mangrove restoration and conservation.

The presentation showcased how RS and AI technologies provide scalable, cost-effective, and data-driven solutions for mangrove management in dynamic coastal regions. Satellite imagery, SAR data, UAVs, LiDAR, hyperspectral sensors, and AI/ML algorithms such as Random Forest, Deep Learning, SVM, and ensemble models are being used for species-level mapping, canopy height estimation, biomass assessment, fragmentation analysis, and monitoring of ecosystem health. These tools support early warning systems for deforestation, encroachment, aquaculture expansion, cyclone impacts, salinity stress, and hydrological changes.



RS & AI for Mangrove Management and Conservation

RS: Provides continuous, multi-scale observations

AI converts these data into actionable intelligence

- **Proactive, Precise, and Resilient** mangrove conservation
- **CC / Anthropocene!**

1. Decision Support and Governance

- Outputs feed into **Geospatial Dashboards** for forest departments and Coastal managers
- **AI-driven risk maps** support **Community-based management, Disaster preparedness**
- Enhances transparency and compliance under inter-/national conservation frameworks

2. Community and Policy Integration

- Simplified **AI products (maps, alerts)** empower **local communities and NGOs**
- Evidence-based insights strengthen **policy formulation, EIAs, and coastal regulation enforcement**

More...
TLS, Thermal, Inversion

Colored Point Cloud using Acquired Images

Colored Point Cloud based on Height

The presentation focused on field campaigns were undertaken Bhitarkanika Wildlife Sanctuary in Odisha (Ramsar site) to generate high-quality datasets for species classification, Above Ground Biomass (AGB) estimation, Leaf Area Index (LAI), canopy height analysis, and chlorophyll assessment.

The AI-assisted integration of optical, SAR, LiDAR, and hyperspectral datasets significantly improve estimation of biomass and carbon stocks, which are critical for blue carbon accounting, The studies demonstrated that deep learning and ensemble modelling approaches perform better than traditional semi-empirical methods for biomass estimation and carbon stock mapping.

Key Highlights

- AI-enabled species-level mangrove mapping using Remote Sensing technologies.
- Use of satellite imagery, SAR, LiDAR, UAVs, and hyperspectral data for ecosystem monitoring.
- Monitoring of mangrove health, stress, deforestation, and coastal hazards.
- Advanced biomass and carbon stock estimation using Deep Learning and ensemble models.
- Application of RS and AI for blue carbon accounting and climate resilience planning.
- Detailed field studies conducted in Bhitarkanika Wildlife Sanctuary, Odisha.
- AI-driven geospatial dashboards and risk maps for decision support and governance.
- Integration of community participation, disaster preparedness, and evidence-based conservation planning.

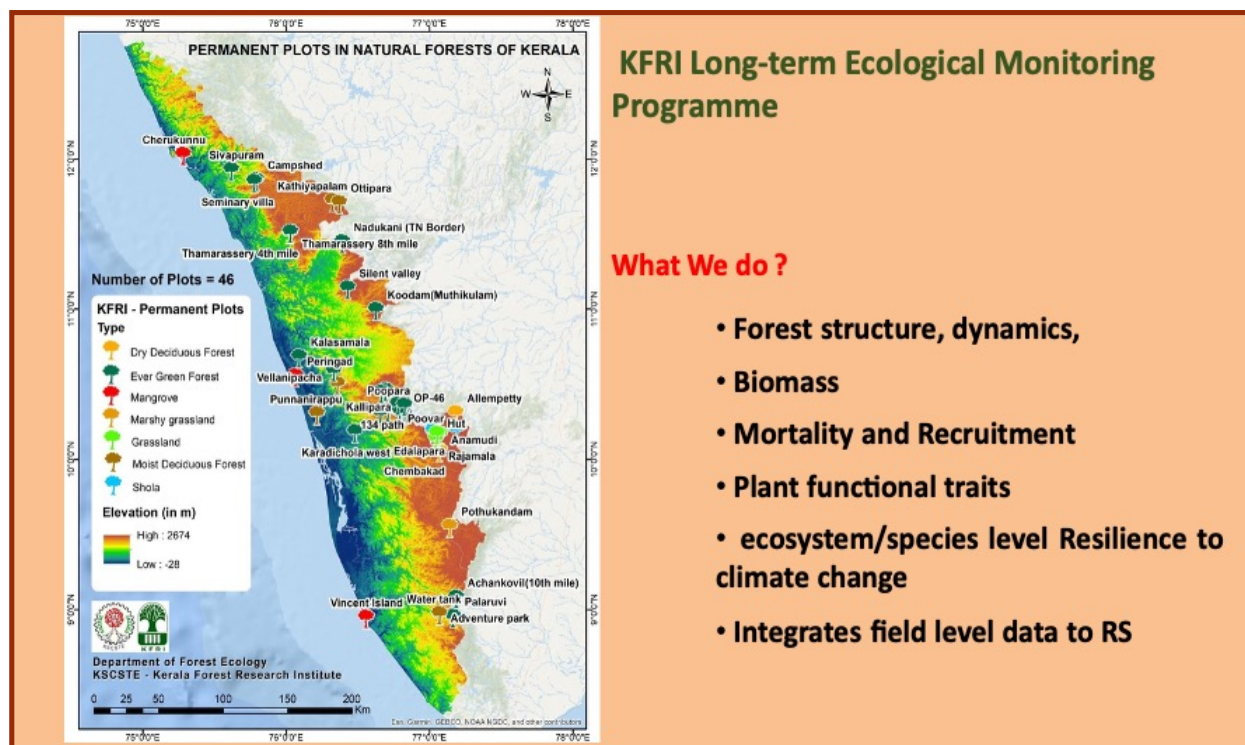
9.2 Using Long-Term Ecological Monitoring to Guide Climate-Resilient Forest Management

Dr K. A. Sreejith,
Kerala Forest Research Institute (KFRI), Peechi

The presentation emphasized the importance of long-term ecological monitoring for understanding forest responses to climate change, human pressures, and management interventions. It highlighted that forests should be managed with a climate-resilient and long-term perspective, as ecological changes are gradual and variable over time. The presentation stressed the integration of Permanent Sample Plots (PSPs), remote sensing, LiDAR, and biological indicators for effective monitoring, adaptive forest management, and carbon accounting.



Climate Smart Forestry was presented as an important framework for improving carbon storage, ecosystem resilience, productivity, and community benefits. Case studies from Kerala demonstrated the use of mortality-recruitment analysis, mangrove resilience studies, and phenology observations to assess ecosystem dynamics and climate impacts. The presentation also highlighted global concerns regarding declining forest resilience under increasing climate variability and water stress.



Key Highlights

- Importance of long-term ecological monitoring for climate-resilient forestry.
- Integration of PSPs, remote sensing, LiDAR, and biological indicators.
- Climate Smart Forestry for resilience, carbon storage, and adaptive management.
- Kerala case studies on mangrove resilience and ecosystem monitoring.
- Use of AI, UAVs, machine learning, and LiDAR for smart forest management.
- Need for adaptive and science-based forest governance systems.

Overall, the presentation linked ecological science with practical forest governance and emphasized that continuous monitoring, adaptive management, and technology integration are essential for sustainable and climate-resilient forestry.





Day 2 | 12th February 2026

TECHNICAL SESSION 3

WOOD TRANSFORMATION AND FOREST CERTIFICATION

Theme (i): Strengthening Sustainable Wood Supply Systems through Value Addition and Certification

Shri Naresh Kumar IFS Chief Project Director & APCCF, Uttarakhand Forest Department

Co-Chairperson: Mr. Siddharth Parmeshwaran, Development Specialist, JICA India

Panelists/Speakers

i. **Shri Sanjeev Gaur, IFS**

Managing Director, Maharashtra Forest Development Corporation

Forest Certification as a Driver of Sustainable Wood Transformation: Lessons from the FDCM

ii. **Dr. Anvita Pandey**

Associate Professor, Indian Institute of Forest Management, Bhopal

Indian Forest and Wood Certification Scheme – “PRAMAAN”



10.1 Forest Certification as a Driver of Sustainable Wood Transformation: Lessons from the FDCM

Shri Sanjeev Gaur, IFS

Managing Director, Maharashtra Forest Development Corporation

The presentation focused on how the Forest Development Corporation of Maharashtra (FDCM) has successfully utilized Forest Stewardship Council (FSC) certification as a transformative tool for sustainable teak production, responsible forest management, and value-added timber business development. The presentation highlighted India's growing timber deficit and emphasized the need for a national mission to promote sustainable teak cultivation, harvesting, and marketing to achieve timber self-sufficiency by 2047.

FDCM was presented as a successful government-led forestry enterprise managing approximately 3.5 lakh hectares of forest land through an integrated operational chain involving quality seed collection, advanced nurseries, plantations, thinning operations, and timber marketing. The organization has significantly increased teak production and revenues while supplying premium-quality timber to major national institutions such as Parliament, PMO, Bharat Mandapam, and Shri Ram Temple at Ayodhya.



Benefits of Forest Certification		
Environmental	Social	Economic
- No use of banned chemical pesticides - No negative impact on environment - Management of High Conservation Value (HCV) forests - Safe collection and disposal of toxic waste - Preserve water catchments and water bodies - Protection from soil erosion	- Emphasis on occupational health and safety - Ensures social equity and livelihood opportunities to locals - Ensures legal labour wages and facilities - Capacity building of women - Respect for rights of tribals, local communities and forest workers - Compliance with ratified ILO conventions	- Competitive advantage - Access to new markets - Third party, market driven - Regular staff training - Periodical monitoring of management activities - Ensures legality and economic viability - Brand recognition, preference and value addition due to use of certification logo

A major highlight of the presentation was FDCM's achievement of FSC Forest Management and Chain of Custody certification covering over 170,000 hectares, the largest certified forest area among Indian entities. The presentation emphasized that FSC certification strengthened environmental safeguards, worker safety, tribal rights, women's participation, and market competitiveness while

ensuring compliance with internationally accepted sustainability standards. It also demonstrated how certification can become a business differentiator for government forest corporations.

Key Highlights

- FSC certification as a driver of sustainable teak production and value addition.
- FDCM managing 3.5 lakh hectares with integrated plantation-to-market operations.
- Largest FSC-certified forest area among Indian entities.
- Improved market access, brand value, and global credibility through certification.
- Strong focus on worker safety, tribal rights, social equity, and environmental safeguards.
- Demonstrated replicable model for sustainable forestry enterprises in India.

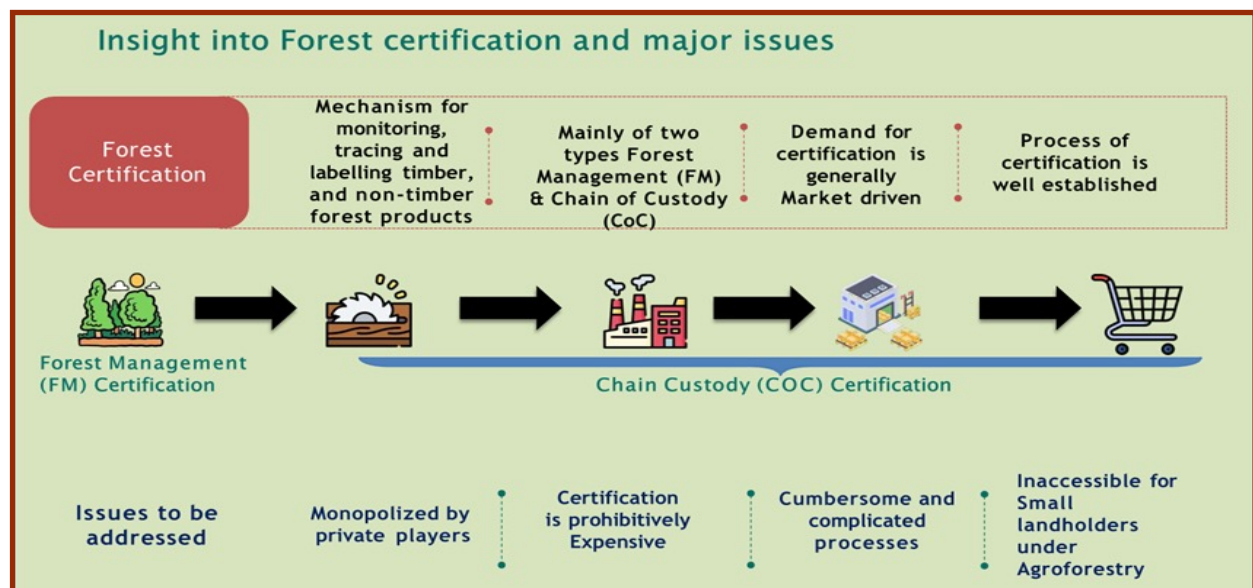
10.2 Indian Forest and Wood Certification Scheme – “PRAMAAN”

Dr. Anvita Pandey

Associate Professor, Indian Institute of Forest Management , Bhopal

The presentation introduced “PRAMAAN,” India’s national forest and wood certification scheme launched in December 2023 as a government-backed certification framework for sustainable forest and agroforestry management. Developed under the Indian Forest and Wood Certification Council (IFWCC), the scheme was presented as a cost-effective and India-specific alternative to international certification systems such as FSC and PEFC.

It was noted that international certification systems are often expensive and inaccessible for small farmers and agroforestry landholders, creating the need for a more inclusive and context-specific certification mechanism.



PRAMAAN includes three major certification categories: Forest Management (FM), Trees Outside Forests Management (TOFM), and Chain of Custody (CoC) certification for industries and traders. The framework covers both wood-based products and non-timber forest products (NTFPs) while integrating due-diligence mechanisms aligned with EU Deforestation Regulation (EUDR) requirements to support international market access.

The presentation also highlighted progress made under the scheme, including audits and pre-audits conducted in Andhra Pradesh, Maharashtra, Madhya Pradesh, and industry-led agroforestry areas. Capacity-building initiatives involving auditors, IFS officers, and stakeholders were also emphasized. The presentation positioned PRAMAAN as an important step towards expanding sustainable forest certification, supporting small farmers, strengthening traceability, and improving India's access to international timber and forest product markets.

Key Highlights

- Launch of India's national forest and wood certification scheme "PRAMAAN."
- Cost-effective and India-specific alternative to FSC and PEFC.
- It Covers Forest Management, Trees Outside Forests, and Chain of Custody certification.
- Supports timber, agroforestry, and NTFP certification systems.
- Alignment with EU Deforestation Regulation (EUDR) requirements.
- Capacity building of auditors, officers, industries, and stakeholders.
- Promotes sustainable forestry, traceability, and market access for Indian products.





Day 2 | 12th February 2026

TECHNICAL SESSION 3

WOOD TRANSFORMATION AND FOREST CERTIFICATION

Theme (ii): Agroforestry, Genetics and Industry Linkages for Expanding Wood Supply

Chairperson: Shri Dharamdeo Rai, IFS, CCF & Project Director, West

Bengal Forest Department Co-Chairperson: Ms. Iha Chinatsu, Deputy Director, JICA

Panelists/Speakers

i. **Dr. A Sethy and Ms. Sujatha D., IWST, Bangalore**

Challenges, Technologies and Business Pathways for Strengthening Wood-Based Industries and Forest Corporations

ii. **Dr. R. Yasodha and Dr. A Nicodemus, IFGTB, Coimbatore**

Operationalizing State Agroforestry Policies through Genetics-Driven Expansion: Translating IFGTB Models from Tamil Nadu to Field-Level Adoption in Odisha



11.1 Challenges, Technologies and Business Pathways for Strengthening Wood-Based Industries and Forest Corporations

**Dr. A Sethy and Ms. Sujatha D.,
IWST, Bangalore**

The presentation by Dr. Anil Sethy focused on the challenges, technologies, and business pathways for strengthening Wood Based Industries and Forest Development Corporations (FDCs). It highlighted wood as a sustainable and low-carbon building material that can contribute significantly to climate change mitigation and green growth.





The presentation discussed the growing importance of plantation and agroforestry timber resources and addressed common concerns regarding fast-grown wood, such as poor durability, small girth, and variable quality. It emphasized that modern technologies could transform plantation timber into high-value products like plywood, MDF, LVL, Glulam, and Cross Laminated Timber (CLT).

Major challenges faced by industries and FDCs include raw material insecurity, outdated machinery, poor grading and storage systems, shortage of skilled manpower, and weak market and R&D linkages.

To overcome these issues, the presentation showcased several advanced technologies such as scientific log storage, efficient drying systems, machine grading, precision machining, laser cutting, finger-jointing, and structural design using FEM software. It also highlighted the increasing use of mass timber technologies like Glulam and CLT in modern construction.

The presentation concluded that assured wood supply through plantations and agroforestry, cluster-based industrial development, value addition, export-oriented products, and zero-waste approaches are essential business pathways for strengthening the wood industry sector sustainably.

Wood – as a sustainable building material

- Construction and building industries - a major target for the reduction of environmental impacts as they amount to 1/3rd of the global energy and contribute around 15% of CO₂ emissions (IEA, 2022).
- Construction with **low carbon footprint materials** is part of the solution to this problem.
- In this context, wood is an ideal choice as its use is positively associated with well-being, aesthetic and eco-friendliness.



Key Highlights

- Wood identified as a renewable, eco-friendly, and low-carbon construction material.
- Construction sector contributes significantly to global CO₂ emissions; wood can help reduce environmental impact.
- Plantation and agroforestry wood resources seen as future raw material sources.
- Fast-grown plantation timber can be converted into high-value products such as MDF, plywood, LVL, Glulam, and CLT.
- Major industry challenges include raw material shortages, fragmented supply chains, outdated machinery, and lack of skilled manpower.
- Technologies highlighted included scientific storage, efficient drying, machine grading, CNC machining, laser cutting, finger-jointing, and structural design systems.
- Mass timber technologies such as Cross Laminated Timber (CLT) and Glue Laminated Timber (Glulam) were presented as transformative solutions for sustainable construction.
- Business pathways suggested included assured wood supply, promotion of agroforestry, furniture parks, Common Facility Centres (CFCs), value addition, and zero-waste approaches.
- The presentation emphasized that value-added wood products provide better economic returns than traditional log or sawn timber trade.

11.2 Operationalizing State Agroforestry Policies through Genetics-Driven Expansion: Translating IFGTB Models from Tamil Nadu to Field-Level Adoption in Odisha

Dr. R. Yasodha and Dr. A Nicodemus,
IFGTB, Coimbatore

The presentations focused on strengthening Wood Based Industries (WBIs), agroforestry, and sustainable wood production through advanced technologies, scientific tree breeding, and industry-farmer linkages. The speakers highlighted the growing demand for wood and engineered wood products in India, the widening gap between wood demand and supply, and the need to promote plantation forestry and agroforestry to reduce dependence on imports and natural forests. Emphasis was given to the role of wood as a sustainable, low-carbon construction material and the importance of value addition through engineered wood products such as plywood, MDF, particle boards, LVL, Glulam, and Cross Laminated Timber (CLT). The presentations also discussed the challenges faced by wood



industries, including raw material shortages, outdated technologies, quality compliance issues, and weak research-industry linkages. Advanced technologies such as scientific wood processing, machine grading, precision machining, improved drying systems, novel wood composites, and mass timber applications were presented as key solutions for improving efficiency and sustainability.

The speakers further highlighted successful agroforestry and tree breeding models developed by IFGTB for Casuarina and teak through genetics-driven improvement programmes. The presentations demonstrated how high-yielding clones, clonal forestry, tissue culture, and farmer-industry-research the partnerships can significantly improve wood productivity, farmer income, and industrial raw material supply. Overall, the sessions underscored that integrating scientific breeding, agroforestry expansion, modern processing technologies, and value-added wood products can strengthen the forestry sector, support rural livelihoods, promote green growth, and contribute to climate change mitigation.

Broadening Genetic Base for Resilience to Climate Change



Balancing productivity and sustainability

Varietal replacement not crop replacement
Broadening genetic base with more site-specific varietal choices
Integrate with farm crops and long-rotation plantations

Current direction of breeding

Wood quality
Water use efficiency Sustaining
soil fertility
Efficient carbon sequestration – low N usage





Key Highlights

- Wood recognized as a sustainable, renewable, and low-carbon construction material.
- Growing demand for timber and engineered wood products in India, with a significant demand–supply gap.
- Plantation forestry and agroforestry identified as key solutions for enhancing domestic wood supply.
- Advanced wood processing technologies and engineered wood products (MDF, LVL, Glulam, CLT) highlighted for sustainable construction.
- Industry faces challenges related to raw material availability, quality standards, technology, and skilled manpower.
- Improved Casuarina and teak clones demonstrated higher productivity, better timber quality, and increased farmer incomes.
- Strong research–industry–farmer partnerships are essential for scaling agroforestry and reducing timber imports.
- Modern forestry practices can strengthen climate resilience, carbon sequestration, and sustainable development.



Day 2 | 12th February 2026

TECHNICAL SESSION 3

WOOD TRANSFORMATION AND FOREST CERTIFICATION

Theme (iii): The Green Wood Economy – Industry, Investment and Policy Pathways

Chairperson: Smt. N. Kshitija, IFS, CCF & CEO, CAMPA, Telangana Forest Department

Co-Chairperson: Mr. Nishihara Ryosuke, Representative, JICA India

Panelists/Speakers

i. J K Paper Mill

Challenges and Pathways for Expansion of Wood-Based Industries: A Private Sector Perspective

ii. Arpit Agarwal, Nomura Research Institute, Japan

Wood Transformation – New perspective

iii. Shri Swayam Mallick, IFS Joint Project Director, OFSDS

Presentation on the experiences of country focused training in Japan



12.1 Challenges and Pathways for Expansion of Wood-Based Industries: A Private Sector Perspective

Shri Gauri Shankar Patnaik,
J K Paper Mill

The presentation by G. S. Patnaik of JK Paper Ltd. focused on sustainable raw material management, farm forestry, energy efficiency, and green manufacturing practices adopted by the company. The session highlighted JK Paper's journey as one of India's leading integrated paper manufacturers and its efforts to create a sustainable business model through large-scale farm forestry, advanced clonal

technology, circular economy practices, and renewable energy initiatives. The presentation emphasized the importance of high-yield plantation forestry, farmer partnerships, and sustainable sourcing for ensuring long-term raw material security while improving farmer livelihoods and environmental sustainability.

The presentation discussed JK Paper's successful farm forestry programme involving over 19,500 farmers across 1.35 lakh hectares and the distribution of high-yield disease-free clonal plants to improve wood productivity and farmer income. It highlighted the company's shift from long-distance and imported raw material sourcing to localized procurement within a 200 km radius of the plant, thereby improving efficiency and reducing transportation impacts. The session also covered sustainability initiatives such as carbon sequestration, FSC-certified plantations, green energy adoption, biomass utilization, water conservation, waste utilization, and the company's aspiration to achieve zero fossil fuel usage by 2030.



WHAT JK PAPER CAN OFFER

- **QUALITY PLANTING MATERIAL – HIGH YIELDING CLONES (30-35 Cu M /Ha/ Yr) DEVELOPED BY JK SUITABLE FOR RAINFED PLANTATION IN ODISHA**
- **TECHNICAL KNOW HOW & EXTENSION SERVICES**
- **TIE UP FOR RAW MATERIAL TO BE PRODUCED**
- **INTERNATIONAL CERTIFICATION EXPERIENCE**
 - **> 50,000 Ha Farm Forestry Plantations under International FSC-FM Certification.**
 - **100% raw material procured by JKPM is FSC COC-CW certified**



JK PAPER.....*Creating Lasting Impressions*

Slide No. 22



The speaker further highlighted the challenges faced by the paper industry in Odisha, particularly raw material shortages, dependence on imported wood, lack of enabling policies for pulpwood plantations, and increasing competition for wood resources. Several policy recommendations were suggested, including promotion of agroforestry, free trade of farm forestry wood, subsidized planting materials, extension support, and plantation of fast-growing species on degraded lands.

Key Highlights

- Over 19,500 farmers were engaged in farm forestry across 1.35 lakh hectares.
- High-yield clonal planting material promoted to enhance wood productivity and farmer incomes.
- Strong emphasis on sustainable sourcing, FSC-certified plantations, and circular economy practices.
- Carbon sequestration, water conservation, biomass energy, and waste utilization were key sustainability initiatives.
- Target set to achieve zero fossil fuel use by 2030 through renewable energy adoption.
- Agroforestry and pulpwood plantations highlighted as important for timber supply, employment generation, and climate mitigation.
- Policy support, improved planting material, and efficient wood supply chains were identified as critical for sector growth.
- Key challenges include raw material shortages, transportation costs, and limited availability of superior clones.

12.2 Wood Transformation – New perspective

Arpit Agarwal

Nomura Research Institute, Japan

The presentation by Nomura Research Institute focused on “Wood Transformation (WX)” as a strategic approach for developing a sustainable wood-based economy in India through India–Japan cooperation. The session highlighted the growing global importance of wood as a climate-friendly construction material and emphasized that India’s per-capita wood consumption remains significantly lower than developed countries due to limited domestic supply and low adoption of wood-based construction. The presentation discussed the increasing dependence on wood imports, stagnant domestic timber production, and the need to strengthen agroforestry, wood processing, and sustainable timber supply systems in India.



The presentation further showcased Japan’s successful model of combining forest conservation with commercial timber production through managed plantations, standardized wood processing systems, and strong policy support for wooden construction. Under the JICA-supported Wood Transformation (WX) initiative, emphasis was placed on promoting afforestation, sustainable forest management, advanced wood processing technologies, and prefabricated wooden housing systems.

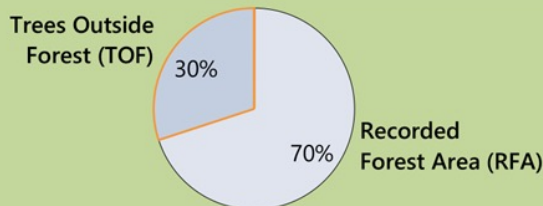
The session also highlighted opportunities for India–Japan collaboration in areas such as forest management, engineered wood products, wooden construction technologies, pilot demonstration projects, research on climate-resilient timber species, and capacity building for wood processing and construction sectors.



Timber Supply Source: India and Japan

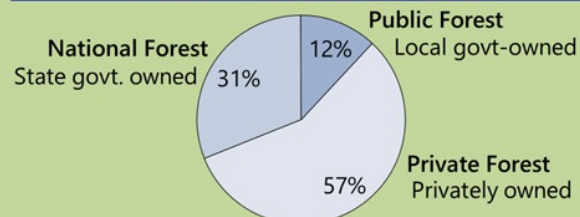
- Japan enables managed timber supply through regulated forest ownership. India relies largely on Trees Outside Forests (TOF) for wood supply.

India: Growing stock split



- 30% of wood stock is outside forests; timber supply mainly depends on TOF / farm trees.
- No (or limited) commercial harvesting of forests
- RFA includes forest cover, protected areas like wildlife sanctuary, national park.

Japan: Forest area by ownership



- Timber can be harvested from all forest areas as per the 5-year plan + post-felling mandatory afforestation.
- Further, Japan classifies forest as Protection Forest (~90% of national forest) & Production Forests.
- Japan allows commercial harvesting by private owners, but only with prior notification

NKI 8

Key Highlights

- Wood Transformation (WX) proposed as a strategy for sustainable growth of India's wood sector.
- India's wood consumption remains much lower than developed countries.
- Increasing wood demand and rising dependence on imports highlighted.
- Need to strengthen agroforestry, timber supply, and domestic wood processing industries.
- Japan's forestry model combines conservation with commercial timber production.
- Promotion of engineered wood products and prefabricated wooden housing emphasized.
- JICA initiative aims to support afforestation, sustainable forest management, and modern wood technologies.
- Japanese companies expressed interest in investing in India's wood sector with suitable policy support.
- Suggested collaboration areas include pilot projects, technology transfer, research, and capacity building.
- Emphasis on wood as a low-carbon material supporting climate mitigation and sustainable development.



12.3 Experiences of country focused training in Japan.

Shri Swayam Mallick, IFS

Joint Project Director, OFSDP-II

The presentation highlighted the experiences and key learnings from the JICA KCCP training programme on Sustainable Forest Management and Integrated Watershed Management held in Japan in 2023. The programme focused on forest management, disaster prevention, watershed management, ecosystem conservation, and livelihood integration through field visits and practical demonstrations across Hokkaido.

The presentation explained Japan's forest management system, including natural forests, artificial forests, and protection forests managed for purposes such as headwater conservation, disaster prevention, recreation, and biodiversity conservation. It also highlighted the clear classification of forest ownership among national, prefectural, and private forests.

Key learnings included multi-storied forest management with low-density planting, phased harvesting and regeneration, and the concept of protection forests for focused ecological and disaster management. Various protection forest categories such as headwater conservation, windbreak, rockfall prevention, flood control, and sea salt control forests were showcased.

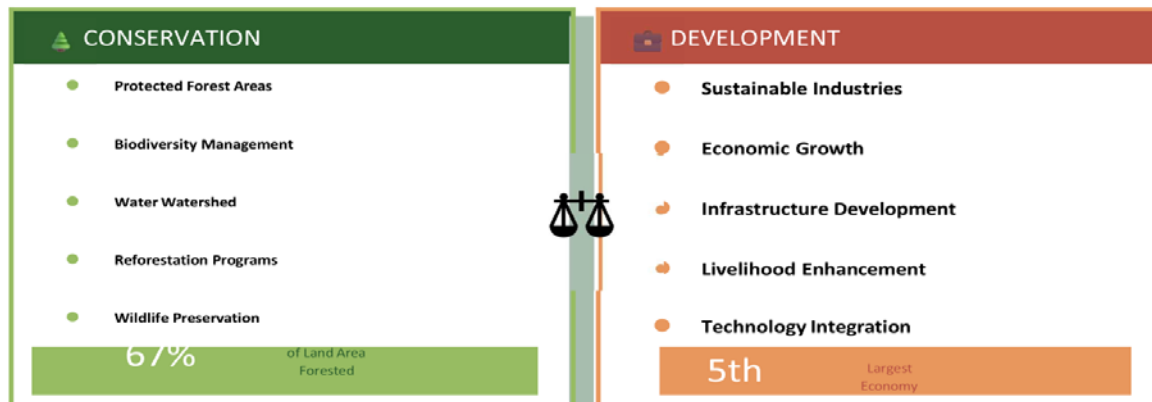


The presentation covered Chisan forest conservation projects for landslide prevention and watershed protection, modern forestry practices including elite tree selection, container seedlings, lower density plantations, and improved productivity systems. Urban forestry initiatives, pilot forest restoration, biodiversity conservation, and livelihood-based forestry activities were also discussed. The presentation also highlighted Japan's support mechanisms for private forest owners through subsidies and emphasized green growth through increased wood use, promotion of timber buildings, and strengthening the competitiveness of the wood industry.

The presentation emphasized key learning from how Japan successfully balances conservation and development through integrated forest management, strong institutional support, sustainable industries, biodiversity conservation, and technology-driven forestry practices.



Japan: The Perfect Example of Balance Between Conservation and Development



KEY LEARNING: Integrated approach balancing ecological integrity with economic prosperity drives sustainable forest management success

Key Highlights

- Forests in Japan are managed for multiple functions including biodiversity conservation, watershed protection, disaster prevention, recreation, and environmental stability.
- Protection forests are used for headwater conservation, soil stabilization, erosion control, flood protection, windbreaks, and rockfall prevention.
- Multi-storied forestry and low-density plantation practices help balance productivity with ecological sustainability.
- Forest conservation and slope stabilization projects reduce landslide and mountain disaster risks and protect communities.
- Advanced nursery techniques such as container seedlings, seed storage, and grafting improve plantation success and forest regeneration.
- Livelihood-based forestry activities like shiitake mushroom cultivation support rural income generation and local enterprises.
- Cooperative systems strengthen production, storage, processing, and marketing of forest products.
- Urban forestry and pilot forest restoration improve recreation, biodiversity, and environmental quality in urban and rural areas.
- The training highlighted the importance of integrating conservation, productivity, disaster management, and community benefits in forest management.
- Japan's forestry model provides practical lessons for sustainable forest management and integrated watershed development.



Group Discussion

On the second day, the technical sessions concluded with an interactive Group Discussion session involving all participants. The session was moderated by PMC Experts. The participants were divided into three groups to deliberate on emerging thematic areas relevant to future JICA-assisted projects. The discussions focused on Climate Change Resilience and Carbon Financing, Wood Transformation and Agroforestry, and Digital Transformation in project implementation. Each group actively exchanged experiences, challenges, and practical strategies for integrating innovative and sustainable approaches into future projects. The session encouraged participatory learning and enabled delegates from different states and organizations to contribute diverse perspectives and recommendations for strengthening project planning, implementation, monitoring, and long-term sustainability.



The group discussion focused on emerging thematic areas that are becoming increasingly important in future JICA-assisted projects, particularly in relation to sustainability, climate resilience, livelihood enhancement, and technology-enabled governance. The participants discussed practical approaches, institutional strategies, and scalable models for integrating innovative interventions into project planning, implementation, monitoring, and long-term sustainability. The deliberations emphasized alignment with national priorities, global climate commitments, and sustainable development goals while improving project effectiveness, transparency, and measurable impact.

Key Points Discussed:

Group A: Climate Change Resilience, Adaptation, Mitigation and Carbon Financing

The group discussed the integration of climate risk and vulnerability assessments during project planning and recommended the following strategies for adoption:

- Promoting nature-based solutions and ecosystem-based adaptation measures.
- Sustainable forest and land management practices for improving climate resilience.



- Exploration of carbon sequestration, carbon financing, REDD+, and voluntary carbon markets were explored.
- Adoption of carbon accounting, MRV, and reporting frameworks in future projects.
- Capacity building of institutions and communities for implementing climate-smart interventions was discussed.
- Convergence with national policies and financing mechanisms are important.
- Proposed preparation of a strategic roadmap for mainstreaming climate-smart and carbon-financed approaches in future JICA-assisted projects.

Group B: Wood Transformation, Seed & Wood Certification, Agroforestry / Farm Forestry

This group focused on following aspects during the discussion:

- Promotion of value-added wood products and improved wood processing technologies.
- Strengthening SHGs, MSMEs, and local enterprises engaged in forestry-based value chains.
- Establishment of seed and wood certification systems to ensure quality planting material and traceability.
- Agroforestry and farm forestry models for livelihood diversification and climate resilience.
- Integration of agroforestry with agricultural extension, credit, and insurance systems.
- Skill development, capacity building, and market linkages for forestry-based enterprises.
- Mainstreaming these components during project formulation and DPR preparation.
- Scalable implementation models with community participation and private-sector engagement to be proposed.

Group C: Digital Transformation in JICA-Assisted Projects

The groups after detailed discussion, recommended following

- Use of GIS, MIS, remote sensing, drones, and mobile applications for project planning and monitoring.
- Real-time monitoring of physical and financial progress through digital systems.
- Geo-tagging, field data collection, beneficiary tracking, and feedback mechanisms.
- Dashboards and decision-support systems for project management.
- Integration of climate, biodiversity, and livelihood indicators into digital platforms.
- Interoperability with national and state-level digital systems.
- Data quality assurance, cybersecurity, and sustainability of digital systems were also discussed.
- Capacity building and phased implementation of digital solutions with scalability provisions were recommended.



Overall Outcome of the Discussion

The group discussions resulted in practical recommendations and strategic suggestions for mainstreaming climate-smart interventions, carbon financing, wood-based value chains, agroforestry, and digital technologies in future JICA-assisted projects. The discussions highlighted the importance of integrated planning, institutional strengthening, community participation, technology adoption, and sustainable financing mechanisms for enhancing long-term environmental, social, and economic outcomes. The groupwise summary of the recommendations are:

The elaborated summary of the recommendations from all three groups are given below

Group A – Climate Change, Resilience, Adaptation, Mitigation & Carbon Financing



Group A presented a comprehensive set of recommendations centered on building climate resilience while unlocking carbon finance opportunities within JICA-assisted forestry projects.

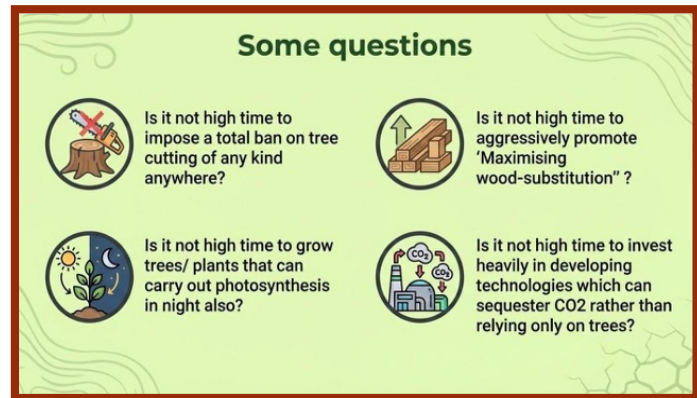
1. Context-Specific Risk Assessment: The group stressed that a one-size-fits-all approach is inadequate. Each project area must identify its own specific drivers of climate vulnerability and design targeted adaptation, mitigation, and ecosystem sustainability actions accordingly. Understanding local risks — whether drought, flooding, or land degradation — should be the starting point for any intervention.

2. Promoting Wood-Based Local Construction: One of the most practical adaptation strategies recommended was promoting the use of locally available wood and timber in construction. Wood-based buildings not only reduce dependence on carbon-intensive materials like cement and steel but also provide a sustained market for timber from farm and plantation forestry, benefiting local communities economically.

3. Integration of Green Building Norms into the National Building Code: The group recommended that green building standards, with a special emphasis on timber structures, be formally incorporated into the National Building Code of India. This would provide a regulatory and institutional push to

mainstream sustainable construction practices across the country, creating long-term demand for certified wood products.

4. Plantation of Local and Native Species: Rather than relying on exotic or fast-growing monocultures, the group advocated for encouraging the plantation of local and native tree species. This approach strengthens ecological resilience, supports biodiversity conservation, and ensures that forests are better adapted to withstand the impacts of climate change over the long term.



5. Leveraging Community and Traditional Knowledge: The group recognized that local communities possess centuries of knowledge about land, forests, and climate patterns. Integrating this traditional ecological knowledge into formal mitigation and adaptation strategies was recommended as a cost-effective and culturally appropriate way to enhance project outcomes.

6. Introduction of Payment for Ecosystem Services (PES): To incentivize local communities to protect and manage forests sustainably, the group recommended establishing PES mechanisms. By placing a monetary value on services such as carbon sequestration, water regulation, and biodiversity, communities can be directly compensated for conservation efforts, aligning their economic interests with ecological goals.

7. Early Identification of Land for Carbon Finance: Accessing carbon markets requires careful upfront planning. The group recommended identifying eligible land areas at the very beginning of projects so that carbon finance opportunities can be pursued from the initial stage, avoiding delays and maximizing the financial benefits available through compliance and voluntary carbon markets.

8. Establishing Carbon Finance Facilitation Mechanisms: Given the complexity of carbon markets, the group recommended setting up dedicated facilitation mechanisms that support aggregation of small landholdings, compliance with carbon standards, and navigation of certification processes. This would make carbon finance accessible even to small and marginal farmers who cannot engage with these markets individually.

9. Minimum Support Price and Buy-Back Mechanisms: During the long gestation period of forestry investments, when trees are growing but not yet generating income. Farmers face significant financial stress. The group recommended providing Minimum Support Price guarantees or buy-back arrangements to ensure a reliable income stream, thereby reducing the risk that farmers abandon tree plantations for short-term cash crops.

10. Strengthening Production Forestry and Renewable Energy Integration: The group called for a comprehensive strengthening of production forestry through investments in quality planting material, seed research, and tissue culture techniques. Additionally, integrating renewable energy solutions such as solar power into forestry operations was recommended to reduce dependence on fossil fuels and lower the carbon footprint of project activities.



Group B – Wood Transformation, Seed & Wood Certification, and Agroforestry/Farm Forestry

Group B focused on the critical need to build robust value chains around forestry outputs, improve the quality and traceability of planting materials, and create enabling conditions for farmers to adopt agroforestry at scale.

1. Early Integration of Wood Transformation and Certification: Value addition, processing, and certification components are often treated as afterthoughts in project design. The group strongly recommended embedding these elements from the very beginning of project planning so that infrastructure, capacity, and market linkages are developed in parallel with tree planting activities, rather than scrambling to establish them at the end.

2. Developing Pilot Agroforestry Projects with Scalability in Mind: Rather than implementing agroforestry interventions in an ad hoc manner, the group recommended developing structured pilot projects that come with clear, predefined pathways for scaling up. These pilots should be designed with measurable outcomes, covering productivity, income generation, ecological impact, and social benefits, so that successful models can be replicated efficiently across other project areas.

3. Decentralized Wood Processing and Common Facility Centres: To reduce transportation costs and generate local employment, the group recommended establishing decentralized wood processing units and common facility centres closer to production areas. These facilities would allow primary processing, such as seasoning, sawing, and preservation — to happen at the local level, increasing the value retained by communities before wood products reach larger markets.



4. Improving Seed and Planting Material Quality through Certification: The group identified the lack of quality planting material as one of the most significant bottlenecks in both forestry and agroforestry programmes. They recommended establishing certified seed sources, clonal orchards, and standardized nursery practices to ensure genetic quality and productivity. Certification systems should address traceability and sustainability, particularly for timber products destined for export markets or organized value chains.

5. Use of Digital Tools for Traceability and Transparency: The group recognized the role of technology in strengthening certification systems. Tools such as QR-based tracking and digital seed source registries were recommended to bring greater transparency to the supply chain, making it easier to verify the origin and quality of planting material and timber products throughout the value chain.

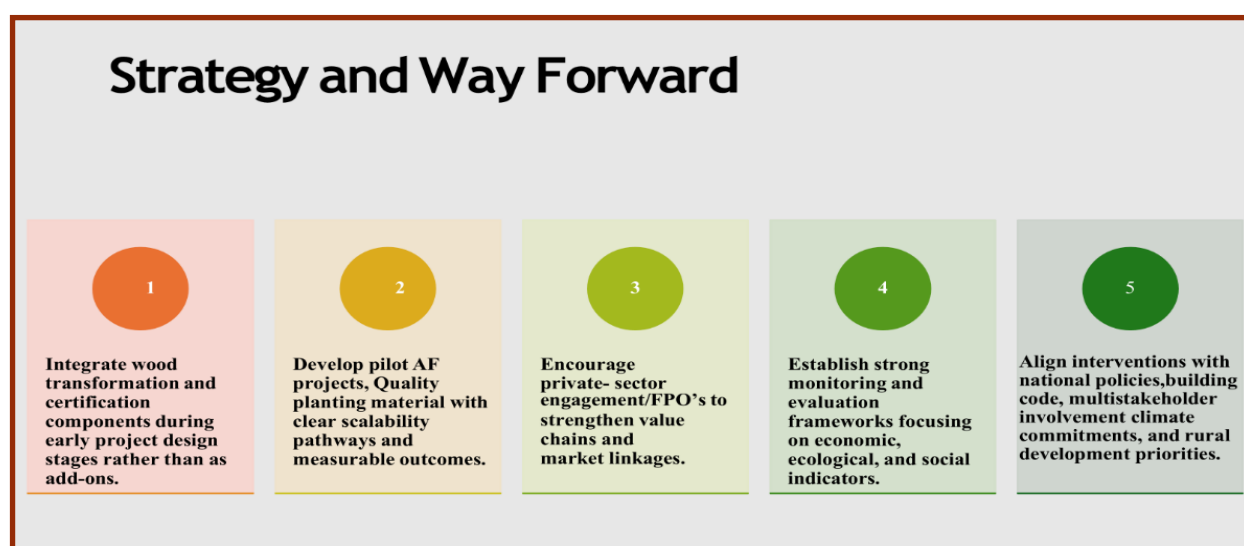
6. Encouraging Private Sector and FPO Engagement: Scaling value chains cannot be achieved through government effort alone. The group recommended actively encouraging private sector companies, Farmer Producer Organizations (FPOs), and MSMEs to participate in wood transformation and agroforestry value chains. Public-private partnerships were highlighted as a particularly effective mechanism for facilitating technology transfer, improving market access, and mobilizing investment.



7. Risk Mitigation to Encourage Farmer Participation: Farmer adoption of agroforestry remains constrained by perceived risks around uncertain markets and long waiting periods before returns materialize. The group recommended implementing risk mitigation mechanisms such as crop insurance, buy-back arrangements, and contract farming models to provide farmers with greater certainty and encourage wider participation.

8. Establishing Strong Monitoring and Evaluation Frameworks: The group recommended that all interventions be supported by robust monitoring and evaluation systems that track progress across economic, ecological, and social dimensions. This would ensure accountability, enable course corrections, and generate credible evidence to guide future investments.

9. Alignment with National Policies and Climate Commitments: Finally, the group emphasized the importance of ensuring that all project interventions are aligned with existing national policies, building codes, climate commitments, and rural development priorities. This alignment would strengthen institutional support for the projects and improve the prospects of sustaining outcomes beyond the project period.



Group C– Digital Transformation Across States

Group C, presented the collaboration to harness digital technologies across JICA-assisted forestry projects in India, with a focus on creating scalable, interoperable, and value-driven digital solutions.

1. Digital Tools Must Drive Decision-Making, Not Just Reporting: A foundational principle emphasized by the group was that digital tools deployed in forestry projects should go beyond mere data collection and reporting. They must actively support informed decision-making by forest managers, field staff, and policymakers, enabling timely, evidence-based responses to challenges such as encroachment, wildlife conflict, fire management, and NTFP market fluctuations.

2. Blueprint and Repository for Best Practices: The group recommended developing a shared blueprint and centralized repository of digital best practices — such as Git repositories for code, seven canopy density classification systems, and NTFP management tools. This would prevent duplication of effort across states and allow successful innovations to be adopted rapidly by other projects.

3. Co-Creation and Innovation with the Broader Ecosystem:

Digital transformation in forestry cannot be achieved in isolation. The group stressed the importance of co-creating digital solutions in collaboration with a broader ecosystem of stakeholders — including state forest departments, technology providers, research institutions, and communities. An innovation-focused culture that encourages experimentation and iterative development was identified as essential for long-term success.



4. Interoperability of Digital Tools: Many state forest departments already have a range of digital systems in use — for monitoring, licensing, nursery management, and more. The group highlighted the critical need to ensure that the states should communicate with each other and work together seamlessly, rather than functioning as isolated silos. Building interoperable systems would dramatically improve efficiency and data quality across the board.

5. Modular and Customizable Architecture: Rather than building monolithic, state-specific software systems, the group recommended adopting a modular architecture where reusable digital components can be deployed across different schemes and states with appropriate customization. This approach reduces development costs, speeds up implementation, and ensures that improvements in one module benefit all users.

6. National-Level Standardization to Prevent Fragmentation: A consistent concern raised was that without national-level standardization, digital investments in forestry risk becoming a patchwork of incompatible, isolated pilot projects. The group called for common definitions, standards, and frameworks — particularly in Detailed Project Reports (DPRs) — to ensure coherence, scale, and long-term sustainability of digital initiatives.

7. Leveraging AI and Open-Source Technologies: To accelerate innovation and reduce costs, the group recommended leveraging artificial intelligence and open-source prototyping tools. These approaches enable faster development cycles, allow smaller teams to build sophisticated solutions

8. Learning from Existing State Models: States such as Chhattisgarh and Odisha were cited as examples with relatively advanced digital practices in forestry management. The group recommended systematically learning from these models and adapting successful approaches to other states, rather than developing entirely new systems from scratch in each location.

9. Emerging Digital Use Cases Across Sectors: The group identified a rich set of emerging digital applications across key domains — including digital timber marketplaces for fair price discovery in agroforestry, digital aggregation platforms and GI tagging for NTFP/MFP ecosystems, digital inventory and micro-credit linkage tools for SHGs, supply chain optimization and market intelligence dashboards for logistics, and geospatial land parcel surveys and fire management integration for forestry governance.



10. Focus on Value Creation Beyond Monitoring: Ultimately, the group's vision for digital transformation was not merely to improve compliance and monitoring but to drive meaningful value creation, enhancing livelihoods, improving market access, strengthening governance, and empowering communities to participate more effectively in the forestry economy.



JICA Perspective

- **Different Digital Maturity Across States – Need differentiated approach**
- **Common Vision & Definitions Required – Especially in DPRs**
- **National-Level Standardization Critical – Prevent isolated pilots**
- **Leverage Existing Models – Learn from Chhattisgarh, Odisha, others**
- **Technology Should Be Reusable & Scalable – Across states and JICA projects**
- **Avoid Reinventing the Wheel – Build interoperable, modular systems**
- **Focus on Value Creation – From monitoring to livelihood enhancement**

5
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Valedictory Session



The valedictory session of the 14th National Workshop of JICA Assisted Forestry Projects, held in Bhubaneswar in February 2026, was graced by the august presence of Shri Bhaskar Jyoti Sharma, IAS, Principal Secretary, Forest, Environment and Climate Change Department, Government of Odisha; Shri N. Murugesan, IFS, Principal Chief Conservator of Forests and Head of Forest Force, Odisha Forest Department; and Mr. Sidharth Parmeshwaran, Development Specialist, JICA India Office.

At the outset, **Shri G. Rajesh, IFS, Project Director, OFSDS** warmly welcomed the dignitaries and delegates present on the dais and expressed gratitude to all participating states, institutions, experts, and development partners for their active participation and valuable contributions during the workshop. He also presented a summary of the key outcomes and deliberations of the three-day workshop, highlighting the exchange of experiences and best practices among JICA-assisted forestry projects across India.

Addressing the gathering, **Shri N. Murugesan, IFS**, emphasized the importance of strengthening participatory forest management and adopting innovative approaches for sustainable forestry governance. He highlighted the need for integrating technology, scientific management practices, and community institutions to address emerging challenges related to climate change, biodiversity conservation, and livelihood security. He further appreciated the role of JICA-assisted projects in creating successful models of sustainable forest management and enhancing the capacities of forestry professionals across states.

In his valedictory address, **Shri Bhaskar Jyoti Sharma, IAS, Principal Secretary, Environment, Forest and Climate Change Department, Government of Odisha** appreciated the rich deliberations and knowledge-sharing that took place during the workshop. He underlined the importance of collaborative learning among states and institutions for achieving long-term ecological sustainability and community prosperity. He also stressed the need to strengthen convergence, promote green growth, and enhance livelihood opportunities for forest-dependent communities through sustainable forest-based enterprises and value addition initiatives. He commended OFSDP-II and JICA for successfully organizing the workshop and providing a valuable platform for sharing innovative forestry practices and experiences.

Shri Siddharth Parameswaran, JICA India in his address, highlighted that the 14th National Workshop of JICA Assisted Forestry Projects in India provided an important platform for knowledge sharing, collaboration, and discussions on the future of sustainable forestry in India. He emphasized the significant achievements of JICA-supported forestry projects, particularly OFSDP, and noted that key deliberations focused on climate adaptation, digital transformation, and wood transformation. According to him the workshop reaffirmed the shared commitment of JICA, Government of India, and State Forest Departments towards climate resilience, biodiversity conservation, and sustainable livelihood development through collective action and international cooperation.

The dignitaries appreciated the successful organization of the workshop by the Odisha Forestry Sector Development Project Phase-II (OFSDP-II) in collaboration with JICA. They lauded the platform for fostering knowledge sharing, inter-state learning, and strengthening partnerships among forestry institutions and stakeholders. The speakers reiterated the importance of integrating conservation goals with sustainable development approaches for achieving long-term ecological and socio-economic benefits.

The session concluded with a heartfelt vote of thanks proposed by **Shri Swayam Mallick, IFS, Joint Project Director, OFSDS**. He conveyed sincere gratitude to the dignitaries, delegates, representatives from various JICA-assisted forestry projects, resource persons, organizing teams, support staff and members from media for their valuable participation and contributions towards the successful conduct of the workshop. He also acknowledged the continued support and cooperation extended by JICA, the Forest, Environment and Climate Change Department, Government of Odisha, and all partner institutions in making the event a grand success.

The valedictory session ended on a positive note with renewed commitment towards strengthening sustainable forest management practices, collaborative learning, and partnership-driven forestry development initiatives across the country.





Day 3 | 13th February 2026

FIELD VISIT

The third day of the workshop was devoted to a field visit organized for interested participants to the Puri Wildlife Division. The visit covered important departmental intervention sites located in and around the ecologically rich and culturally significant landscape of Puri and the heritage site of the Sun Temple at Konark. The objective of the field tour was to provide participants with first-hand exposure to ongoing forest management and conservation activities and to complement the conceptual and strategic discussions held during the previous two days of the workshop.

The Forest Department staff discussed about various interventions being implemented, including habitat improvement works, plantation activities, protection measures, and conservation initiatives in sensitive areas. The field interactions enabled delegates to better understand ground realities, including operational challenges



faced by field staff such as resource limitations, protection issues, and management of human-wildlife interactions. Informal discussions with frontline staff and community members further enriched the learning experience. Overall, the field visit was highly enriching and well appreciated by the participants, as it provided practical insights into the implementation of forest management strategies. It effectively reinforced the importance of field-level execution, community participation, and adaptive management in achieving sustainable conservation goals.







Articles and Notes From the Participating States



Harmonizing Nature and Livelihoods: The Journey of OFSDP Phase-II

In the heart of Odisha's verdant landscapes, a transformative journey is unfolding. The Odisha Forestry Sector Development Project (OFSDP), Phase-II, is proving that environmental conservation and socio-economic growth are not competing goals, but two sides of the same coin. Launched in 2017-18 with a 10-year horizon, this ambitious initiative—backed by the Japan International Cooperation Agency (JICA)—is redefining sustainable forest management across 10 districts of the state.

A Robust Framework for Change

With a total financial outlay of ₹1,000.30 crore, the project is built on a foundation of partnership. While JICA provides loan assistance of ₹848.60 crore, the State Government contributes ₹151.70 crore. The implementation is massive in scale, spanning 50 Forest Ranges within 12 Forest Divisions and 2 Wildlife Divisions.

At its core, OFSDP-II seeks to enhance forest ecosystems while securing the livelihoods of those who depend on them most. This is achieved through a community-led model, placing the forest's future directly in the hands of local people.



Gudipalli VSS, Surada FMU, Ghumsur (S) Division



Farm Forestry, Badpahad VSS, Karanjia Division

Empowering Communities Through JFM

The heartbeat of the project lies in its 1,210 Vana Surakshya Samitees (VSSs) and 10 Eco Development Committees (EDCs). By assigning 1.25 lakh hectares of forest area to these committees, the project ensures that conservation is a participatory act.

The results speak for themselves:

- **Green Cover:** Over 51,000 hectares of Assisted Natural Regeneration (ANR) and 6,286 hectares of Block Plantations have been completed.
- **Beyond the Forest:** Farm Forestry has expanded over 8,885 hectares, benefiting nearly 20,000 individuals outside traditional forest boundaries.
- **Resource Management:** Strategic soil and moisture conservation measures and over 1,710 km of fire line maintenance have fortified the landscape against climate risks.



Fuel Fodder Plantation over 20 H. at Sahajabahal VSS of Binka FMU, Subarnapur



Fuel Fodder Plantation, Jhulendihi VSS, Lephripa FMU, Sundargarh DMU

From Conservation to Prosperity

What sets OFSDP-II apart is its focus on the “poorest of the poor.” By integrating 4,624 Women Self Help Groups (SHGs) and Common Interest Groups, the project has turned forest dwellers into entrepreneurs.

The establishment of specialized Livelihood Clusters has added value to local produce:

- **Sal Leaf** clusters in Baripada, Rairangpur, and Karanjia.
- **Pulses** in Boudh and Cashew in Dhenkanal.
- **Lemon Grass Oil** in Jharsuguda.

To further boost local economies, the project has facilitated ₹30.53 crore in loans through VSS Revolving Funds, empowering SHGs and forest dependent families to launch income-generating activities.



NTFP Plantation Khadisole VSS, Baripada



Soil work inside ANR Plantation, Baripada



Scientific Excellence and Synergy

The project doesn't just work on the ground; it looks to the future through science. In the Bhitarkanika Conservation Area, the project collaborates with the National Centre for Sustainable Coastal Management (NCSCM) to monitor ecosystem health, already producing three significant Health Report Cards. Meanwhile, the Satoyama model in the Bamra Wildlife Division is showcasing how human-influenced landscapes can support biodiversity.

Furthermore, the project's success is amplified by inter-sectoral convergence. By aligning with 41 Line Departments, OFSDP-II has mobilized ₹744.40 crores in additional resources, touching the lives of over 26 lakh beneficiaries.



Plantation under Saluapalli VSS, Ghumsur (N) Division



Plantation under Baghuapalli VSS, Ghumsur (N) Division

A Legacy of Knowledge

As we look toward the project's completion in 2026-27, its greatest legacy may be the knowledge left behind. With over 5,100 training programs conducted for 2.08 lakh stakeholders, the project has built a skilled workforce of foresters and community leaders ready to protect Odisha's natural heritage for generations to come.

OFSDP Phase-II stands as a beacon of hope- a testament to what can be achieved when international cooperation, government vision, and community spirit unite to protect the green lungs of our planet.



DLT JFM Padhel VSS, Boudh DMU



LBCD Chhamunda VSS, Sambalpur DMU

Target & Achievement of OFSDP-II from 2017-18 to 2025-26 (till December, 2025)

SL No.	Project Components	Sub-Component	Target to Cover	Achievement
1	2	3	4	5
1	Preparatory Works	No. of VSS	1200	1210
		No. of EDC	1	10
		Deployment P.NGO	34 nos Teams	34 nos Teams
		VSS Animators Engagement	2400 nos Animators	2420 nos Animators
		EDC Animators Engagement	1	10 Nos
		Micro Plan Preparation	1200 Nos	1211 Nos
		Revisit of Micro Plan	1210 Nos	1179 Nos
2	Sustainable Forest Management	Total Assigned Forest Area Cover in Ha		1,25,703
		ANR Plantation	51000 Ha.	51006 Ha.
		AR Plantation	6000 Ha.	6286 ha.
		Farm Forestry (Plantation & Incentive)	10000 Ha.	8885.5 Ha.
3	SMC	DLT JFM	1500 Ha.	1504.5 Ha.
		DLT Non-JFM	750 Ha.	756.29 Ha.
		Fire line Construction (Establishment)	1710 RKM	1710.39 RKM
		Consolidation of Forestry Boundary	1898 RKM	1898 RKM
		Permanent Nursery (Hi-Tech Nursery)	6 Nos	6 Nos

4	Livelihood	SHG/CIG/PoP through Revolving Fund support		SHG-3055, CIG-479, PoP-12994 Nos, Beneficiaries-46580 Nos
		Disbursement of Revolving Fund		30.53 Cr
		Livelihood promotion through Convergence		
		Funds Mobilize		744.40 Cr.
		No of Beneficiaries		26.53 lakhs Beneficiaries
		Establishment of Product Clusters	6 Nos	6 Nos (Sal leaf -Baripada, Karanjia & Rairangpur), (Cashew-Dhenkanal), (Pulses-Boudh) & (Lemon Grass Jharsuguda
5	Capacity Building Training	Theme		24 nos
		No of Trainings / Exposure Visits		5109 Nos.
		No of Participants		2,08,700 Nos
		Stakeholders	Project Personnel, P NGO Team, Line Department Officials, VSS Members, SHGs, CIGs PoPs and Animators	
6	Sustainable Biodiversity Management	Incorporation of the concept of Satoyama Model	1 Nos	1 Nos
		Establishment of Scientific Monitoring System at Bhitarkanika	1 Nos	1 Nos
7	Consulting Service	PMC Establishment for operation	1 Nos	1 Nos

Plantation through JICA Projects in West Bengal

Introduction

Tropical and subtropical forests of South Asia provide ecosystem services of global importance, including carbon sequestration, watershed regulation, biodiversity conservation, and rural livelihood support. Land use changes and climate variability and overuse of resources has put so much pressure on these forests that need for special inputs for their revival was felt imperative.

West Bengal is the only state in the country having hill areas that receive snowfall, plains receiving floods and deltaic areas facing cyclones and storms. Its dominant vegetation includes temperate, deciduous and mangroves. With these natural vegetations and process these areas support a rich and divers flora and fauna which in turn provide different ecological services, and hence need to be enriched and protected so that it may continue to provide the same.

JICA projects

To address above challenges suitably, the Government of West Bengal, with the assistance of the Japan International Cooperation Agency (JICA), initiated a project viz. WBFBCP (West Bengal Forest & Biodiversity Conservation Project) which from 2013 to 2022. After successful completion and highly satisfactory performance of the this first project, second project WBFBCCR(West Bengal Forest & Biodiversity Conservation for Climate Change Response) was initiated starting from 2023 and expected to complete in 2031. JICA, as one of the world's largest bilateral development agencies, has a long track record of supporting sustainable forest management in developing nations. These projects represent a significant commitment of technical and financial resources aimed at rehabilitating degraded forest areas through nursery-based seedling production, systematic plantation, and community engagement. A set of diverse activities were implemented through these projects including plantation, wildlife management, livelihood improvement and institutional strengthening but this write up focuses on plantation and allied activities only. A Project Management Unit(PMU) was created at the head Quarter level under which different DMU(Divisional Management Units- the Forest Divisions) and FMU(Field Management Units- Forest Ranges) worked with cooperation of Joint Forest Management Committees (JFMCS local communities). DMU was main field unit responsible for nursery management, planting operations, and post-plantation maintenance.

Plantation

1. Nurseries

Systemic reforms were brought under this activity by changing the nursery practices and plantation techniques. In this project infrastructure for standardisation of nurseries were created to raise better quality of seedling which are stronger and taller and free from diseases. To achieve the same central nurseries at the DMUs were provided funds to make raised beds and purchase hycopots of different sizes to grow seedlings. In this phase two sizes of hycopots 150cc and 300cc were used. This practice completely eliminated the use of polypots. Polypots are plastic containers in which seedlings were grown. They are kept on ground with growing seedling inside and need frequent shifting to prevent damages to roots of seedlings. Moreover, raised beds with hycopots in central nurseries helped in improving sanitation, capacity determination and better survival of seedlings. A summary table for central nurseries raised in both phases is given below :-

Table -Nurseries created in Phase-I

Name of D.M.U	Unit	Total Nursery Capacity
Baikunthpur	1.00	2,00,000.00
Bankura north	4.00	8,00,000.00
Bankura south	3.50	7,00,000.00
Birbhum	1.00	2,00,000.00
Burdwan	2.50	5,00,000.00
Coochbehar	0.50	1,00,000.00
Darjeeling	0.50	1,00,000.00
Durgapur	1.00	2,00,000.00
Jalpaiguri	2.50	5,00,000.00
Jhargram	1.00	2,00,000.00
Kangsabati north	1.75	3,50,000.00
Kangsabati south	1.50	3,00,000.00
Kharagpur	1.50	3,00,000.00
Kurseong	1.50	3,00,000.00
Medinipur	4.00	8,00,000.00
Panchet	5.00	10,00,000.00
Purulia	2.00	4,00,000.00
Rupnarayan	4.50	9,00,000.00
Wildlife iii	0.75	1,50,000.00
Grand total	40.00	80,00,000.00

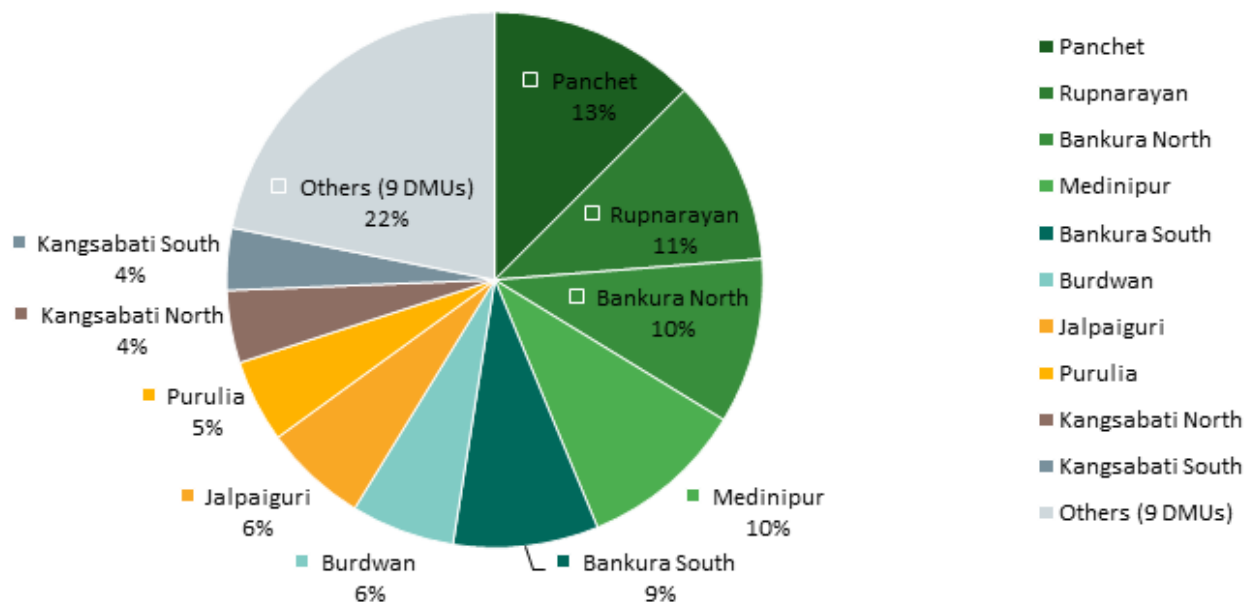
Similarly in Phase-II of the project nurseries were further improved and upgraded. It was recommended by the committee to go for bigger hycopots to further improve the seedling quality. Accordingly two sizes of hycopots- 750 cc & 1000cc were used and raised beds were modified accordingly. A list of nurseries created/maintained in this phase is given below :-

Table -Nurseries created in Phase-II

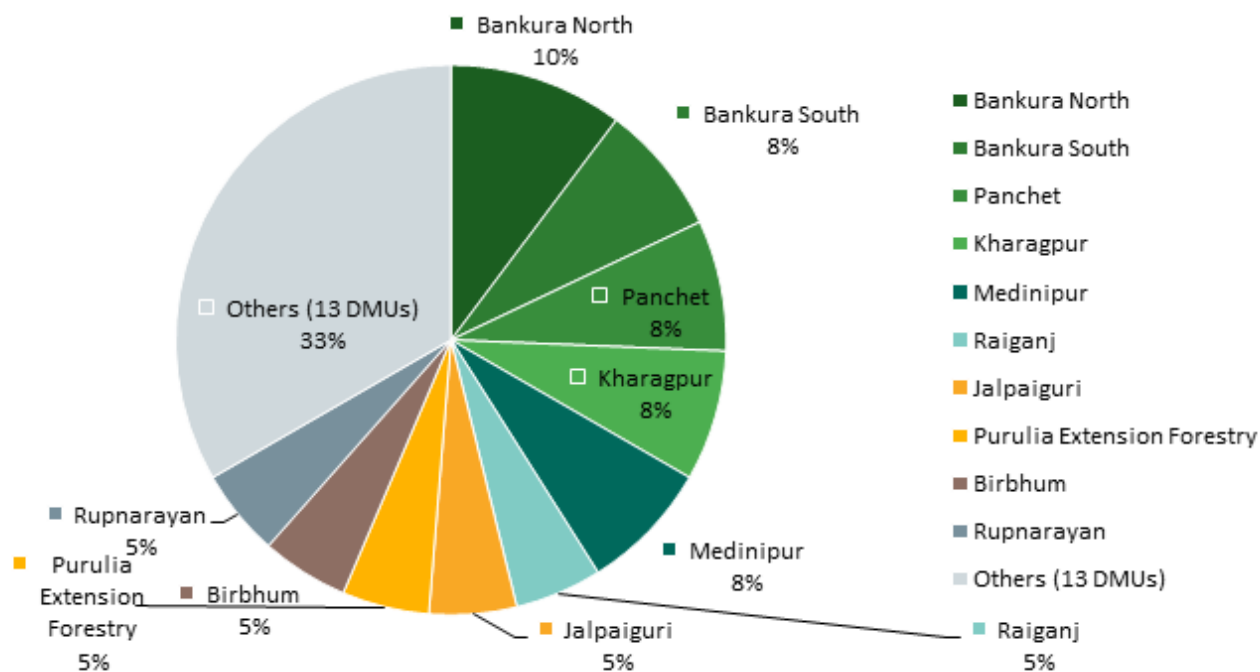
Sl. No.	DMU Name	No. of Nurseries	Total Capacity (seedlings)
1	Buxa Tiger Reserve (East)	1	60,000
2	Buxa Tiger Reserve (West)	1	60,000
3	Bankura North	4	240,000
4	Bankura South	3	180,000
5	Panchet	3	180,000
6	Darjeeling	1	60,000
7	Kurseong	1	60,000
8	Kalimpong	1	60,000
9	Raiganj	2	120,000
10	Baikunthpur	1	60,000
11	Coochbehar	1	60,000
12	Jalpaiguri	2	120,000
13	Silviculture Hill	1	60,000
14	Silviculture North	1	60,000
15	Purulia Extension Forestry	2	120,000
16	Birbhum	2	120,000
17	Kangsabati North	1	60,000
18	Kangsabati South	1	60,000
19	Purulia	1	60,000
20	Kharagpur	3	180,000
21	Medinipur	3	180,000
22	Rupnarayan	2	120,000
23	Wildlife III	1	60,000
	Grand Total	39	2,340,000

As it is evident from the above tables plantation and nurseries activities were more concentrated to southern part of the state primarily due to two reasons, firstly, southern part has more degraded forest land available for plantation and, secondly northern region has better forest density and less degraded areas.

Nursery Capacity (Phase-I)



Nursery Capacity (Phase-II)



2. Plantations

Plantations were done following the standard silvicultural practices prescribed in the working plans of concerned Forest Divisions. Seedlings were raised in the central nurseries created under the projects. Seeds were taken from seed stands and were mostly supplied by the Silviculture Divisions to DMUs. This entire exercise led to the creation of 21883 ha. of plantations across the states creating many man-days of work in forest and forest fringe areas. In Phase-1 total eight models of plantations were followed in different areas as given below in the table :-

Table- Plantation models in Phase-1

SI No	Model	Area covered(Ha)	Species planted
1	A1	450	Eucalyptus clonal plantation
2	A2	2510	Sal & associates in SB
3	A3	7300	Local QGS in SB
4	A4	8430	Coppice regeneration of Sal
5	A5	1190	Miscl Sps in NB
6	A6	400	Sal & associates in NB
7	B1	1501	Strip plantation
8	B2	100	Block plantation

Note :

1. NB- North Bengal
2. SB- South Bengal
3. Sal- Shorea robusta

Table- Plantations created in different DMUs in Phase-1

Sl. No.	DMU Name	Total Plantation (Ha)
1	Medinipur	2613
2	Rupnarayan	1716
3	Kharagpur	1725
4	Jhargram	1078
5	Purulia	1235
6	Kangsabati north	810
7	Kangsabati south	631

8	Purulia extension	75.86
9	Bankura north	2631
10	Bankura south	2614
11	Panchet	2113
12	Burdwan	1124.5
13	Durgapur	235
14	Birbhum	365.74
15	Nadia murshidabad	97
16	Kurseong	220
17	Darjeeling	100
18	Baikunthapur	325
19	Jalpaiguri	700
20	Coochbehar	135
21	Wildlife - iii	180
22	Malda	137
23	Raiganj	490
24	Siliguri sf	247.5
25	Jalpaiguri sf	195
26	Howrah sf	89.43
	Total	21883

Plantation under this phase is going on as mentioned in the table above. In this phase only local species are being planted and includes two models- 1. Sal and associate species, 2. Miscellaneous species. It has been mandated that each DMU will plant at least fifty local species in each plantation. One important feature of Phase-II is creation of Seed Stands of 50Ha area in North Bengal to ensure continuous supply of the seeds for future plantations.

In order to ensure seed production of tree species of economic importance in the long run, seed production areas (SPAs) shall be developed. Genetically superior propagules shall be selected and planted in the SPAs. Tree plantation out of forest area (TPOFA) has also been kept as a component with a total target of 50 ha area.



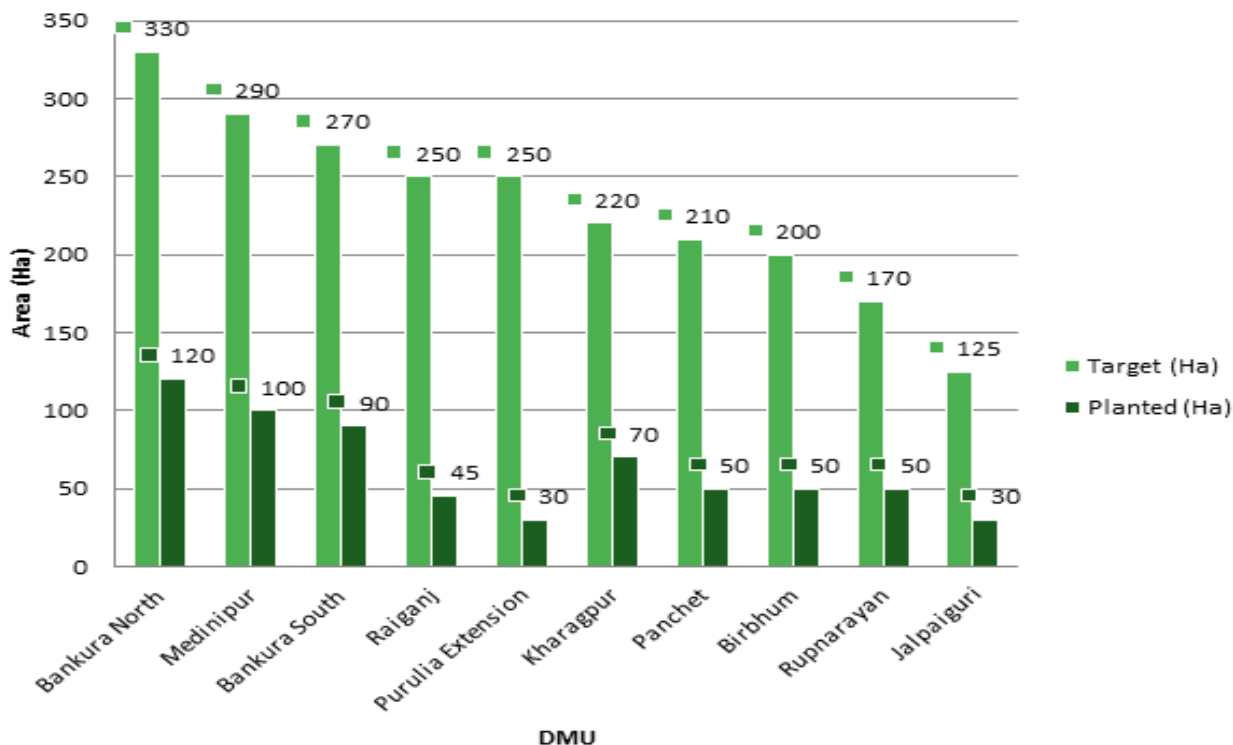
Table- Plantations created in different DMUs in Phase-II

Sl. No.	NAME OF D.M.U	Plantation Target	Plantation Done
1	Medinipur	290	100
2	Rupnarayan	170	50
3	Kharagpur	220	70
4	Purulia	100	30
5	Kangsabati north	120	40
6	Kangsabati south	90	20
8	Bankura north	330	120
9	Bankura south	270	90
10	Panchet	210	50
11	Birbhum	200	50
12	Kurseong	20	10
13	Darjeeling	25	10
14	Kalimpong	10	10
15	Baikunthapur	30	0
16	Jalpaiguri	125	30
17	Coochbehar	20	10
18	Buxa tiger reserve (east)	30	10
19	Buxa tiger reserve (west)	40	10
20	Jaldapara WL	50	10
21	Raiganj	250	45
22	Purulia Extension	250	30
23	Silviculture (Hill)	20	10
24	Silviculture (North)	30	15
Total		2900	820

As Phase-II is ongoing, all the targets will be achieved as per time schedule. A comparative summary of different DMUs targets vis a vis achievement is provided below :-



Plantation Target vs. Area Planted (Phase-II)



Monitoring and survival- Monitoring of these plantations are done by the Monitoring Wing and survival percentage has been found very good and almost of the plantations of Phase-I have shown above seventy percent survival after 5th year monitoring. Records of these plantations are kept in e-Plantation journals and thus are preserved for ever.

5th Year Plantation Survival (Phase-I Monitoring)

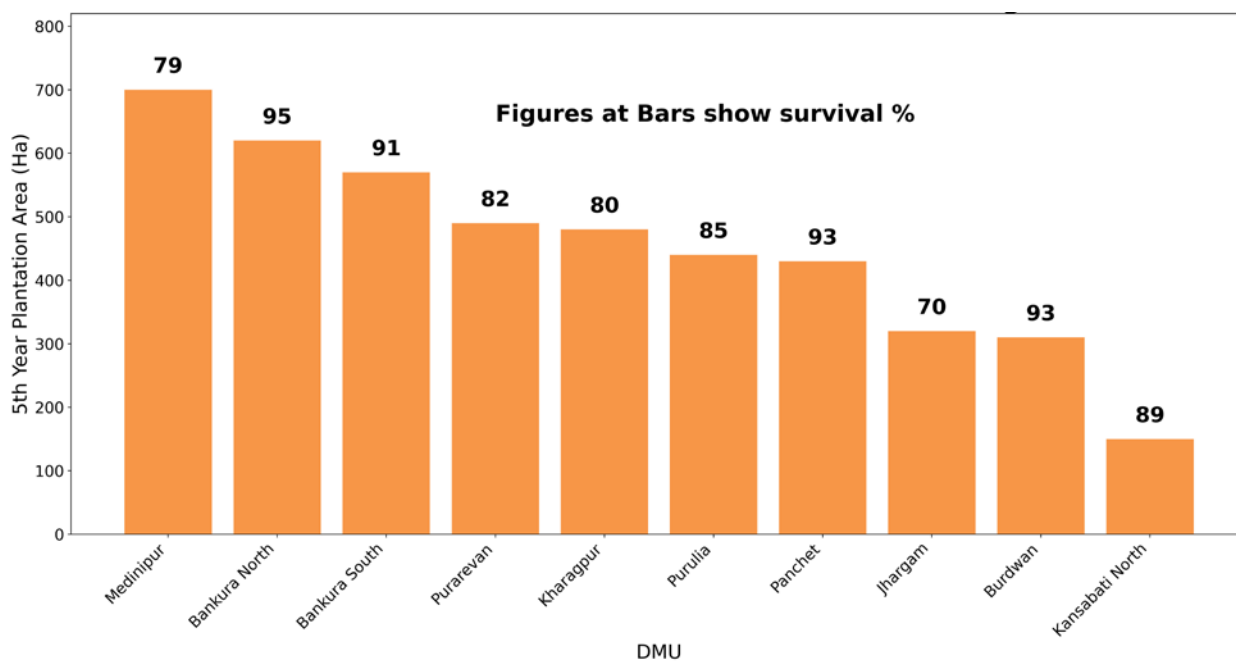


Table- WSP of 5th Year plantations of Phase-I

Sl. No.	DMU	5th yr plantation (ha)	WSP(weighted survival%)
1	Medinipur	701	79
2	Rupnarayan	489	82
3	Kharagpur	475	80
4	Purulia	440	85
5	Kangsabati north	145	89
6	Kangsabati south	100	95
8	Bankura north	625	95
9	Bankura south	570	91
10	Panchet	425	93
11	Birbhum	55	87
15	Baikunthapur	70	63
17	Coochbehar	25	78
20	Jaldapara WL	55	87
21	Jhargram	315	70
22	Burdwan	308	93
23	Durgpur	50	91
24	Kurseong	40	70
25	Malda	55	87

Survival of plantations done under the project clearly speaks about the success of the project. Plantations are basic and primitive natural tools of carbon sequestration and long term carbon storage. With experience and lessons learnt from the phase-I of the project, Phase-II plantations will definitely become more successful and will provide different ecological services including carbon sequestration.



Nagaland: Brief on Nagaland Forest Management Project (NFMP)

The Nagaland Forest Management Project (NFMP) is a 10-year (2017–2027) externally aided initiative of the Government of Nagaland supported by the Japan International Cooperation Agency (JICA), covering 185 villages across 11 districts and targeting restoration of 79,096 hectares of Jhum-affected landscapes with an outlay of approximately ₹530 crore. The project integrates forest restoration, livelihood development, institutional strengthening and digital governance under a community-led framework. A key innovation of NFMP is the operationalisation of five context-specific forestry models namely Jhum Agro Forestry (JAF), Jhum Fallow Forestry (JFF), Jhum Conversion to Forestry (JCF), Jhum Conversion to Community Conservation Area (JCC) and Protection and Expansion of Community Conserved Area (PEC) designed to convert shifting cultivation areas into sustainable, income-generating and ecologically resilient landscapes. The deployment of 99 native species through decentralised, community-managed nurseries enhances biodiversity while mitigating climate risks. Institutionalisation of Free, Prior and Informed Consent (FPIC), participatory microplanning, and convergence with multiple departments represent important best practices that anchor ecological restoration within community ownership and long-term sustainability.

On the livelihood front, NFMP has formed 431 Self-Help Groups comprising approximately 3,680 women members, promoted 15 income generating activities, and released ₹3.56 crore as revolving funds, thereby creating structured rural income systems linked to forest conservation. Market-oriented innovations such as the “Freshly Wokha” and “Delightful Mokokchung” brands, supported by quality control and FSSAI registration, demonstrate a transition from subsistence production to organised enterprise. Some of the flagship case studies include the EPA–WHS water security model at Aliba village, which provided household tap water through multi-departmental coordination; and conservation-linked betel leaf cultivation along Community Conservation Area boundaries in Mon district highlight tangible socio-ecological impact. The project’s digital forestry ecosystem, including GIS-based monitoring, mobile data collection and plantation tracking, has strengthened transparency and data-driven governance. Collectively, NFMP represents a scalable model for Jhum landscapes where forest restoration, women-led institutions, market-linked livelihoods and digital innovation converge to deliver ecological and socio-economic transformation.

Feedback on 14th National Workshop of JICA assisted Forestry Projects in India

The 14th National Workshop of JICA Assisted Forestry Projects in India, themed “Future Ready Forestry – Climate Resilience, Digital Transformation and Sustainable Wood Economies,” marked a significant coming of age of the JICA forestry platform in the country. The workshop successfully positioned itself as a strategic dialogue platform aligned with JICA’s assistance framework for 2024–26, which emphasizes climate change response, green transformation, disaster risk reduction, and the policy principles of co-creation, innovation, and circulation.

The deliberations were forward-looking and policy-aligned, setting a clear tone that forestry projects must now integrate climate resilience, digital governance, and sustainable market linkages into their core design.

Fruitful technical discussions were held on wood transformation and value chain strengthening, with particular focus on certification mechanisms such as the Forest Stewardship Council (FSC) and PRAMAAN, recognizing certification not merely as compliance but as a market-enabling instrument for integrating smallholders, SHGs, and community institutions into formal sustainable wood economies.

The presentation by the Odisha Forestry Sector Development Society (OFSDS) on the Satoyama initiative reinforced multi-pronged approach of infrastructure development, resource Protection, sustainable livelihoods and environmental awareness. The landscape-level ecological harmony and ecosystem-based approaches to climate adaptation of Tamil Nadu, highlighted the importance of moving beyond plantation-centric models towards ecosystem service-oriented forestry.

One of the most impactful segments of the workshop was the group discussion on digital transformation, which facilitated a free and substantive exchange of ideas across states and led to several important conclusions. A strong consensus emerged that digital systems in forestry must evolve from static reporting tools into dynamic decision support systems capable of informing adaptive management. The Digital Forest Stack developed by Rajasthan demonstrated how integrated GIS–MIS architectures can serve as scalable models for replication. Participants emphasized the need for a centralized open digital repository of best practices from JICA-assisted projects to ensure cross-learning and prevent duplication of effort. The use of open-source AI tools for rapid prototyping was recommended to reduce go-live timelines and avoid vendor lock-in. It was further suggested that future DPRs should be digitally designed from inception, incorporating GIS baseline maps, digital monitoring plans, standardized data protocols, and app-based reporting frameworks. The integration of carbon stock maps, fire vulnerability layers, flood risk maps, biodiversity indices, and plantation performance dashboards within unified GIS–MIS platforms was identified as essential for climate-smart forestry governance. Discussions also highlighted the importance of digitizing SHG inventories, enabling data analytics for production forecasting, and establishing digital fleet management systems covering transport tracking, aggregation logistics, product inventories, and marketing analytics to strengthen sustainable wood economies.

Overall, the workshop demonstrated thematic coherence, operational relevance, and strategic depth, signaling a transition from project-based forestry implementation to platform-based forestry governance driven by climate intelligence, digital integration, and market-linked sustainability.



Telangana: Eco Restoration & Biodiversity Conservation Project of Telangana

(Proposed under Official Development Assistance of Japan International Cooperation Agency (JICA))

The total geographical area of Telangana State is 1.12 crore ha, of which 26.97 lakh ha (24.05%) is under forest cover. However, degradation, biotic pressure, forest fires, and habitat fragmentation necessitate large-scale eco-restoration and biodiversity strengthening interventions. Therefore, Government of Telangana has proposed the Eco Restoration & Biodiversity Conservation Project with financial assistance from JICA to strengthen forest productivity, biodiversity conservation, and livelihood security of forest fringe communities across all 33 districts of Telangana through the Telangana Forest Department. The project will be implemented over 5 years.

The total project cost is ₹1270 Crores to be implemented over five years, out of which JICA Assistance is 85% & the rest 15% born by the Telangana Government. The investment covers plantations, soil & moisture conservation, wildlife management, forest protection, eco-tourism, livelihood enhancement, infrastructure, capacity building, IT strengthening, and monitoring.

The JICA-supported Eco Restoration & Biodiversity Conservation Project is a transformative initiative aimed at restoring degraded ecosystems, strengthening biodiversity, and ensuring sustainable livelihoods. The project integrates ecological restoration with socio-economic development, setting a strong foundation for sustainable forest management in Telangana.

The expected outcomes of the project is improvement in forest cover density and growing stock, enhanced groundwater recharge and soil conservation, strengthened wildlife habitats and corridors, reduction in forest fires and illegal activities. Apart from that livelihood opportunities to the forest fringe communities will be provided besides contribution towards achieving 33% green cover target as per National Forest Policy.



Brief Note on the Project for Ecosystem Restoration in Gujarat

The Project for Ecosystem Restoration in Gujarat (PERG), JICA assisted Project, is a project of 12 years duration with an outlay of 16.293 billion YEN (~ 10.719 billion INR) and has commenced since 2024.

Main Objective

The main objective to restore and enhance ecosystem services by development of mangroves and coastal shelterbelts, restoration of grasslands, wetlands and forests, management of human wildlife conflicts, and institutional strengthening, thereby contributing to solving socio-economic issues in Gujarat state.

Coverage

The project intervention area spreads to 11 Circles, 21 Districts, 27 Divisions and 114 Ranges.

Components

The project has four main components, namely (1) Ecological Infrastructure Development in Coastal Area, (2) Ecological Infrastructure Development in Inland Area, (3) Human Wildlife Conflict Management and (4). Institutional Strengthening.

Physical Targets

The main physical targets to be covered under the projects are;

Plantations:

- Plantation in Coastal Area- 12200 ha,
- Grassland Plantation- 8500 ha
- Plantation in Degraded Land – 9000 ha
- Other plantations – 2000 ha Total 31700 ha

Development of wetlands - 8 including recognition of three Wetlands as Ramsar Sites and One World Heritage Site.

Special facilities: Ecotourism Centres- 4, Breeding Centres- 8, Rescue Centres- 9, Botanical Gardens -2 and Solid Waste management Facility-1.

Livelihood Support: Clusters-8, Village Panchayats-19, People's Organisations (JFMCs/EDCs)- 701 and SHGs- 1402.

Main Approach

- Participatory approach of Eco-restoration.
- Implementation in Society Mode.
- MIS/GIS supported reporting and monitoring.
- PMC to assist PMU in project implementation and monitoring.
- Environment and Social Considerations.

Project for Improvement of Himachal Pradesh Forest Ecosystems Management & Livelihoods (PIHPFEM&L-JICA)-A brief overview

Dr. Sanjay Sood and Mr. Shreshta Nand PIHPFEM & L-JICA

Project for Improvement of Himachal Pradesh Forest Ecosystems Management & Livelihoods (PIHPFEM&L-JICA) is being implemented in 460 Village Forest Development Societies/Biodiversity Management Committees-Sub Committees (VFDS/BMCsc) of 72 Ranges of 22 Forest Divisions under 9 Forest Circles in 7 Districts of Himachal Pradesh (Shimla, Bilaspur, Mandi, Kullu, Kangra, Kinnaur and Lahaul & Spiti). Designed with an aim to achieve improvement of forest ecosystems services for sustainable socio-economic development in the Himachal Pradesh, the JICA assisted Forestry Project is working towards management and enhancement of the project area through *Sustainable Forest Ecosystem Management, Biodiversity Conservation, Livelihoods Improvement Support, and Strengthening Institutional Capacity*, thereby contributing towards the overall environmental conservation and socio-economic development.

Out of the target of 460 VFDS/BMCsc, all are successfully constituted and registered under the Society's Registration Act 2006; VFDS/BMCsc are implementing project interventions like plantation, forest conservation, community development, and livelihoods through participatory and community designed Micro Plans. Microplans of 460 VFDS/BMCsc have been prepared.



Nursery Development: The project for Improvement of Himachal Pradesh Forest Ecosystem & Livelihoods (PIHPFEM&L) has clear intention regarding improvement in permanent nurseries to upgrade the seedling production capacity to ensure availability of high-quality seedlings of local/regional species for plantation activities being carried out under the Project. Six (06) Circle level nurseries, and 66 Range level Nurseries, have been supported by PIHPFEM&L in modernization, improvement and enhancement of areas of the nurseries. The capacity has been enhanced by more than 80 Lakh plants in these nurseries which is a major contribution by the project to achieve the state's target of plantations there by increasing the area under green cover from 27.2 % to 30%.



Plantation: Targeted area for forest treatment is 10,984 ha, whereas 12381 ha area has been achieved through different plantation activities such as improvement of Moderately Dense Forests / Open & Scrub Forest; Eradication of Invasive Species (lantana), Improvement of Pastures under PFM and Departmental Mode in Territorial and Wildlife forest Division of Himachal Pradesh.



- The Plantation of these areas in 4405 ha (Component 1 & 2PFM mode) has been completed under PFM Mode and on departmental mode 3938 ha under Departmental Mode for Batch-1 to Batch IV ranges. More than 55 different tree species has been planted under above models.

Biodiversity intervention:

Under Biodiversity Conservation, all envisaged activities are to be implemented through two sub-components: 1) Scientific Biodiversity Management which will mostly undertaken in Departmental Mode, targeting the protected areas and their surroundings in the Project areas, both in territorial and wildlife forest divisions. 2) Community-based Biodiversity Conservation by adopting the SATOYAMA concept as model, which will focus on providing a framework to achieve sustainable livelihoods and natural resource management in a holistic manner. By following the SATOYAMA elements (as per DPR) following activities have been carried out:

- **Sacred Grove:** Sacred groves are very important reservoirs of biodiversity conservation areas in the entire Himalayan Region and in addition they have important cultural and religious values for the Local communities since time immemorial. Large number of sacred groves is identified in the State by Himachal Pradesh Council for Science Technology and Environment, Shimla. Some of the sacred groves have prospect of becoming biological diversity heritage sites and their protection and management has to be ensured for the conservation of native species. Under JICA forestry Project, 17 sacred groves were identified for Biodiversity conservation and sustainable management. Under these sacred groves many activities were carried out such as plantation of native species, maintenance of water bodies, development of water ponds, fencing around the plantation site and maintenance of the old monuments etc.
- **Eco-trails:** The trail's development utilized manual labour and eco-friendly materials, minimizing the ecological footprint and promoting sustainable tourism practices. The project also emphasizes local involvement by engaging the community in its management and maintenance, providing economic opportunities for villagers/VFDSs members. This approach supports sustainable livelihoods, boosts incomes, and fosters a sense of ownership among residents. The eco-trail enhances tourism in the area, attracting visitors who contribute to the local economy through lodging, food, and other services, thereby also fostering cultural exchange and allowing communities to share their traditions and practices with a broader audience. This integration of local participation and benefits aligns with Satyoma's broader goals of promoting community empowerment and sustainable development in the Kullu, Anni and Chopal Forest Division.



- **SATOYAMA Initiatives under WL Spiti:** 1. Two Diesel operated Threshers have been provided to BMC Sub Committee Demul, as the villagers were dependent on Donkeys for threshing of barley, which lays heavy pressure on pastures and also results in common grazing area conflict between Spp-Ibex (Sch-1), Blue Sheep and Donkeys. 2). Solar hamam were procured for each BMCsc under JICA forestry project to conserve fragile Himalayan forests by reducing firewood dependency, mitigate carbon emissions, and alleviate the daily drudgery of women collecting fuel. 3). Feral Dogs Sterilisation has been done to Control overpopulation of stray and feral dogs. 4). Corals to 17 BMC Committees have been developed to prevent the attack of Snow leopards on cattle/livestock.

Rapid Response Team:

The Project aims to strengthen Rapid Response Teams to address emergency cases of Human-Wildlife Conflict in the all territorial divisions. In FY 2019-2020 to 2025-2026, funds to the tune of Rs. 70.00Lacs were spent on procurement of relevant equipment and goods for the RRT in accordance with the list of equipment prescribed by PCCF Wildlife in 19 Territorial Divisions. RRTs are being strengthened with an aim to support the response action on tackling Human-Wildlife conflicts and improving the prevention and protection measures in field. These division level RRTs are being strengthened to extend support to the existing RRTs for forest offences/ human-wildlife conflict, already established by HPFD at forest circle level. In this context the HPFD has devised a Standard Operating Equipment (*Capturing /transportation cages and squeeze cages, Tranquilizing Gun with cartridges and all accessories, Collapsible ladder, Heavy duty searchlights and torches of all sizes, Nylon and rope nets, Metal cutters including pliers, Power chain saws and ordinary saws, Snake catching equipments with all accessories, Screw drivers of all sizes, Pick axes, spade and axes of all sizes, Safety kits (gloves, jump suits, boots, helmets etc.)* kits in consultation with experts in the field for ready reference for strengthening and smooth functioning of the Rapid Response Teams operational at various Forest Divisions.

Livelihood Improvement Support:

Livelihood Improvement Support is one of the pivotal focus areas under the project, wherein through community mobilization and participation, rural livelihood opportunities are being supported in the State. Out of the target of 920 Self Help Groups (SHGs), 915 SHGs has been formed under the Project. Through Project support these SHGs are working on getting additional source



of livelihood by engaging themselves in different income generation activities. 26 Income generation models have been formulated by the Project, so as to assist SHGs in identifying Income Generation Activities (IGA) of their preference, like Mushroom Cultivation, Leaf Plate Making, Food Processing, Handloom & Handicrafts, Pine products Production, Bee Keeping, Cutting and Tailoring Knitting etc.

- Total 895 Business Plans of various Income Generation Activities have been prepared by the support of Project staff.
- Each Self Help Group is being provided skill based training for income generation activities as per the approved business plans. Apart from this SHGs are being supported for machinery and equipments in terms of capital cost (as per DPR) by the project. To promote Income Generation Activities through the project, Self Help Groups are provided with revolving fund of Rs. 1 Lakh per group. Till now revolving fund for 904 Self Help Groups has been provided. All products made by Self Help Groups

are marketed under the brand name HIM TRADITION. 22 Multipurpose Outlets are being constructed across the State to support the sale and marketing of SHGs products. Apart from this, the products are also sold by setting up movable Gazebo tents in various fairs and festivals with the help of Project. All SHGs made products are displayed on Project website with all required information. Sale of more than Rs 8.94 Crores has been registered by 819 Self Help Groups.



Training & Capacity Building: Training & Capacity Building is another area of intervention, where focused and customized support is extended to all stakeholders. All Institutional capacity building modules have been designed for 3 types of stakeholders, viz. HPFD & Project Officials, Village Forest Development Societies and SHG members. Further, IGA specific skilled based training to SHGs is provided by reputed and specialized training institutes. Till date, 9405 members of 888 Self Help Groups have been trained, out of which 8728 are women.



Jadi-Buti Cell: A Jadi-Buti Cell has been set up under the project, which is responsible for establishing sustainable propagation models (NTFP and Non-NTFP IGAs) for Medicinal and Aromatic Plants in the state. Till now 17 models have been identified under Jadi-Buti Cell like Pine Needle Model, Satua Model, Leaf Plate Model, Palmarosa Grass Model, Kutki Model, Amla Model, Harar Model, Reetha Model, Tej Pata Model etc., and Village Forest Development Societies are being associated in the project area to work on these models. The Jadi-Buti Cell is working in collaboration with (NARC)-RCFC-Jogindernagar, Himalayan Research Group and Institute of Himalayan Bio-resource Technology (CSIR-IHBT), Palampur to propagate improved varieties of major medicinal plants.



- A MOU was signed with UHF, Nauni for supply of good quality grafted planting stock of Harar, Amla, Baheda and Reetha for the period of three years (2024-25 to 2026-27). In FY 2024-25 total 4400 plants were procured while 17480 plants of these species were planted during FY 2025-26 as per MoU signed with UHF Nauni. These plants were planted at Nurpur, Bilaspur, Mandi, Suket, Dharamshala, Chopal, Ani and Palampur Forest Division through Common Interest Groups (CIG). Plantations of total 21,15,000 Kutki plants have been planted under JICA forestry project.

GIS/MIS/ICT : This project utilizes a sophisticated suite of geospatial and digital management tools to streamline environmental conservation and operational efficiency. By integrating DGPS surveys, drone imaging, and asset geo-tagging, the initiative ensures high-precision mapping of intervention areas, nurseries, and project infrastructure.

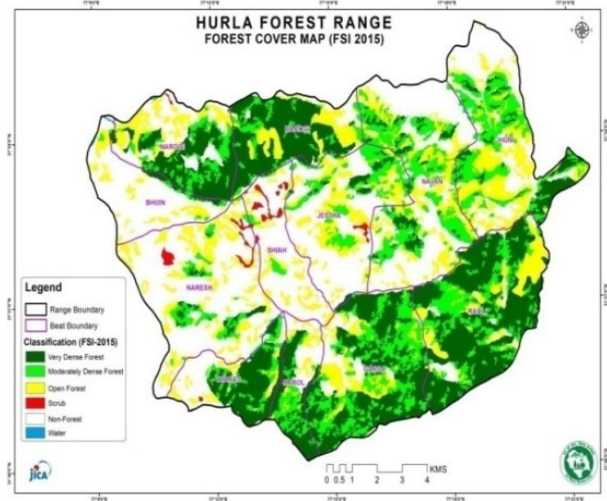
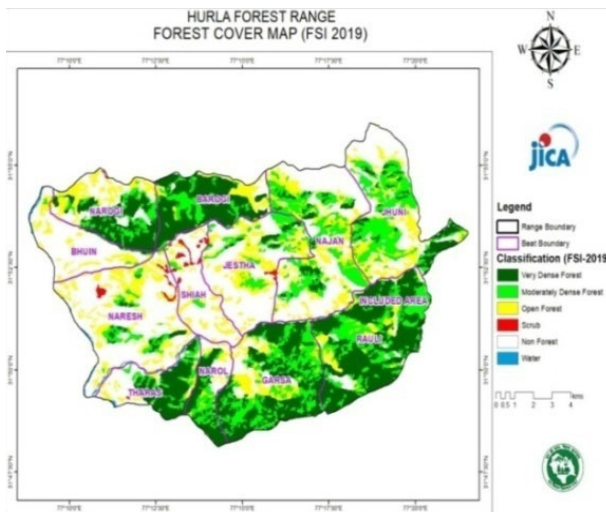
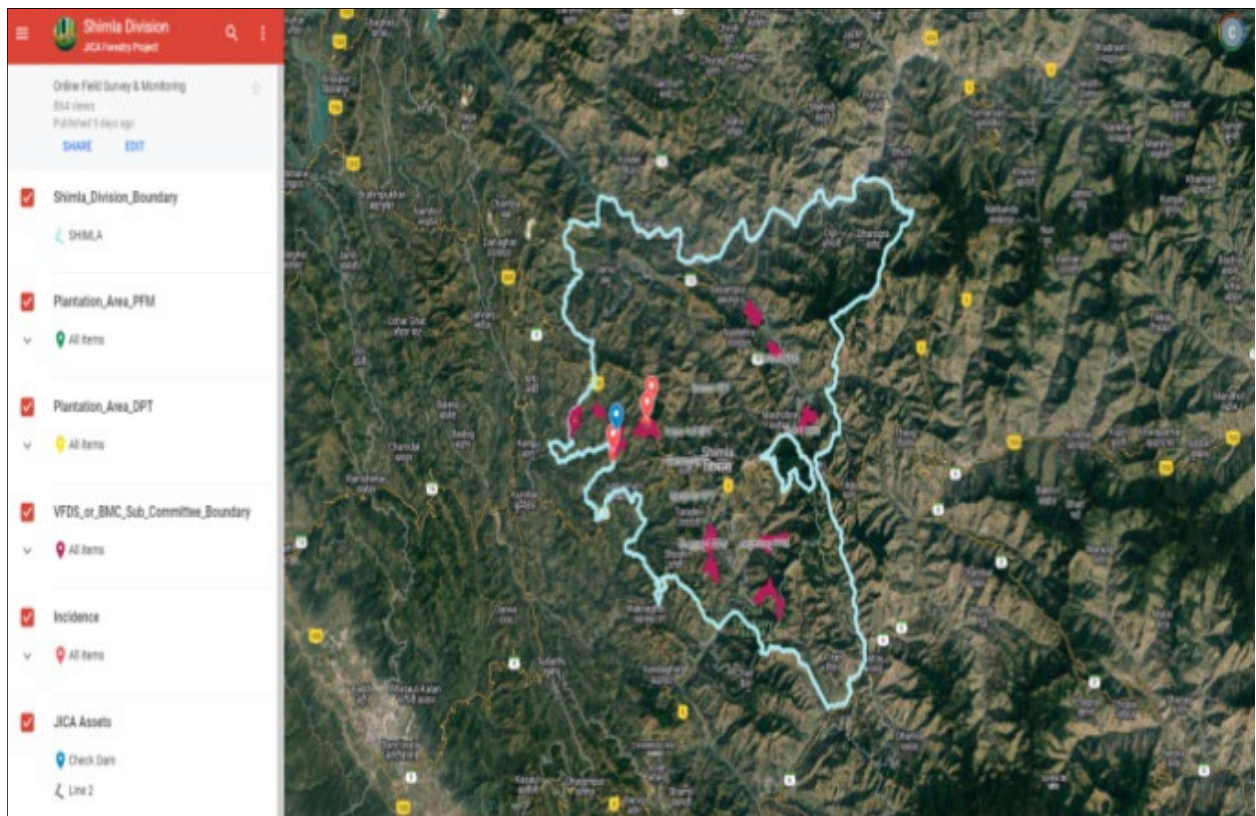


Key Operational Components

Operational Area	Focus & Objectives	Key Achievements
Geospatial Mapping & Surveys	Establishing high-precision boundaries and base layers for intervention areas.	Finished 400 VFDS & 60 BMC surveys; 396 base maps ready; adjustments done for 6 major divisions (120 VFDS).
Remote Sensing & Aerial Survey	Capturing high-resolution visual data for site monitoring and vectorization.	Drone imaging completed for 374 sites; vector data creation ongoing (90 VFDS finalized).
Digital Asset Management	Real-time tracking of physical infrastructure and project assets.	Ongoing geo-tagging across 22 divisions using the Online Field Survey application.
Strategic Intelligence & Specialized Mapping	Creating decision-support tools for specific ecological and economic projects.	Published 22 FSI maps; launched dynamic Geo Server maps; developed Jadi Buti and Milk Plant proximity maps.
MIS & Performance Reporting	Streamlining field reporting and financial tracking through digital dashboards.	Launched new Inspection Report Dashboard and upgraded Sales Report module for higher precision.

Himachal Pradesh JICA Prioritized Areas Online Field Survey and Monitoring-Geo tagging





Use of Temporal Data for Change Analysis in Forest Density Class

ICT: All project activities are publicized through social media (Facebook, Insta, X, YouTube), electronic media and print media. Short movies based on success stories are produced and broadcast on the YouTube channel. So far, 110 short movies have been produced. Hindi and English Newsletters are published every three months. A total of 18 editions have been published so far.

Sustainable Catchment Forest Management in Tripura: An Integrated Model of Ecological Restoration and Community Livelihood Transformation under the JICA-supported SCATFORM Project

Introduction

Tripura, located in the eastern Himalayan foothills and forming part of the Indo-Myanmar biodiversity hotspot, presents a unique ecological and socio-cultural landscape. The State is characterised by low hill ranges, narrow valleys, high rainfall intensity, and a dense network of streams and rivers. As per ISFR, 2021, the total forest cover is 7721.52 Sq.km accounting to seventy-four per cent of its geographical area, making forests the dominant land use as well as the primary ecological life-support system for the State. A significant proportion of Tripura's population, particularly indigenous tribal communities, remains directly dependent on forests for subsistence, livelihoods, cultural identity, and ecosystem services.

Over several decades, however, this fragile hill ecosystem has faced sustained pressure from shifting cultivation practices, unregulated extraction of forest produce, soil erosion on steep slopes, siltation of water bodies, and increasing impacts of climate variability. These pressures have led to degradation of forest catchments, decline in forest quality, reduction in water retention capacity, and growing livelihood insecurity in forest fringe and interior villages. The situation has been further shaped by Tripura's progressive implementation of the Forest Rights Act, 2006, under which individual and community forest rights have been recognised over more than 4.66 lakh acres of forest land. While this recognition has strengthened tenure security and social justice, it has also necessitated the development of sustainable land-use models that can balance livelihood needs with long-term ecological stability.

Conventional forestry interventions, often limited in duration and scope, were found inadequate to address the interconnected challenges of forest degradation, water scarcity, biodiversity loss, and rural poverty in such a complex socio-ecological context. There was a clear need for a long-term, integrated, and participatory approach that could restore degraded catchments, enhance forest productivity, build climate resilience, and simultaneously improve the socio-economic well-being of forest-dependent communities.

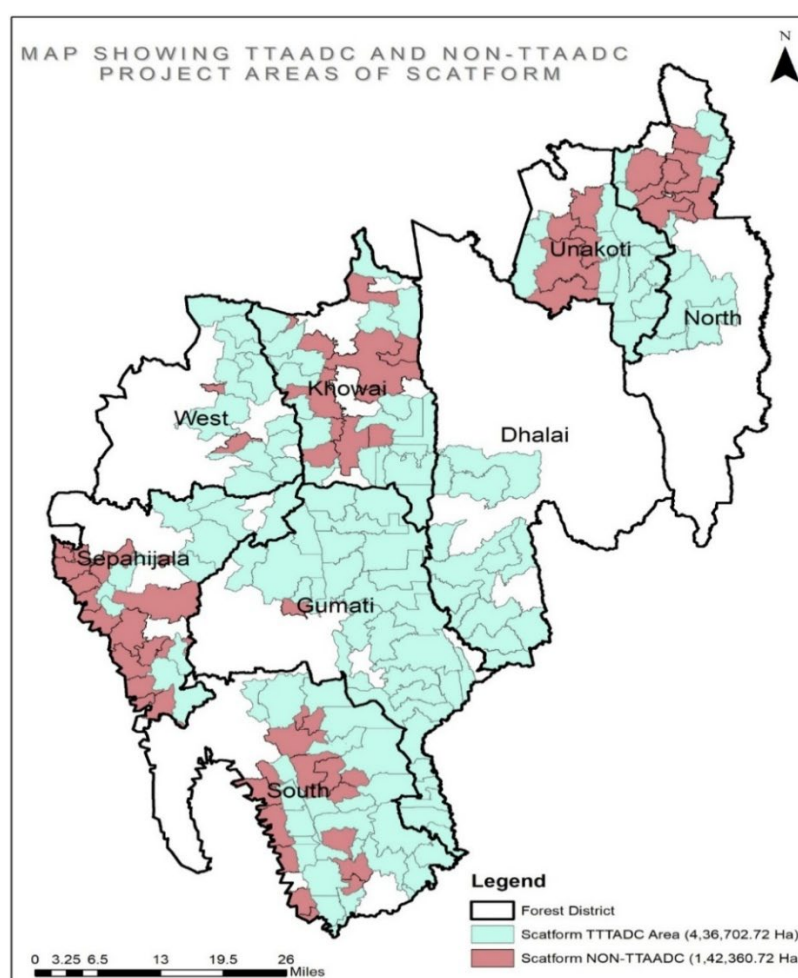
It was in response to this multidimensional challenge that the Government of Tripura, with financial and technical assistance from the Japan International Cooperation Agency (JICA), conceptualised and launched the Sustainable Catchment Forest Management Project, commonly known as SCATFORM. The project was designed not merely as a forestry intervention, but as a comprehensive landscape-level programme integrating sustainable forest management, soil and moisture conservation, biodiversity conservation, agroforestry, livelihood diversification, institutional strengthening, and digital planning

tools like Forest Integrated Geospatial Solutions (FIGS) and Cloud Based Tally Prime Accounting System. SCATFORM represents a shift from sectoral forestry towards integrated catchment-based management, with communities positioned at the centre of planning, implementation, and benefit-sharing.

Project overview and implementation framework

SCATFORM is a ten-year externally aided project being implemented during the period 2018 to 2028 by the Tripura Forest Department. The total approved financial outlay of the project is approximately Rs. 998.40 crore, with 75.5 per cent funded through a JICA loan and the remaining 24.5 per cent contributed by the State Government. The project covers nearly fifty-seven per cent of Tripura's geographical area, encompassing major forested catchments across all districts and forest divisions of the State (**Figure 1**).

Figure 1: Map showing project areas of SCATFORM



The total geographical area of the State of Tripura is 10,491 square kilometres. The SCATFORM project covers approximately 57% of the State's geographical area, amounting to 5,790.63 square kilometres, which is equivalent to 579,063 hectares. A significant proportion of the project area lies within the jurisdiction of the Tripura Tribal Areas Autonomous District Council (TTAADC). About 75% of the SCATFORM project area, covering 436,702 hectares, falls under TTAADC regions, reflecting the strong tribal and forest-dependent socio-cultural context of the project. The remaining 25% of the project area, covering 142,360.72 hectares, lies outside the TTAADC jurisdiction.

Administratively, the project spans all eight districts of Tripura. However, within Dhalai District, only the Gumti Wildlife Sanctuary is included under the project area. The SCATFORM project operates across 15 Territorial Forest Sub-Divisions, with the exception of Manu and Ambassa Sub-Divisions, which are not included, along with three Wildlife Sanctuaries.

At the field implementation level, the project encompasses 36 Forest Ranges out of the total 59 ranges in the State. These ranges are supported by 148 Forest Beat Offices, drawn from a total of 283 forest beats across Tripura.

Community participation forms a central pillar of the project. A total of 457 Joint Forest Management Committees (JFMCs) is actively involved in SCATFORM implementation. These include 329 newly constituted JFMCs, 76 JFMCs from JICA Phase I, and 52 JFMCs formed under the National Afforestation Programme (NAP). In addition, the project supports 1,350 Self-Help Groups (SHGs), facilitating livelihood development, financial inclusion, and women's empowerment.

In terms of local governance coverage, the project area includes 744 Gram Panchayats and villages, comprising 292 Gram Panchayats, 443 Village Committees, 3 Municipal Councils, and 6 Nagar Panchayats. This extensive coverage highlights the scale and institutional complexity of SCATFORM and underscores its relevance as a large-scale, community-centred forestry and catchment management initiative.

The project's implementation architecture is structured to ensure decentralised execution and strong field-level ownership. District Management Units and Sub-District Management Units coordinate technical planning and implementation, while Joint Forest Management Committees (JFMCs) function as the primary community institutions at the village level. A total of 457 JFMCs have been formed or strengthened under the project, each responsible for preparing participatory micro-plans that integrate forestry operations, soil and water conservation works, livelihood activities, and biodiversity protection measures.

A defining feature of SCATFORM is its bottom-up planning framework. Micro-plans prepared by JFMCs through participatory rural appraisal (PRA) exercises are integrated with Beat Forest Basic Plans (BFBP), ensuring that scientific forestry prescriptions are aligned with local knowledge, customary practices, and livelihood aspirations. This approach has enabled convergence with national programmes such as MGNREGA, NRLM, and horticulture schemes, enhancing scale, efficiency, and sustainability.

Sustainable forest management and restoration of degraded landscapes

Sustainable Forest Management under the SCATFORM project is conceived as a long-term, landscape-level intervention aimed at restoring degraded forest areas, enhancing forest productivity, and maintaining ecological stability in the fragile hill ecosystems of Tripura. The project adopts regeneration-based forestry approaches that reinforce natural ecological processes while ensuring the sustained provision of critical ecosystem services. Core interventions include Artificial Regeneration and Aided Natural Regeneration, which respectively address severely degraded forest patches and facilitate natural recovery through protection and silvicultural support. Overall, the physical achievements under these interventions under the SCATFORM project are presented in **Table 1**.



Management of existing teak plantations constitutes another important component of sustainable forest management under SCATFORM. Teak plantation management has been undertaken in existing plantations, particularly in central and northern Tripura, through thinning, cleaning, and protection measures to improve stand quality, enhance growth, and reduce pressure on natural forests for timber. Silvi-pastoral plantations have also been promoted as an integrated land-use system combining trees and fodder species, contributing to soil conservation, biomass production, livestock support, and reduced grazing pressure in forest fringe areas (**Figure 2, 3**).

Habitat improvement measures form an integral part of sustainable forest management, particularly in ecologically sensitive areas such as the Gumti Wildlife Sanctuary (**Figure 4**). Grassland development supports herbivore populations while stabilizing soil and improving habitat quality. Fruit tree plantations enhance food availability for arboreal wildlife, especially primates, thereby supporting biodiversity conservation. Invasive weed eradication has been undertaken to restore native vegetation and reduce competition for resources, while systematic fire-line creation strengthens fire prevention and safeguards regenerated forest habitats. The extent and coverage of these habitat improvement interventions are summarized in **Table 1**.

Table 1: Forestry interventions under SCATFORM

Plantation	Unit	Project Target	Achievement details
AR Plantation	ha	5,000	5,056
ANR Plantation	ha	21,000	27,000
Teak Plantation Management (TPM)	ha	15,000	5,534
Silvi Pastural	ha	1,000	1,127
River Bank plantation	km	100	107
Filter Strip plantation	km	96	104
Grass Land Development	ha	375	271
Fruit Tree Plantation	ha	600	745
Weed eradication	ha	330	135

Figure 2: a) AR Bamboo Plantation (2021-22) at Upendra JFMC, Khowai;
b-c) Teak Plantation Management (2022-23) at Mandirghat JFMC, Karbok.



Figure 3: a) ANR Agar Plantation (2023-24) at Maitri JFMC, Kathalia;
b) AR Misc Plantation (2022-23) at Pratirai JFMC, Bagafa;
c) Fruit Tree Plantation (2022-23) at PurbaBelbari JFMC, West Tripura.

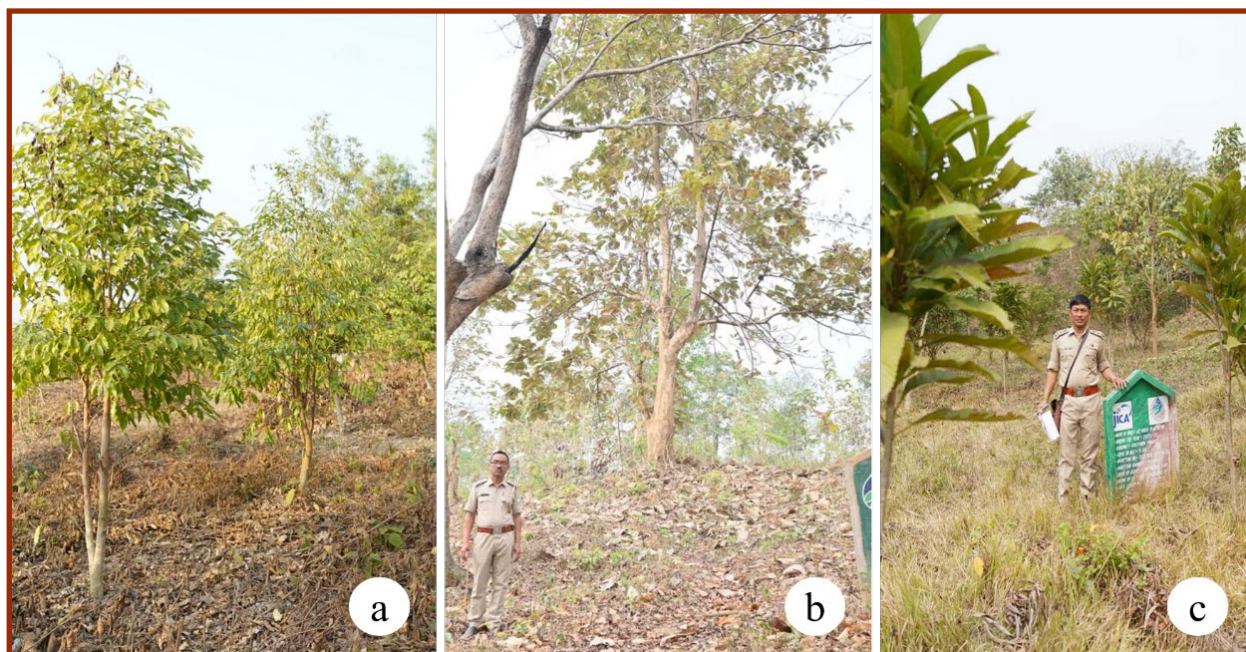


Figure4: a-b) Silvipasture Plantation (2023-24) at Madya Krishnpur JFMC, Teliamura Beat; c-d) Grassland Plantation (2024-25) at Khakchang JFMC, Gandacherra.



Soil and Moisture Conservation for Catchment Stability

Soil and moisture conservation under the SCATFORM project addresses soil erosion, rapid runoff, and declining water retention in Tripura's hill catchments through an integrated catchment-based approach that combines engineering and biological measures. Community-managed earthen check dams (Model-I and II) constitute a major intervention in erosion-prone drainage lines and play a crucial role in groundwater recharge, sediment retention, and the creation of seasonal and perennial water bodies under the supervision of JFMCs (Figure 5).

Contour trenching has been implemented on vulnerable hill slopes to intercept surface runoff, improve infiltration, enhance soil moisture availability, and increase plantation survival while reducing soil loss during periods of intense rainfall. In degraded valleys and gully erosion sites, brushwood check dams constructed using locally available materials have effectively stabilized drainage channels and promoted natural regeneration in adjoining areas.

Biological measures complement these structures through filter strip plantations and riverbank plantations established along streams and rivers. These plantations act as vegetative buffers that trap sediments, stabilize banks, reduce erosion, and enhance riparian biodiversity, thereby contributing significantly to overall catchment stability and ecosystem protection. The physical achievements of soil and moisture conservation interventions implemented under the SCATFORM project, including check dams, contour trenches, and gully stabilization measures, are summarised in Table 2.

Table 2: Soil and moisture conservation achievements

Sl. No.	Particulars	Unit	Project Target	Achievement
1	Model-I Check Dams	No	900	826
2	Model-II Check Dams	No	450	529
3	Model-III Check Dams	No	25	11
4	Brushwood Check Dams	No	1,269	2,523
5	Contour Trench	Ha	1,125	812.5

Figure 5: a-b) Model-I check dam construction at Panbagan JFMC (Balanancherra Beat); c) Model-II Checkdam (2024-25) at Matimapara JFMC, Gandacherra; d) Model-II check dams at Kathiram Bari JFMC (West Tripura); e) a Model-III check dam at Magroom Beat, Bankul RMU, South Tripura.



Biodiversity Conservation, Carbon Stock Assessment and Ecological Monitoring

Biodiversity conservation under SCATFORM is grounded in scientific assessment and continuous monitoring. A comprehensive biodiversity assessment across project areas documented 526 plant species, including 240 tree species, 258 shrubs and regenerating species, and 195 herbaceous species. Thirteen species were identified as Rare, Endangered and Threatened, highlighting the ecological sensitivity of the project landscape. Thirty important Non-Timber Forest Produce species were also recorded, reinforcing the livelihood–biodiversity linkage.

Carbon stock assessment carried out across 273 sampling points covering more than 4.13 lakh hectares estimated total forest carbon stock at over 44.6 million tonnes. This exercise not only quantified climate mitigation benefits but also strengthened the technical capacity of forest staff and communities in carbon monitoring and GIS-based analysis.

Catchment protection measures such as riverbank plantations and protection of newly created water bodies have supported aquatic biodiversity and associated micro-ecosystems. Periodic biodiversity surveys and GIS mapping now provide a scientific basis for adaptive forest management, plantation monitoring, and threat assessment.

Livelihood Development and Community Empowerment

Livelihood development under SCATFORM aims to reduce pressure on forests while enhancing household income and resilience. The project has promoted a diverse portfolio of income-generating activities through 1,352 Self-Help Groups involving over 13,000 members, with a strong emphasis on women's participation (Table 3).

Fisheries in check dams have emerged as a flagship livelihood activity, directly linked to soil and moisture conservation investments. Livestock rearing, mushroom cultivation, broom grass processing, bamboo-based enterprises, handloom, and food processing units have further diversified income sources (Figure 6). A structured revolving fund mechanism at the JFMC level has enabled access to affordable credit, with over Rs. 13.42 crore disbursed and strong repayment performance.

Table 3: Status of JFMCs and SHGs formed and Revolving Fund (RF) disbursed under the Project.

District	JFMC Formed	SHG formed	Revolving Fund disbursed (Nos.)
North Tripura	43	123	123
Unakoti	43	130	129
Khowai	65	198	198
West Tripura	42	125	126
Sepahijala	46	120	112
Gomati	90	270	269
South Tripura	71	214	214
Gumti WLS	57	172	171
Total	457	1352	1342

Figure 6: Income generating activities by JFMC and SHG members - a) fishery activity at Mundaline JFMC, Kailashahar SDMU, Unakoti; b) handloom activity by HapungHatai SHG, Khowai; c) Fishery activity at Upendra JFMC, Khowai; d) Piggery activity at Chamathwi Badal SHG, Mandwi SDMU.

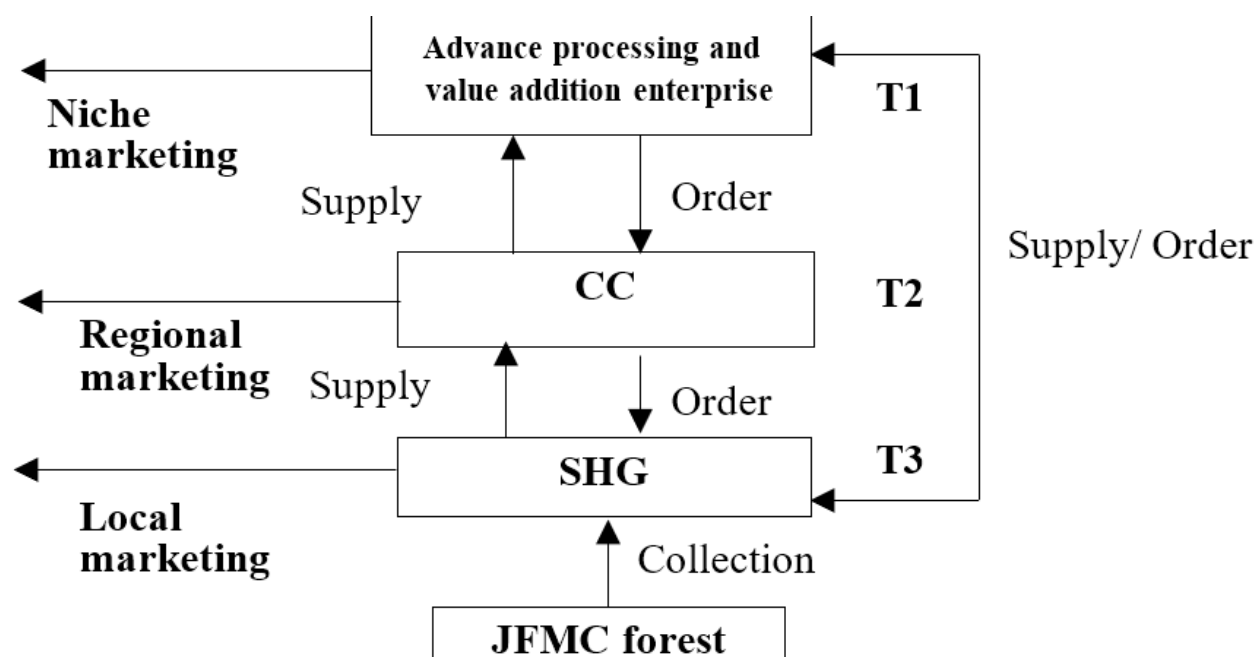


Cluster development approach under livelihood development

Under SCATFORM, livelihood promotion has moved beyond individual activities to a cluster development approach, wherein groups of beneficiaries are organised around a common enterprise within a defined geographical area. This approach enables economies of scale, shared infrastructure, improved quality control, and better market access. Business plans for each cluster are prepared and vetted, and proposals are formally submitted to the Project Management Unit, ensuring technical and financial viability prior to fund release.

Across different districts and forest divisions of Tripura, a wide range of livelihood clusters have been supported, reflecting the ecological diversity of the State and the socio-economic context of local communities. These include fisheries, mushroom cultivation, bee-keeping, dairy, piggery, broom grass production, handloom, bakery, non-timber forest produce processing, dry fish preparation, and innovative enterprises such as plate making using betel leaves. The selection of these activities is closely linked to soil and moisture conservation investments, forest restoration outcomes, and agroforestry interventions, thereby reinforcing the integrated nature of the project. The three-tier institutional and processing framework adopted under the SCATFORM project, linking SHGs, Simple Processing Units, and Advanced Processing Units, is illustrated in Figure 7.

Figure 7: Tier levels and SHG, Simple Processing Unit and Advanced Processing Unit.



Agroforestry as a sustainable landuse model in FRA Landscapes

Agroforestry, as promoted under SCATFORM, is taken up in a three tier system by allowing multiple layers of production, such as forestry species, horticultural crops, and agricultural or medicinal plants, to coexist on the same land (**Figure 8**). This approach enhances forest cover while ensuring continuous income flow, enabling RoFR holders to move gradually from short-term crops to medium-term horticulture/agriculture crops and eventually to long-rotation forest species. The Project consciously promotes a shared long-term vision among villagers, forest officials, and other stakeholders, recognising that agroforestry succeeds only when livelihood and conservation objectives advance together.

As of now, more than 3,027 hectares have been covered under agroforestry, benefiting 4,695 households. Convergence with MGNREGA has supported labour components, while SCATFORM has provided planting material, fencing, and technical guidance. This approach has ensured continuous income flow, improved soil health, and enhanced ecological stability.

Figure 8: Agroforestry Plantation at Thakurachara JFMC, Gumti Wildlife Sanctuary, Dhalai Tripura.



Ecotourism and community-led biodiversity conservation

Ecotourism under SCATFORM has been conceptualised as a conservation-oriented, community-managed initiative that complements biodiversity protection while generating sustainable livelihoods (Figure 9). Sites such as Sita Chara (Tui-Chinta) Eco-Park, spread over 110 hectares, protect natural forest patches, perennial streams, and micro-habitats. Local JFMC members are actively involved in habitat protection, visitor management, and awareness activities, ensuring that tourism benefits directly support conservation objectives.

Figure 9: Sitacherra (Tui-chinta) Eco-Park - a new ecotourism destination under SCATFORM Project, b) Nature Trails and c) Bamboo and Thatch Hut at Sitacherra Eco-Park; d) Camping site at newly developed Ecotourism site Nakuchara (Dumboor Biodiversity Park).



NTFP Centre of Excellence (NCE) under SCATFORM

The NCE established as an autonomous society with financial and technical support from the JICA-assisted SCATFORM Project, functions as Tripura's apex knowledge and implementation support institution for sustainable NTFP-based livelihoods. The core objective of NCE is to enhance profitability, sustainability, and market integration of NTFPs for forest-dependent communities while strengthening forest governance and conservation outcomes.

Under SCATFORM, NCE undertakes applied research on NTFPs, medicinal plants, and high-value timber species; assesses the economic contribution of NTFPs to village economies; conducts productivity inventories and market surveys to determine fair prices for collectors; and supports value addition, processing, and marketing through community institutions. The Centre plays a key role in developing

sustainable harvesting protocols, promoting in-situ and ex-situ conservation, transferring technologies, building capacities of JFMCs, SHGs, and forest staff, and supporting policy formulation and national-level knowledge exchange. A major responsibility of NCE is the comprehensive NTFP Resource Assessment across Tripura, including availability mapping, importance value index analysis, prioritisation of species and zones, and preparation of conservation and extraction plans that form the basis for Tier-2 and Tier-3 enterprise development under the project.

As part of its knowledge dissemination mandate, NCE has generated key evidence and insights through select research and extension outputs. Major findings include comprehensive analysis of agarwood resources and trade potential, systematic evaluation of the contribution of NTFPs to the State economy of Tripura, assessment of the status, development, and utilization of bamboo resources, development of standardized guidelines on NTFP cultivation and collection methods for community use, and documentation of the diversity, distribution, and economic importance of NTFPs in Tripura through consolidated reference volumes. The research, resource assessment, and market intelligence generated by NCE directly underpin the NTFP-based cluster and livelihood models implemented under SCATFORM, ensuring that community enterprises are resource-secure, market-responsive and environmentally sustainable.

Enterprise Challenge Fund: A new initiative under SCATFORM

The Enterprise Challenge Fund (ECF) under the JICA-assisted SCATFORM project is a strategic initiative aimed at catalysing entrepreneurship for sustainable development by promoting environmentally responsible and innovative enterprises in forest-dependent landscapes of Tripura. The fund is designed to support forest-dependent communities, particularly tribal youth and Self-Help Groups, by encouraging enterprises that contribute to ecological sustainability while creating local employment and promoting the sustainable use of natural resources. Through a competitive selection mechanism, the ECF provides a combination of soft loans, grants, and capacity-building support to promising business ideas aligned with forest conservation objectives. Progress to date reflects a strong preparatory phase, including the development of comprehensive ECF guidelines, consultations with banking institutions to explore risk-sharing and loan facilitation mechanisms, and coordination with key line departments and technical institutions to integrate sectoral expertise. The implementation roadmap focuses on systematic identification of potential entrepreneurs through community networks, awareness and mobilisation campaigns at the village level, structured capacity-building and exposure visits, enterprise promotion with dedicated handholding support, transparent funding disbursement processes, and a robust monitoring and evaluation framework.

Conclusion

The JICA-supported SCATFORM project in Tripura represents a comprehensive and replicable model of integrated catchment forest management in a fragile hill ecosystem. By combining long-term investment, scientific planning, community institutions, and livelihood integration, the project has delivered tangible ecological, climatic, and socio-economic outcomes. SCATFORM demonstrates that sustainable forestry is most effective when conservation and development objectives are pursued together, with communities as equal partners in stewardship. The lessons emerging from Tripura offer valuable insights for forestry and climate-resilient landscape management across India and other JICA-supported regions.



Uttarakhand: Best Practices Under Jica Projects

Technical Cooperation Project

Background of the Project

In June 2013 as an after effect of heavy rains in the Himalayan region, the unexpected large-scale destruction due to floods & landslides caused tremendous loss to human life and property in Uttarakhand. This was one of the largest natural calamities in India.

Responding to this, the disaster management component of the Yen loan project “Uttarakhand Forest Resource Management Project” (UFRMP) and Technical Cooperation Project named “The project for natural disaster management in forest areas in Uttarakhand” was conceptualized. The main objectives of the “Technical Cooperation Project” were to

- Technology for erosion control works adopted in Uttarakhand is developed.
- Knowledge and skills on erosion control in UK Forest Department and other related organizations are improved in Uttarakhand.
- Appropriate Technology developed for erosion control in forest areas is shared in the state and with other Himalayan states.
- Collaboration with UFRMP for implementing the interventions under the erosion control and sediment disaster mitigation component is achieved.

Different stakeholders & team of engineers involved in this unique construction activity were provided with an extensive technical training at different construction sites in Japan. This led to proper capacity building of the stakeholders so the technology transfer could be realized properly and implemented at all sites. An appropriate technology was developed for erosion control in forest areas in the state.

Prior to UKFD implementing this *Chisan Technology* at selected sites in Uttarakhand, in India we had no specific technology for the treatment of devastated forests and roads due to landslides and debris flow in the streams. This technology which is time tested in Japan has been sustainable solution with no failure after treatment.

Chisan Technology' for treatment of landslides

Under “Technical Cooperation Project” initially 03 sites were selected as Model sites namely Nirgad, Nr. Rishikesh, Jawadi in Rudraprayag and Padli Nr. Nainital. By way of this Technical Cooperation Project technology transfer of the Japanese Landslide techniques were to be realized. Based on the works



carried out at Model sites replication was carried out at selected 04 more sites denoted as candidate sites by the team of Indian engineers trained for the purpose.

In India we don't have any concrete/sustainable technology for treatment of landslides/sediment disaster, so understanding and adopting the very new technology was difficult. Moreover, we had no suitable contractors in India to work as per Japanese procedures. However, adopting Japanese methods and strict procedures led to an excellent quality of works at all sites. This will now will be used in other landslide treatment projects.

After implementation of this technology on model sites now proper procedure and sequence of activities are in place. The following points regarding technology transfer are worth noting-

- A thorough survey is carried out over a sufficient period for all sites resulting in precise designs.
- Prior to starting the construction works "construction methodology" is prepared. This helps in outlining the complete procedure & sequence of works to be taken up for construction besides the challenges to be faced during construction. Prior knowledge of challenges helps in prior preparation of countermeasures for these challenges so the loss of time & money is prevented due to unforeseen circumstances. This leads to precise design of the structures.
- Proper supervision plans & formats required are prepared.
- Proper quality control procedures are in place for all the construction works.
- The site engineers are fully trained to supervise adhering to the required quality and safety norms.
- The Chisan methods of construction with 0% tolerance for safety and quality is inculcated.

Stakeholders from other departments were also involved in site visits & workshops solving the purpose of disseminating this unique technology to other departments. The objective of capacity building of stakeholders in the state was completely fulfilled.

Example of the one of the treated sites

Location : Nirgad, Nr. Rishikesh

Area : 05 hectares.

Latitude : 30°8'10.97"N Longitude : 78°20'30.72"E



Countermeasure Plan



Complete treatment on

Nirgad Site

The Nirgad site has been fully treated, the purpose of construction of structures and implementation of other sustainable methods has fully solved the objectives.

At Nirgad site prior to implementation of countermeasures a lot of debris used to flow down to the NH58 which has a strategic importance with respect to spiritual tourism to Shri Kedarnath & Shri Badrinath dhams. The NH used to be blocked due to this debris flow from the devastated stream.

After this treatment activity the following objectives are effectively fulfilled.

- The flow of debris to the NH 58 is fully stopped even in heavy rains.



05 Nos. Groundsills

Series of 03 Nos. Double wall check Dams

Double Wall Check Dam Apron work using crate wires (Gabions)

Treated Nirgad stream





Series of 03 Nos. Double wall check Dams

Series of 03 Double Wall Check Dam



*Cut slope treated area
With natural vegetation
erupting all over*

Cut slope treated area

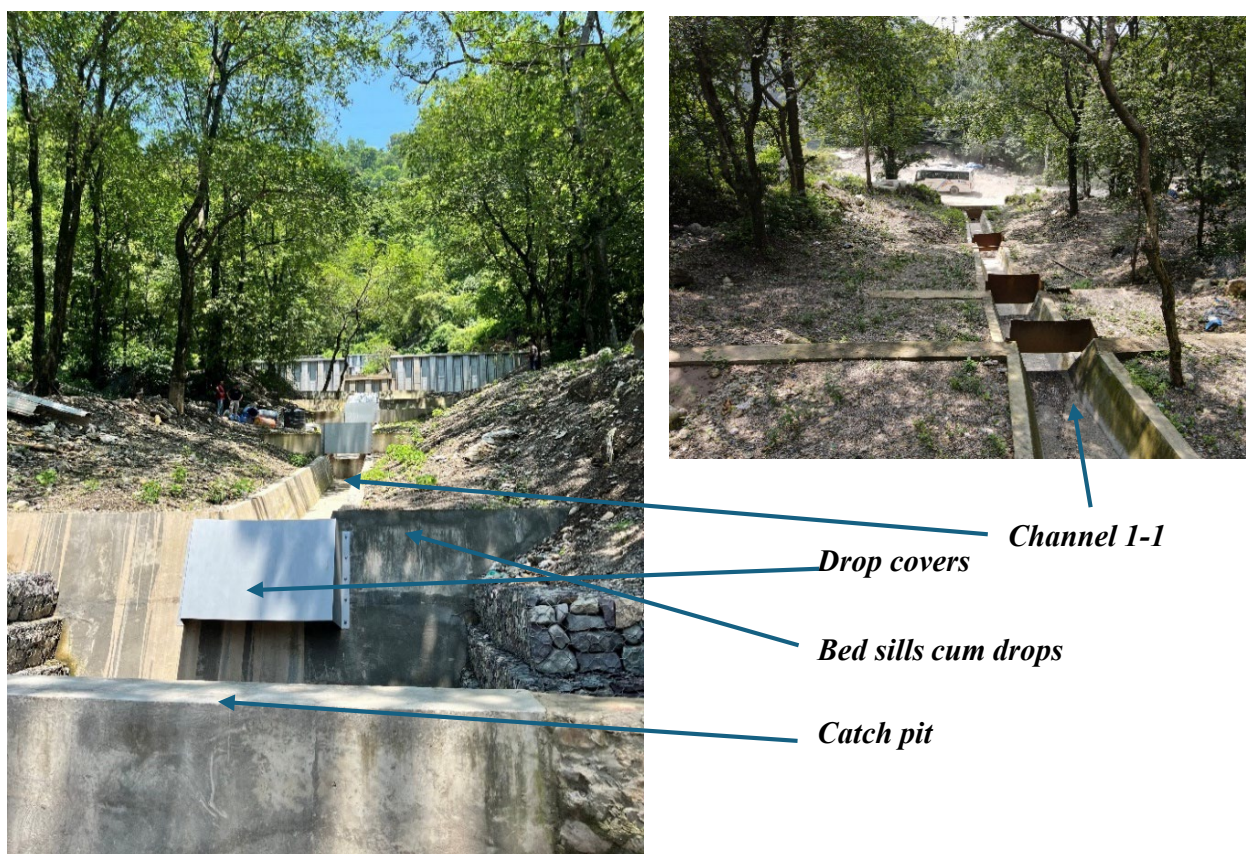


*Treated area on the wing
sides of dam 3 with natural
vegetation erupting all over*

Check Dam 2 & 3



- The erosion on the road side cut slope is stopped and vegetation has gradually come up on the slope.
- The erosion all along is stopped & excess water in the rains/heavy rains is streamlined to the river without any damage to the slope/stream.
- The devastated forest along the stream is regained.
- The NH & complete habitation downstream including government offices are fully safe.
- The hydra for clearing of debris on road was required full time which is now not required.
- Traffic was always interrupted in rainy season.
- There always was a risk of rock fall to the traffic.
- The loose sediments were vulnerable to flow during rains. This is fully prevented after treatment.



Series of 3 check dams & channel 1-1 above NH

After this site was treated using this technology it has already sustained more than 03 heavy rainy seasons. Besides this, this year a cloud burst occurred at the top of our site but our interventions were fully able to prevent any erosion or damage. A lot of debris runs off was there upstream but the NH was fully protected. Not even a single debris could flow down to the National highway. Only the flooded water in the stream flow down to the river Ganges smoothly.

During this rainy season there was no damage to the site despite flooded rains.



Use of Chisan Technology on other sites in Uttarakhand

After the capacity building of UKFD & engaged engineers and successfully implementing the countermeasures on 03 model sites, 04 more candidate sites were selected scattered all over Uttarakhand where the methods have been successfully replicated.



Crib work at Jawadi



Treated slope at Jawadi



Jokla series of 05 dams



Raipur treated area

Moreover, UKFD is in the process of selecting 12-15 more sites to be taken up for treatment after necessary approvals. On the other hand, the society constituted for the execution of this project have conducted various state and national level workshops to disseminate this knowledge to the other stakeholders in other departments of the state and other Himalayan states involved in landslide treatment activity.

Contact details

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Rajasthan: Building A Digital Public Infrastructure for Smart Forest Governance

Rajasthan's Forest Stack & DigiVan Experience

Presented at the 14th JICA National Workshop of Forestry Projects in India 11 February 2026, Bhubaneswar.

Introduction

At the 14th National Workshop of JICA-Assisted Forestry Projects, the Rajasthan Forest Department, in collaboration with Boston Consulting Group (BCG), presented the Forest Stack and DigiVan initiative as a scalable Digital Public Infrastructure (DPI) model for smart forest governance.

The presentation showcased Rajasthan's journey in leveraging data, digital platforms, and ecosystem innovation to strengthen forest planning, monitoring, and climate-responsive governance.

Vision: Forest Stack as a Digital Public Infrastructure

Forest Stack has been conceptualized as a DPI for forestry—providing a secure, standardized, and interoperable digital backbone that integrates multiple datasets, registries, and analytical layers to enable evidence-based decision-making.

The architecture is anchored around:

- Standardized registries and directories
- A secure Data Exchange integrating central, state, and open-source datasets
- Business intelligence layers and AI-enabled analytics
- Consent and governance frameworks for responsible data usage

Operational Use Cases in Rajasthan

1. Forest Health Monitoring

A GIS and MIS-enabled system providing real-time dashboards for monitoring plantation performance and ecosystem health across ~3.3 million hectares, transitioning from manual collation to automated reporting.

2. Forest Project Planning

A GIS-driven planning tool enabling scientific and transparent site selection for plantation activities, supporting decision-making for ₹650+ crore plantation budgets annually.

3. Wildlife Habitat Monitoring

Digital tools for biodiversity tracking, habitat fragmentation monitoring, and human–wildlife conflict management, significantly improving efficiency in wildlife census and restoration planning.

4. Green & Carbon Credit Project Preparation

A carbon module within DigiVan supporting site-level eligibility checks and Project Design Document (PDD) preparation using 30+ data parameters, reducing project preparation timelines and rejection risks.

Forest Stack Data Exchange: Enabling Ecosystem Innovation

The Forest Stack Data Exchange integrates 60+ datasets and 10+ analytical models, enabling secure and standardized access to forestry-related data across stakeholders.

Through the Open Innovation Challenge, which attracted 185+ participants, the platform catalyzed AI-driven solutions including wildlife monitoring, drone-based carbon estimation, and climate risk prediction.

Replicability and National Relevance

The Rajasthan experience has generated interest from multiple states and has been presented at national and international forums. To facilitate replication, JICA, the Rajasthan Forest Department, and BCG have developed the Forest Stack Blueprint—an implementation guide covering architecture, governance, use-case prioritization, and sustainability models.

The initiative demonstrates how Digital Public Infrastructure principles, combined with institutional reforms and ecosystem participation, can enhance transparency, efficiency, and climate-aligned forest governance. It presents a scalable model for strengthening digital forestry systems across states.



Glimpses of Cultural Programmes



LIST OF PARTICIPANTS OF JICA NATIONAL WORKSHOP-2026

14th NATIONAL WORKSHOP OF JICA ASSISTED FORESTRY PROJECTS IN INDIA Date: 11th February 2026 to 13th February 2026 Venue: Mayfair Convention, Bhubaneswar		
LIST OF PARTICIPANTS		
Sl. No.	Name of the Guest	Designation
MoEF & CC, GoI		
1	Mr. K.B Singh, IFS	Inspector General of Forests (EAP), MoEF & CC, Govt. of India
2	Shri S. Senthil Kumar, IFS	IRO, MoEFCC, Bhubaneswar
DEA, Ministry of Finance, Government of India		
3	Mr. Manoj Kumar	Deputy Secretary, DEA, Ministry of Finance, Government of India
Japan International Cooperation Agency (JICA)		
4	Ms. Iha Chitanshu	Deputy Director
5	Ms. Shimojo Hitomi	Deputy Assistant Director
6	Mr. Wakamatsu Eiji	Senior Representative
7	Mr. Vineet S Sarin	Chief of Development Operations
8	Mr. Nishihara Ryosuke	Representative
9	Ms. Ito Fumi	Project Formulation Advisor
10	Ms. Nishtha Vengurlekar	Development Specialist
11	Mr. Siddharth Parmeshwaran	Development Specialist
12	Mr. Puneet Bansal	Project Officer
Department of Forest , Environment and Climate Change , Government of Odisha		
13	Sri Bhaskar Jyoti Sharma, IAS	Principal Secretary, Forest, Env. & Climate Change Department Government of Odisha
14	Dr. K. Murugesan, IFS	PCCF & HoFF, Odisha
15	Sri K.S. Pradeep, IFS	"Special Secretary to Govt. Director of Environment, FE&CC Dept."
16	Sri Lingaraj Otta, IFS (Retd.)	OSD cum Special Secretary
17	Sri Deben Kumar Pradhan, IAS	Additional Secretary to Govt.
18	Sri Dharam Hansda, IAS	Additional Secretary to Govt.
19	Sri Smruti Ranjan Pradhan, IAS	Additional Secretary to Government
20	Smt. Jyotirmayi Pradhan	Special Secretary to Govt.
21	Smt. Babita Mohanty	Additional Secretary to Govt.
22	Smt Kalyani Malli	FA cum Addl. Secy to Govt.
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25	Sri Aswini Kumar Kar, IFS	CCF, (P & A)
26	Sri B.P. Acharya, IFS	ACCF, Admin
27	Sri Manoj V. Nair, IFS	Director, Nandankanan
28	Sri Sanat Kumar N, IFS	Director, Nandankanan
29	Sri Vivek Kumar, IFS	Dy. Conservator of Forests (WL)
30	Sri Bikash Ranjan Dash, IFS	Chief Conservator of Forests (Eco-Tourism)
31	Sri Karthick V, IFS	CF (P&SM), Chief Executive, SMPB
32	Sri Sudhanshu S. Khora, IFS	CEO, RPRC

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West Bengal Forest & Biodiversity Conservation Project		
35	Mr. Dharmdeo Rai, IFS	CCF & Project Director WBFBCCCR
Project for Sustainable Catchment Forest Management, Tripura		
36	Smt. Banumathi G, IFS	Project Director
37	Mr. Harshakumar C, IFS	Director (M&E/AFA /LCD)
38	Mr. Anurag Gupta	Team Leader, PMC
Uttarakhand Forest Resources Management Project		
39	Mr. Naresh Kumar, IFS	APCCF/Chief Project Director
40	Shri Jay Kumar Sharma,	Chief Engineer, UFRMP
Nagaland Forest Conservation and Livelihood Improvement Project		
41	Shri. Vedpal Singh, IFS	PCCF & HoFF, Chief Project Director, Nagaland Forest Management Project
42	Shri. Desabathula Rajiv Shankar, IFS,	"Dy. Project Director (ME & GIS), NFMP"
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45	Ms. Bratati Purkayastha	Technical Specialist, Project Management, MegLife Project
Project for Improvement of Himachal Pradesh Forest Ecosystem Management and Livelihood		
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Project for Ecosystem Restoration in Gujarat		
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Telangana Startup and Innovation Ecosystem Strengthening Project, Telangana		
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55	Dr. A. Nicodemus	"Scintitist - G Institute of Forest Genetics and Tree Breeding (IFGTB)"
56	Dr. Ashok Kumar Singha	"Managing Director, CITRAN ASCERT Network Advisors"
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63	Ms. Sujatha. D.	Scientist-G,ICFRE-IWST, Bengaluru
64	Dr. Anil Sethy	Scientist-F,ICFRE-IWST, Bengaluru
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68	Dr. K. A. Sreejith	Principal Sceintist, Kerala Forest research Institute, Kerala
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70	Sri Rajiv Kumar, IFS (Retd.)	Ex- Project Director
71	Dr. Ajit Kumar Pattnaik, IFS (Retd.)	Ex- Project Director
72	Dr. (Mrs.) Meeta Biswal, IFS (Retd.)	Ex- Project Director
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86	Sri Gobinda Ch. Biswal, OFS-I(SB)	Baripada
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90	Sri Manu Ashok Bhat, IFS	Jharsuguda
91	Sri Bikram Deb Pattanaik, OFS-I(SB)	Bamra(WL)
92	Sri Sumit Kumar Kar, IFS	Dhenkanal
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150	Sri Manash Dash	Operation Head, MMSA
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	Name of theDMUs	Name of The Participants and VSS
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156	Baripada	Sri. Padmalochana Mohanta,Asanabani
157	Rairangpur	Ms. Minati Patra,Banadunguri
158	Athamallik	Ms. Sumati Sahoo,Susab
159	Boudh	Sri. Alekha Bagarti,Biranarshighpur
160	Sambalpur	Ms. Banita Kisan,Jangla
161	Sundergarh	Sri. Mananit Dungdung,Dainidihi
162	Jharsuguda	Sri. Chudamani Behera,Khuntamal
163	Subarnapur	Sri. Satya Narayan Bagh,Sankhachul
164	Gumusur (S)	Sri. Bhagaban Behera,Sapua
165	Gumusur (N)	Ms. Sabita Rani Dakua,Kotibaradi



ODISHA FORESTRY SECTOR DEVELOPMENT PROJECT PHASE - II

Odisha Forestry Sector Development Society
Forest, Environment and Climate Change Department,
Government of Odisha

