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PROCEEDINGS OF THE

Technical Workshop on Developing a Strategic Framework and Manual for Landscape Restoration in the Himalaya

29 September – 1 October 2026
Gangtok - Sikkim, India

Organised by: ATREE Regional Office



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Technical Workshop on Developing a Strategic Framework and Manual for Landscape Restoration in the Himalaya

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Organised by: ATREE Regional Office

Venue: Gangtok, Sikkim

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Introduction

The Himalaya is a region of high ecological and cultural diversity, supporting rich biodiversity, vital ecosystem services and mountain communities. Increasing pressures from land-use change, infrastructure development, climate change and other human-induced factors are contributing to ecosystem degradation and landscape vulnerability.

The Technical Workshop on Developing a Strategic Framework and Manual for Landscape Restoration in the Himalaya, organised by ATREE Regional Office, Gangtok, brought together experts and practitioners from India, Nepal and Bhutan to discuss restoration approaches and strengthen a practical, region-specific framework for Himalayan landscapes.

Background

ATREE Regional Office has been implementing restoration initiatives in the Darjeeling–Sikkim Himalayan landscape and developed a draft Restoration Framework and Manual to guide restoration planning, implementation and monitoring. The workshop was organised to review and strengthen the draft framework through regional experiences and technical inputs, with emphasis on context-specific restoration approaches, implementation strategies, good practices and monitoring.

Objectives

- Strengthen ATREE's Restoration Framework and Manual.
- Share experiences and lessons from restoration initiatives across India, Nepal and Bhutan.
- Identify key implementation and research gaps.
- Develop practical approaches for restoration planning, implementation, monitoring and adaptive management.

Expected Outcomes

- A technically strengthened and practical Restoration Framework and Manual.
- Greater understanding of context-specific restoration approaches across the Himalaya.
- Key recommendations for implementation, monitoring and adaptive management.
- Stronger regional collaboration and knowledge exchange on ecological restoration.

Day 1: 29 September 2026 (Tuesday)

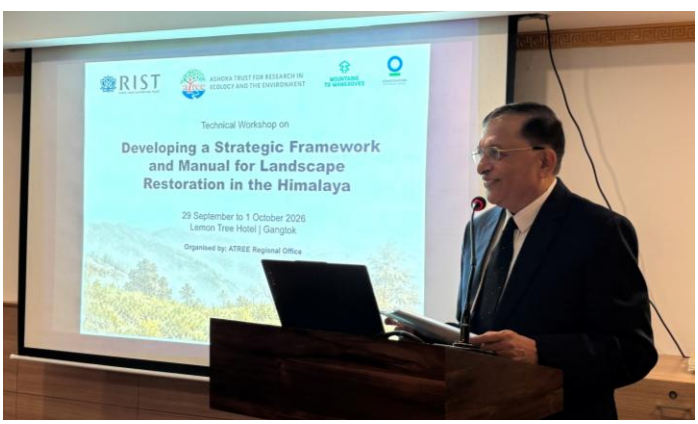
Registration for the technical workshop commenced at 09:00, facilitated by Ms. Deepa Chettri (Project Assistant M & E, ATREE) and Ms. Sonamit Lepcha (Project Assistant, ATREE). The day's events were led by Emcee Dr. Avantika Thapa (Postdoctoral Research Associate, ATREE), who opened the workshop with a welcome and introduction.

Inauguration Session

Opening Remarks, and Strategic Framework

Dr. Eklabya Sharma (Strategic Advisor & Director, The Himalaya Initiative, ATREE) delivered the inaugural address, providing context on ATREE's 30-year establishment in Bangalore, which focuses on interdisciplinary, need-based knowledge generation, sustainability, and building capacity for next-generation leaders.

- Dr. Sharma detailed The Himalaya Initiative (THI) as a geography-focused strategy. This strategy is driven by the Hindu Kush Himalaya's status as the third pole, a global asset, a biodiversity hotspot, and the "water tower of Asia".
- The THI framework advocates for five systematic shifts: bridging science, policy, and practice; implementing landscape-level solutions; building evidence-based policy; growing next-generation leaders; and unlocking nature-positive investments.
- He highlighted ecological connectivity as a critical need, noting that 19 Protected Areas in the Kangchenjunga Landscape (KL) are currently fragmented. As an example, the Mahananda-Senchal and Senchal-Singalila corridors are disconnected, whereas the Singalila-KNP-Barsey corridor remains connected.
- Ecosystem restoration must be viewed as a development vehicle and natural infrastructure for climate resilience, rather than just conservation.
- He called for a transformative shift away from time-bound, target-driven projects toward continuous systematic change that scales vertically to policymakers and horizontally across landscapes and communities. Success inherently relies on shifting from mere community participation to genuine community co-ownership.



Presentation of the Multifunctional Socioecological Landscape Restoration Framework

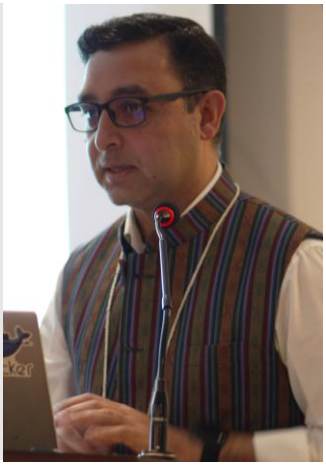
Dr. Aditya Pradhan (Postdoctoral Research Associate, ATREE) presented the draft restoration framework.

- He outlined the "Himalayan Paradox," which highlights how compounded biophysical stresses (such as climate change and hazards) and socio-economic stresses (like land tenure issues) place the burden of restoration heavily on local communities.
- Traditional restoration fails because it applies standard protocols that ignore elevation gradients and the heterogeneity of landscape mosaics, while assuming land parcels are contiguous.
- The proposed framework operates on a dual mandate that integrates ecological recovery with socio-economic and livelihood improvements. It explicitly shifts the economic focus toward Non-Timber Forest Products (NTFPs) rather than timber.
- It utilizes a five-step decision-support pathway: assessing feasibility and land tenure consent, baseline benchmarking, nursery sourcing, site preparation and outplanting, and monitoring socio-ecological indicators.
- The exit strategy emphasizes risk management, community capacity building, adaptive governance, and institutional handover to local bodies. The framework is designed as a "living" or "walking" document, subject to continuous adaptive management based on context.



Remarks on the Draft Framework by Institutional Representatives

Dr. Rajesh Joshi (Scientist & Regional Head, Sikkim Regional Centre, G.B. Pant National Institute of Himalayan Environment): Stated that rapid landscape changes require multisectoral actions. He emphasized that restoration must transition from site-specific plantation targets to a landscape-level approach focused on ecosystem health.



He noted the framework effectively bridges the gap between policy formulation and on-the-ground implementation, but communities must be recognized as traditional knowledge (TK) custodians, not just beneficiaries. Metrics must move beyond counting trees to measuring tangible outcomes like ecosystem services, water regulation, and community resilience. These outcomes should be supported by shared knowledge databases, keeping in mind that restoration is a scalable, global phenomenon.



Prof. Santaram Joshi (Professor, North-Eastern Hill University, Shillong): Emphasized that microbial diversity, such as mycorrhiza and plant-growth promoting bacteria integrated as bioinoculants used in nursery operations, as saplings often fail without them. Establishing satellite nurseries is crucial to mitigate local climate risks, citing examples of heavy rainfall destroying seedlings in Meghalaya. He recognized the framework's transboundary potential, including its application in jhum cultivated areas in Northeast India. He warned that climate change is driving an increase in phytopathogens and emerging diseases, requiring biological mitigation methods. Finally, he noted the framework is crystal-clear and implementable, but farmer community knowledge must be integrated, and communities must understand the long-term benefits of restoration success.

Remarks from the Chief Guest



Dr. D. Manjunatha (IFS) Chief Conservator of Forests - Wildlife - cum - Chief Wildlife Warden, Forest and Environment Department, Govt. of Sikkim: Highlighted that restoration yields both tangible and intangible benefits, requiring a deep understanding of the community mindset is essential for the success of any restoration project. He expressed the importance of restoration work in the landscape and also mentioned Govt. of Sikkim's long-term commitment towards ecological restoration through various initiatives such as the "Mero Rukh Mero Santati", "Sikkim Paryavaran Parva", "State Green Mission" and "Mission: Million Oak Trees by 2047".

Following the remarks, Dr. Nakul Chettri (Associate Director, The Himalaya Initiative, ATREE) delivered a vote of thanks, and Dr. Ugyal Tshering Lama Yolmo (Communication Associate, ATREE) facilitated a group photo.

Session 2: Regional Case Studies

The session, chaired by Dr. Rishi Kumar Sharma (Head-Himalayas Program, WWF-India) and co-chaired by Dr. Shalini Dhyani (Principal Scientist, CSIR-National Environmental Engineering Research Institute) featured regional case studies from Nepal and Bhutan highlighting community-led restoration initiatives and landscape-specific approaches.



Case Study 1: Community-Led Habitat Restoration by Red Panda Network, Nepal

Ms. Munmun Tamang (Program Officer, Red Panda Network, Nepal) presented their efforts to restore the habitat of the endangered Red Panda *Ailurus fulgens* in Nepal.

- The species faces severe habitat fragmentation and poaching, with a 50% decline in forest cover over the past three generations.
- The methodology includes selecting sites based on habitat connectivity, transferring acquired community land to the Divisional Forest Office, installing bamboo fencing, and planting preferred native species.
- The project successfully restored 142 hectares, planting over 142,000 seedlings.
- By engaging "restoration guardians" for post-plantation manuring and weeding, survival rates in the monitoring plot increased from 44% in 2023 to 78% in 2025.
- Challenges include livestock grazing conflicts, slow temperate growth rates, fencing logistics, and balancing NTFP collection by locals.

Q&A: When asked about the reason for the increased survival rate, Ms. Tamang cited focused efforts on specific areas, increased attention, and better knowledge generated over the years. Regarding land acquisition, she explained that land is bought and transferred to the Divisional Forest Office, which works because the community understands the importance of the Red Panda habitat. A question regarding the project's longevity, community ownership, and exit mechanism was postponed for later discussion.



Case Study 2: RESTORE BHUTAN Initiative, Bhutan Ecological Society, Thimphu, Bhutan

Ms. Tashi Yangki (Communications Manager, Bhutan Ecological Society) detailed Bhutan's restoration targets.

- While Bhutan maintains 60% forest cover and carbon neutrality, a large forest cover does not guarantee a functioning, healthy ecosystem.
- The initiative aims to restore 50,000 hectares of degraded forest by 2030 through partnerships with Conservation International, the Bhutan Trust Fund, and the Bhutanese government.
- A place-based approach addresses diverse land-use systems (agroforestry, fallow land) by mapping baselines and engaging communities to ensure monitoring goes beyond simply counting trees.
- Currently, 60+ nurseries have been established, prioritizing community requisitions.
- Youth are actively engaged in long-term solutions through school programs, internships, and ICON fellowships.

Q&A: Land for the ambitious target is acquired and prioritized based on an Atlas, with active government cooperation. Community members are treated as partners who perform plantations based on their requisitions. Regarding community participation (addressed to M2M), she noted it relies on incentive-based engagement and empowering youth with scholarships. The session noted appreciation for engaging children by associating them with specific tree individuals. The Session Chair summarized the importance of holistic restoration, data rigor over milestones, and strengthening the ATLAS through integrated interactions.



Session 3: Regional Case Studies

The session, chaired by Mr. Kshitij Saxena, IFS, Divisional Forest Officer (Territorial), Gangtok, and co-chaired by Dr. Amit Kumar, Scientist E, Wildlife Institute of India, Dehradun featured case studies from southern India and the western Himalaya, demonstrating approaches to restoring forests, grasslands, wetlands, and species habitats while addressing ecological degradation, livelihood dependencies, and community participation.



Case Study 3: Grassland and Forest Restoration in Agasthyamalai

Dr. Muthumperumal C (Project Manager, Agasthyamalai Community Conservation Centre - ATREE) presented the ASPIRE Project, managing five interconnected landscapes facing biodiversity loss, river pollution, and land-use changes.

- Kurunji (Forest): Restoring 3,350 hectares of 100-year-old abandoned tea estates by establishing baseline data on elevation gradients. Regeneration of native species (Litsea, Eliocarpus) is underway, though rapid tea bush growth is a challenge because complete removal risks soil erosion.
- Mullai (Grassland): Focuses on removing the invaded shrub *Dodonaea viscosa* and converting 80% of the removed biomass into biochar or bio-briquettes. Pre- and post-removal biodiversity monitoring is being assessed on the ecological impacts of restoration on native grasses and associated fauna.
- Marutham (Wetlands/Agriculture): Restoring six irrigation tanks to improve biodiversity and water quality. Conventional farmers are engaged in sustainable practices by educating them on natural bat, bird, and invertebrate pest controllers to reduce chemical fertilizer use.

Q&A: Dr. Muthumperumal confirmed they monitor areas where tea bushes have grown into full tree heights, though removal of such trees is currently limited. He noted the projects active engagement with forest, water, agriculture departments and government bodies based on administrative areas, presenting a great opportunity for intersectoral collaboration.





Case Study 4: Restoring Landscapes, Species, and Livelihoods in Himachal Pradesh

Dr. Sanjay Molur (Executive Director, Zoo Outreach Organisation) discussed a project concerning the Sacred Chamba Langur habitat in Himachal Pradesh, India which faces agricultural expansion, deforestation, and habitat fragmentation.

- Wild animals are forced into human areas, escalating conflicts.
- A 2012 Sacred Chamba Langur project mapped 28 willing villages to build nature-based livelihoods and mitigate crop raiding by restoring natural food sources (trees, shrubs, herbs) directly in the primates' native habitats.
- Over 15 hectares have been restored with 40,000+ saplings and 30+ species, engaging women's circle groups and students from five schools.
- Limitations include climate change, landslides, changing plant phenology (which is tied to edaphic soil factors rather than just climate), and the challenge of aligning targets with the community's emigration and livelihood needs.

Q&A: Discussing trade-offs, Dr. Molur noted that quantifying land to restore is a trade-off in itself, as langurs feed on fruit-bearing trees and communities are emigrating out from Chamba valley to places like Pathankot; thus, restoration must be based on community needs. He suggested that translating the model across the Himalaya requires starting with less-controversial species and conducting outreach prior to initiating restoration.

Session 4: Panel Discussion

Stress Test the Framework



The panel discussion was moderated by Dr. Avantika Thapa. Dr. Shalini Dhyani, Dr. Sanjay Molur, Ms. Munmun Tamang, Ms. Sweetlana Ranjan (Founder & CEO, IBehindTheInk Private Limited), Mr. Jishu Chakraborty (Senior Project Coordinator, Conservation International), Dr. Rajesh Joshi, and Ms. Tashi Yangki were the panelists.

Q1: Defining and Measuring Success

Dr. Sanjay Molur (Species-Specific Habitat Restoration): Success is defined by species richness and biodiversity. Restoring native wild shoots naturally provides food for primates, reduces crop raiding, and helps regenerate new species, backed by scientific fossil remnant data. Identifying food sources and integrating them into restoration is critical.

Dr. Rajesh Joshi (Monitoring Indicators and Scale): Monitoring requires evaluating the interlinkages of indirect socio-economic co-benefits, like water availability and soil moisture. Impact assessment requires preliminary assessment at a pilot scale, followed by using technology to extrapolate to a larger scale.

Ms. Munmun Tamang (Locally Owned Stewardship): Success involves identifying native fodder species utilized by both wildlife and communities to establish functional habitat connectivity and corridors, which generates local livelihood opportunities.

Ms. Sweetlana Ranjan (Economic Self-Sustainability): True success is building aspirations for rural youth beyond formal degrees, empowering them with capacity so they take pride in restoring their own landscapes rather than emigrating.

Ms. Tashi Yangki (Communications and Aspiration): The framework acts as a practical reference to show policymakers that restoration transcends plantation, requiring a holistic view of the ecosystem. Success should be indicated by governance, livelihoods, and visible community participation outcomes rather than just technical projects and mere data implementation.

Dr. Shalini Dhyani (Socio-Ecological Results Evidence): Acknowledging that restoration is non-linear and complex, success requires thoroughly assessing how multifunctional factors interact and cause synergistic effects. It requires establishing and quantifying the ecosystem's resilience beyond initial efforts, taking into consideration trade-offs, and showing how communities can become more self-sustainable by acting as guardians for post-restoration work.

Mr. Jishu Chakraborty (Funder's Perspective): From a funder's perspective, success means avoiding unrealistically ambitious designs by embedding robust evaluation, monitoring, and community needs into the core plan. Interventions must be considered based on their sociological and livelihood impacts on local communities, noting that short-term projects do not provide realistic solutions.

Q2: What Makes It Work?

Dr. Rajesh Joshi: Prior to implementation, projects require science-based feasibility testing, such as analyzing depressed spring sites, geological structures, and infiltration rates to manage recharge areas effectively.

Ms. Munmun Tamang: Community disengagement is a critical red flag. Ensuring stewardship requires allocating internal project budgets and external local budgets to incentivize workers and prevent exotic species preference and sapling mortality.

Ms. Sweetlana Ranjan: Projects must build diverse landscape partnerships, involve the community to understand what was historically lost, build youth networks for capacity building, and celebrate failures without guilt to overcome discontinued funding issues.

Ms. Tashi Yangki: Communication must transition from general awareness to personal relevance and participation, utilizing local champions, visual storytelling, and digital platforms to maintain two-way dialogue and envision participatory governance.

Dr. Shalini Dhyani: Stakeholders must identify hidden trade-offs, such as when achieving ecological objectives inadvertently compromises local livelihoods or involves human-wildlife conflict, and rely on community knowledge to balance these risks.

Mr. Jishu Chakraborty: Long-term sustainability relies on evaluating the financial feasibility of maintaining activities while assessing customary, social, and environmental risks specific to indigenous communities.

Dr. Sanjay Molur: Local ecology consideration is paramount. Practitioners must bring back what was lost from the area to make local ecology sustainable, and must convince funders to approve what is ecologically essential rather than thinking solely from a funding perspective.

The session concluded with Dr. Eklabya Sharma emphasizing the overarching need to learn from and seize opportunities as they arise during implementation.



Concluding Session

The session concluded with Dr. Aditya Pradhan thanking all the expert participants for their inputs. He assured the participants that their recommendations would be integrated, but cautioned that the framework should not be made too data-heavy to manage or implement.

A Day 2 Briefing was subsequently provided by Mr. Prazual Gurung (Senior Project Associate, ATREE), bringing Day 1 proceedings to a close.



Day 2: 30 September 2026 (Wednesday)

The second day of the workshop commenced with morning registration facilitated by Ms. Deepa Chettri and Ms. Sonamit Lepcha (Project Assistants, ATREE). The focus of the day was the transition from theoretical frameworks to practical, on-the-ground implementation guidelines. Mr. Prazual Gurung initiated the sessions with a recap of Day 1 and a briefing on the Day 2 agenda.

Session 5: Operational Manual and Implementation Strategy

Presentation of the Restoration Manual

Dr. Aditya Pradhan (Postdoctoral Research Associate, ATREE) presented the operational manual. He explained that the manual outlines the practical continuation of the restoration framework, focusing primarily on areas outside of Protected Areas (PAs) in the Darjeeling-Sikkim region, targeting corridors, abandoned agricultural land, and degraded areas. He noted that the framework is intended to be adaptable beyond forest restoration, expanding into alpine, riverine, and agro-ecosystems to maintain biodiversity and address upward migration pressures. To date, the initiative has successfully restored 193 hectares of land and established six community-based nurseries, generating direct livelihood opportunities.

The 5-Step Operational Pathway: Dr. Pradhan detailed the core methodology:

Step 1 - Feasibility and Consent: The process starts by establishing trust, understanding land tenure usage, and navigating legalities. This includes co-mapping restoration boundaries with local institutions, conducting community consultations to prioritize native tree species, and establishing formal agreements with landowners.

Step 2 - Baseline Benchmarking: To ensure evidence-based management, vegetation surveys utilize quadrat and diagonal sampling to establish permanent control and monitoring plots. Parallel surveys are conducted for faunal indicators (using camera traps for birds and mammals) and socio-economic metrics (household income, tolerance).

Step 3 - Sourcing and Nursery Operations: Procuring native species from commercial nurseries is challenging because they predominantly stock exotic species for monetary value. To counter this, decentralized community nurseries are established and contract growing is commissioned, which requires a 4–6-week acclimatization period for seedlings.

Step 4 – Outplanting and Logistics: Timing is difficult due to narrow and unpredictable monsoon windows. The process prioritizes natural and assisted regeneration, utilizing techniques like staking to mirror natural ecosystem structures, followed by post-plantation maintenance.

Step 5 - Monitoring and Adaptive Management: Structural complexity and performance are monitored via 30x30m permanent plots every two to three years. Monitoring includes biodiversity checks, soil organic carbon (SOC) measurement, hydrological assessments, and tracking socio-economic indicators such as youth outmigration.

Challenges and Livelihood Integration: Dr. Aditya Pradhan and Mr. Sanjeeb Pradhan (Senior Project Manager, ATREE) highlighted significant implementation hurdles, including convincing communities of long-term goals, navigating unregistered land ownership disputes, high transport logistics in difficult terrain, and landowners withdrawing after agreements are signed. To incentivize long-term ownership, NTFPs are integrated strategically. Post-restoration, Panchayats issue "green cards," allowing communities to harvest these products. Capacity building includes providing safety gear (boots, gloves), enforcing a strict no-alcoholism policy during fieldwork, and honing apiary skills. Future strategies will explore carbon credits and eco-tourism via orchids.

During the **Q&A and open discussion**, several key points were clarified:

- **Corridors:** Corridors were previously established in Darjeeling but not accurately delineated; ATREE's current work and the Govt. of Sikkim's plans aim to formally establish them.
- **Early Challenges:** Initial hurdles included convincing communities, navigating unregistered land ownership, and finding suitable native species, as commercial nurseries primarily housed exotic, revenue-generating species.
- **Agreement Process & Security:** Land agreements are established with individuals first, followed by panchayats, society leaders, and environmental safeguarding committees. Post-restoration NTFP integration is secured via green cards issued by Panchayats, with the project supporting value addition and enterprise setups.
- **Invasives:** Invasive species in degraded areas are currently managed through supervised manual removal (uprooting and cutting).

Socio-Ecological Balance: Participants suggested planting medicinal plants for short-term community benefits, developing eco-trails, and growing orchids. It was strongly noted that relying solely on community goodwill is challenging; real models for community benefit must be built. Furthermore, a hyperfocus on ecological aspects may ignore pressing sociological issues like outmigration; thus, the integration of social sciences and a movement from a perception-based to a scientific evidence-based approach is crucial.

Session 6: Group Discussions on Steps 1, 2 & 3

Participants divided into three groups to refine the initial steps of the manual, followed by a plenary presentation chaired by Prof. Santaram Joshi (NEHU) and co-chaired by Dr. Sana Huque (Project Manager, Eastern Himalaya, Nature Conservation Foundation), with rapporteurs Mr. Saurabh Gurung, Ms. Deepa Chhetri, and Ms. Repbamla Lepcha.

Group 1: Feasibility and Consent

Moderated by Dr. Sanjay Molur and facilitated by Mr. Sanjeeb Pradhan, the group was represented by speaker Ms. Sweetlana Ranjan. They emphasized that success relies on understanding social and ecological complexities by involving village elders and explicitly including marginalized voices, youth, and women. Legal documents (MOUs) must clearly document commitments and balance social and ecological objectives to clarify expectations. Outreach must focus on fostering long-term behavioral change and establishing stakeholder rights, rather than imposing perceived obligations.



Group 2: Baseline Benchmarking

Moderated by Dr. Siddhartha Krishnan and facilitated by Dr. Aditya Pradhan, the group was represented by Dr. Amit Kumar. They advocated for methodology refinement, specifically utilizing diagonal plot sampling to better account for edge effects and representation in vegetation surveys. They noted that while mammals are often used as indicators, birds may serve as better indicator taxa for faunal surveys. Establishing long-term permanent plots is essential for monitoring climate change impacts, and community knowledge must be embedded within legal documents.



Group 3: Sourcing and Nursery Operations

Moderated by Prof. Santaram Joshi and facilitated by Mr. Prazual Gurung, the group was represented by Dr. Aseesh Pandey. They strongly emphasized adopting global standards that prioritize native species through decentralized community nursery networks to generate livelihoods. Operational standards must clearly define the nativity and successional stages of seedlings. Furthermore, seed collection methods and locations must be documented to maximize the gene pool, and nurseries must be designed to be herbivory-proof.



Session 7: Group Discussions on Steps 4, 5 & Framework Adaptability

Following lunch, participants re-grouped to address the latter steps of the manual. The subsequent presentations were chaired by Dr. Sanjay Molur and co-chaired by Mr. Suraj Mukhia (Forest Ranger, Dept. of Forests, Govt. of West Bengal).

Group 4: Sapling Logistics and Species Selection

Moderated by Ms. Munmun Tamang and facilitated by Mr. Sanjeeb Pradhan. The group addressed the common conflict where communities request commercial varieties post-restoration rather than indigenous species, noting that species selection must be mediated through Focus Group Discussions (FGDs). Key logistical challenges identified included the lack of sapling materials, the theft of high-value plants (e.g., Chandan) by local communities, and the necessity of collecting and planting specific seeds (like Sal) within a single day.

Group 5: Monitoring (Step 5)

Moderated by Dr. Amit Kumar and facilitated by Dr. Aditya Pradhan. The group praised the precisely designed monitoring framework but highlighted observer and technical biasness as threats. They suggested moving from annual monitoring to regular (event-based) monitoring, defining specific triggers, and evaluating phytopathogens. Monitoring should assess "experienced disservices" rather than merely perceived ones, and involve stakeholders from diverse age groups and backgrounds. They recommended including the 3Bs (Birds, Butterflies, and Bees) and generating soil passport data using instruments like the Bhu-vision Kit to understand climax stabilization.

Group 6: Adaptive Management and Framework Adaptability

Moderated by Ms. Tashi Yangki and facilitated by Mr. Prazual Gurung. The group noted the document is well-structured with a good literature review, but suggested extending its adaptability to cover grasslands and wetlands. The social and human-wildlife conflict parts require strengthening, alongside comprehensive socio-economic vulnerability assessments, especially given that land use is changing due to landslides. For grassland ecosystems, they recommended removing invasive species and planting natives while managing livestock grazing threats. Further suggestions included studying pastoralism and jhum cultivation, creating conservation transportation guidelines, exploring carbon credits, utilizing the People Biodiversity Register, and selecting soil-binding species.



Session 8: Consolidation and conclusion



Dr. Nakul Chettri (ATREE) led the consolidation session.

- **Ecosystem Expansion & Complexity:** The synthesis emphasized the transition from strictly forest-based restoration to agriculture-focused and other diverse ecosystems. Nature's complexity demands attention beyond planting; seed availability is location-dependent, and seed viability relies heavily on functional pollination.
- **Synergy and Scale:** Calculating trade-offs is essential to balance development and conservation. Successful scaling requires moving beyond simply copying methodologies to genuinely adapting them to the cultural, ecological, and inter-departmental synergies unique to each landscape.

Closing Session

The day concluded with remarks from institutional representatives Mr. Jishu Chakraborty (Conservation International). Following this, Mr. Sanjeeb Pradhan (Senior Project Manager, ATREE) provided a briefing for the upcoming field visit. The day officially closed with a vote of thanks by Mr. Prazual Gurung and Dr. Ugyal Tshering Lama Yolmo facilitated the group photo.

Day 3: 1 October 2026 (Thursday)

Field Visit to Panbu and Kambal Restoration Sites

The third and final day of the workshop was dedicated to a practical field visit, designed as a peer-learning exercise for participants to observe the on-the-ground application of the restoration framework. Following breakfast and morning preparations led by Mr. Sanjeeb Pradhan, the delegation departed for the Panbu landscape. The Panbu site serves as a critical demonstration area for restoring ecological connectivity between the Mahananda and Neora Valley Protected Areas.

Panbu Restoration 2024 Site and Monitoring Plots

Upon arrival, the field visit commenced at the Panbu Restoration 2024 Site, guided by Mr. Tenzing Sherpa and Mr. Sanjeeb Pradhan. During this session, Mr. Pramod Rai demonstrated the permanent monitoring plots to the participants, showcasing the

methodology used to track vegetation recovery, structural complexity, and natural regeneration over time. The site visit provided tangible examples of how the project addresses degraded lands and slope-related runoff by prioritizing locally adapted native species and supporting existing natural regeneration.



Community Interaction and Participatory Governance

A core component of the afternoon was the interaction with field staff and local stakeholders. Participants had the opportunity to engage directly with local community members actively participating in the restoration activities, who shared practical field experiences and local perspectives. Furthermore, the delegation interacted with the local Panchayat Secretary, highlighting the project's emphasis on participatory governance, local ownership, and multi-stakeholder collaboration essential for long-term maintenance and grievance redressal.



Kambal Restoration Sites and Synthesis

In the afternoon, the team proceeded to the Kambal Restoration 2025 and 2026 Sites to observe sequential restoration progress across different planting years. The field activities concluded with a comprehensive synthesis of field observations held at the Panbu Field Office. Dr. Nakul Chettri joined the field visit for the day, and the final synthesis session was moderated by him alongside Mr. Sanjeeb Pradhan, allowing participants to reflect on the practical challenges, successes, and replicability of the demonstrated approaches across other Himalayan states.



The workshop officially concluded with an overnight stay and a closing dinner at Manjushree Dhim in Panbu.





Group Photo of the Participants

Annexes

Annex 1: Workshop agenda

Day 1: 29 September 2026 (Tuesday)			
Time	**Programme**	**Remarks**	
0900 - 0930	Registration	Ms Deepa Chettri, Ms Sonamit Lepcha, ATREE	
0930 - 1000	Welcome & Introduction	Dr Avantika Thapa and team, ATREE	
1000 - 1020	Inauguration & Opening Address	Dr Eklabya Sharma, ATREE	
1020 - 1040	ATREE: Presentation of the Restoration Framework	Dr Aditya Pradhan, ATREE	
1040 - 1050	Remarks on the draft framework by institutional representatives	Dr Rajesh Joshi, Sikkim Regional Centre, G.B. Pant National Institute of Himalayan Environment, Gangtok, Sikkim	
		Prof. Santaram Joshi, North-Eastern Hill University, Shillong	
1050 - 1100	Remarks from the Chief Guest	Dr D. Manjunatha (IFS), CWLW cum CCF, Forest and Environment Department, Govt. of Sikkim	
1100 - 1110	Vote of thanks	Dr Nakul Chettri, ATREE	
1110 - 1130	Group photo & Tea Break	Dr Ugyal Tshering Lama Yolmo, ATREE	
1130 - 1200	Case Study from Red Panda Network, Nepal	Ms Munmun Tamang, Red Panda Network	**Chair:** Dr. Rishi Kumar Sharma, WWF-India **Co-Chair:** Dr. Shalini Dhyani, CSIR-National Environmental Engineering Research Institute
1200 - 1230	Case Study from Bhutan Ecological Society, Bhutan	Ms Tashi Yangki, Bhutan Ecological Society	
1230 - 1330	Lunch		
1330 - 1400	Case Study from the Himalaya Restoration Project, Chamba, Himachal Pradesh	Dr Sanjay Molur, Zoo Outreach Organisation, India	**Chair:** Mr. Kshitij Saxena (IFS), Forest and Environment Department, Govt. of Sikkim **Co-Chair:** Dr Amit Kumar, Wildlife Institute of India, Dehradun
1400 - 1430	Case Study from ASPIRE Project, Agasthyamalai Community Conservation Centre (ACCC)	Dr Muthumperumal C, ACCC - ATREE	
1430 - 1600	Panel Discussion Panelists: Dr. Shalini Dhyani *(CSIR-National Environmental Engineering Research Institute)*, Dr. Sanjay Molur *(Zoo Outreach Organisation)*, Ms. Munmun Tamang *(Red Panda Network, Nepal)*, Ms. Sweetlana Ranjan *(IBehindTheInk Private Limited)*, Mr. Jishu Chakraborty *(Conservation International)*, Dr. Rajesh Joshi *(G.B. Pant National Institute of Himalayan Environment, Gangtok, Sikkim)*, Ms. Tashi Yangki *(Bhutan Ecological Society, Thimphu, Bhutan)*	Moderation by Dr Avantika Thapa, ATREE	
1600 - 1610	Day 2 Briefing	Mr Prazual Gurung, ATREE	
1610	Tea / Close of Day 1		
Emcee Dr Avantika Thapa, ATREE			

Day 2: 30 September 2026 (Wednesday)

Time	Day 2 – 30 September 2026	Remarks	
0900 - 0930	Registration	Ms Deepa Chettri, Ms Sonamit Lepcha, ATREE	
0930 - 0940	Day 1 recap and day 2 agenda	Mr Prazual Gurung, ATREE	
0940 - 1000	ATREE: Presentation of the restoration manual	Dr Aditya Pradhan, ATREE	
1000 - 1100	Group discussion (3 groups) on step 1, 2 & 3 of the manual	**Group 1:** Moderation by Dr Sanjay Molur, Zoo Outreach Organisation | Facilitator Mr Sanjeeb Pradhan, ATREE **Group 2:** Moderation by Dr Siddharth Krishnan, ATREE | Facilitator Dr Aditya Pradhan, ATREE **Group 3:** Moderation by Prof. Santaram Joshi North-Eastern Hill University, Shillong | Facilitator Mr Prazual Gurung, ATREE	
1100 - 1130	Tea Break		
1130 - 1215	Presentation of group discussion - step 1, 2 & 3	**Chair:** Prof. Santaram Joshi, NEHU, Shillong **Co-Chair:** Dr Sana Huque, NCF, Bengaluru	**Rapporteurs:** Mr Saurabh Gurung, Ms Deepa Chhetri, Ms Repbamla Lepcha (ATREE)
1215 - 1230	Additional inputs open to all		
1230 - 1330	Lunch		
1330 - 1430	Group discussion (3 groups) on step 4, 5 & framework adaptability across multiple ecosystems	**Group 4:** Moderation by Ms Munmun Tamang, RPN- Nepal | Facilitator Mr Sanjeeb Pradhan, ATREE **Group 5:** Moderation by Dr Amit Kumar, Wildlife Institute of India, Dehradun | Facilitator Dr Aditya Pradhan, ATREE **Group 6:** Moderation by Ms Tashi Yangki, Bhutan Ecological Society, Thimphu, Bhutan | Facilitator Mr Prazual Gurung, ATREE	
1430 - 1515	Presentation of group discussion - Step 4, 5 & Framework adaptability across multiple ecosystems	**Chair:** Dr Sanjay Molur, Zoo Outreach Organisation **Co-Chair:** Mr Suraj Mukhia, Department of Forests, Govt. of West Bengal	**Rapporteurs:** Mr Saurabh Gurung, Ms Deepa Chhetri, Ms Repbamla Lepcha (ATREE)
1515 - 1530	Additional inputs open to all		
1530 - 1550	Tea Break		
1550 - 1610	Consolidation of key recommendations & open discussion	Dr Nakul Chettri, ATREE	
1610 - 1620	Closing remarks by institutional representatives	Ms. Sweetlana Ranjan, IBehindTheInk Private Limited Mr. Jishu Chakraborty, Conservation International Dr Sanjay Molur, Zoo Outreach Organisation, India	
1620 - 1625	Briefing for the field visit	Mr Sanjeeb Pradhan, ATREE	
1625 - 1630	Vote of thanks followed by group photo	Mr Prazual Gurung | Dr Ugyal Tshering Lama Yolmo (ATREE)	
1630	Close of Day 2		

Day 3: 1 October 2026 (Thursday)

Time	Day 3 – 1 October 2026	Remarks
0700 - 0745	Breakfast	Lemon Tree Hotel (Before checkout)
0745 - 0800	Preparation for Field Visit	Mr Sanjeeb Pradhan
0800 - 1200	Departure for Panbu Restoration Site	Mr Sanjeeb Pradhan
1200 - 1330	Field Visit: Panbu Restoration 2024 Site	Mr Tenzing Sherpa, Mr Sanjeeb Pradhan
1330 - 1430	Lunch/Interaction with field staff	Mr Tenzing Sherpa
1430 - 1600	Field Visit: Kambal Restoration 2025 & 2026 Sites	Mr Tenzing Sherpa, Mr Sanjeeb Pradhan
1600 - 1700	Synthesis of Field Observations in Panbu Field Office	Mr Sanjeeb Pradhan, Dr Ugyal Yolmo
1700 - 1800	Night Stay at Panbu	Manjushree Dhim
2030	Dinner	Manjushree Dhim

Annex 2: List of participants for the workshop

Sl No	Name	Designation	Organisation/Institute
1	Dr D Manjunatha (IFS)	Chief Conservator of Forests (Wildlife) – cum - Chief Wildlife Warden	Forest and Environment Department, Government of Sikkim
2	Mr Kshitij Saxena (IFS)	Divisional Forest Officer- Territorial, Gangtok	Forest and Environment Department, Government of Sikkim
3	Prof Santaram Joshi	Professor	North-Eastern Hill University, Shillong
4	Dr Shalini Dhyani	Principal Scientist	CSIR-National Environmental Engineering Research Institute
5	Dr Sanjay Molur	Executive Director	Zoo Outreach Organisation
6	Dr Amit Kumar	Scientist E	Wildlife Institute of India, Dehradun
7	Ms Sweetlana Ranjan	Founder & CEO	IBehindTheInk Private Limited
8	Ms Munmun Tamang	Program Officer	Red Panda Network, Nepal
9	Dr Sana Huque	Project Manager, Eastern Himalaya	Nature Conservation Foundation
10	Dr Rishi Kumar Sharma	Head, Himalayas Program	WWF-India
11	Mr Jishu Chakraborty	Senior Project Coordinator	Conservation International
12	Ms Tashi Yangki	Communications Manager	Bhutan Ecological Society, Thimphu, Bhutan
13	Mr Suraj Mukhia	Forest Ranger, Tukriajhar, Kurseong Division	Department of Forests, Government of West Bengal
14	Dr Aseesh Pandey	Scientist C	G.B. Pant National Institute of Himalayan Environment (NIHE), Almora, Uttrakhand
15	Dr. Rajesh Joshi	Scientist & Regional Head	Sikkim Regional Centre, G.B. Pant National Institute of Himalayan Environment, Gangtok, Sikkim
16	Dr. Kailash Singh Gaira	Technical Officer	Sikkim Regional Centre, G.B. Pant National Institute of Himalayan Environment, Gangtok, Sikkim

Sl No	Name	Designation	Organisation/Institute
17	Dr. Siddhartha Krishnan	Senior Fellow	ATREE - Bengaluru
18	Dr. Muthumperumal C	Project Manager	Agasthyamalai Community Conservation Centre (ACCC) - ATREE
19	Dr Eklabya Sharma	Strategic Advisor & Director, The Himalaya Initiative	ATREE – Regional Office
20	Dr Nakul Chettri	Associate Director, The Himalaya Initiative	ATREE – Regional Office
21	Dr Malavika Hosahally Narayana	Senior Project Manager, The Himalaya Initiative	ATREE – Regional Office
22	Dr Sailendra Dewan	Fellow in Residence	ATREE – Regional Office
23	Dr Aditya Pradhan	Postdoctoral Research Associate	ATREE – Regional Office
24	Dr Avantika Thapa	Postdoctoral Research Associate	ATREE – Regional Office
25	Mr Sanjeeb Pradhan	Senior Project Manager	Darjeeling Community Conservation Center - ATREE
26	Mr Prazual Gurung	Senior Project Associate	ATREE – Regional Office
27	Mr Saurabh Gurung	Project Associate	ATREE – Regional Office
28	Ms Deepa Chettri	Project Assistant M & E	ATREE – Regional Office
29	Dr Ugyal Tshering Lama Yolmo	Communication Associate	ATREE – Regional Office
30	Mr Ashwin Chettri	Senior Database Associate	ATREE – Regional Office
31	Mr Tenzing Sherpa	Senior Field Coordinator	Darjeeling Community Conservation Center - ATREE
32	Mr Ramesh Subba	Field Assistant	Darjeeling Community Conservation Center - ATREE
33	Mr Passang Nima Sherpa	Senior Field Assistant	Darjeeling Community Conservation Center - ATREE
34	Mr Mahesh Khawas Bhujel	Field Assistant	Darjeeling Community Conservation Center - ATREE
35	Mr Sunil Dahal	Assistant Manager Administration & Finance	ATREE – Regional Office
36	Ms Richa Tamang	Admin & Finance Officer	ATREE – Regional Office
37	Ms Nisu Kumari	Project Accountant	ATREE – Regional Office
38	Mr Sangay Wangdi Bhutia	Project Associate	ATREE – Regional Office
39	Ms Sonamit Lepcha	Project Assistant	ATREE – Regional Office
40	Ms Repbamla Lepcha	Research Associate	ATREE – Regional Office
41	Mr Pramod Rai	Project Associate	ATREE – Regional Office



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