Sutra Consulting

MID TERM EVALUATION OF SCATFORM PROJECT

FINAL REPORT

Contents

List of Abbreviations

AGF	Agro-forestry
ANR	Aided Natural Regeneration
APL	Above Poverty Line
AR	Artificial Regeneration
ARDD	Animal Resources Development Department
BFBP	Beat Forest Basic Plan
BGP	4. Brushwood Gully Plugs
BIS	Bureau of Indian Standards
BPL	Below Poverty Line
CAPI	Computer Assisted Personal Interviewing
CF	Community Facilitators
CIMAP	Central Institute of Medicinal and Aromatic Plants
DBH	Diameter at Breast Height
DCPN	Decentralised People's Nursery
DFO	Divisional Forest Office
DMU	Divisional Management Unit
EC	Executive Committee
EDC	Eco Development Committee
ESC	Environmental and Social Considerations
ESMSF	Environmental and Social Assessment Framework
FFDC	Fragrance & Flavour Development Centre
FGD	Focus Group Discussions
FIGS	Forest Integrated Geospatial Solutions
FRA	Forest Right Act
FSI	Forest Survey of India
FY	Financial Year
GB	Governing Body
GBH	Girth at Breast Height
HPSC	High Powered Steering Committee
IBRAD	Indian Institute of Bio Social Research and Development
IDI	In Depth Interview
IEC	Information Education Communication
IGA	Income Generation Activities
INR	Indian Rupee
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
JICA	Japan International Cooperation Agency
JLG	Joint Liability Group
LC	Livelihood Coordinators
LISS	Linear Imaging Self Scanning Sensor
LPG	Liquified Petroleum Gas
MDF	Moderately Dense Forest
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIS,	Management Information System
MOVCD	Mission Organic Value Chain Development
MPR	Monthly Progress Reports
MUC	Multi Utility Centres
NAP	National Afforestation Program
NCE	National Centre of Excellence
NID	National Institute of Design
NIFT	National Institute of Fashion Technology
NTFP	Non-Timber Forest Produce
OF	Open Forest
PMU	Project Management Unit
PPP	Public Private Partnership
QPM	Quality Planting Material
RCC	Reinforced Cement Concrete
RMU	Range Management Unit
SCATFORM	Sustainable Catchment Forest Management in Tripura
SDFO	Sub Divisional Forest Office

SDMU	Sub Divisional Management Unit
SFM	Sustainable Forest Management
SHG	Self Help Group
SMC	Soil and Moisture Conservation
SOP	Standard Operating Procedures
STFDPF	Scheduled Tribe and Forest Dependents Plan Frame Work
TFD	Tripura Forest Department
TFIPAP	Tripura Forest Environmental Improvement & Poverty Alleviation Project
TNTR	Tripura Nature Trail Resorts
TPM	Teak Plantation Management
TRLM	Tripura Rural Livelihoods Mission
UNESCO	United Nations Educational, Scientific and Cultural Organization
VDF	Very Dense Forest
VTC	Vocational Training Centre
WLS	Wildlife Sanctuary

EXECUTIVE SUMMARY

The SCATFORM project has been implemented across all districts of Tripura since 2018-19 and has completed around six years of operation. Implemented through a range of stakeholders at the state, district, sub-division, range, beat, and community levels, it has undertaken a wide range of interventions and activities over this five-year period. These needed to be assessed, focusing not only on the 'quantitative' aspects but more crucially on 'process' and 'system' aspects, considering the focus of the mid-term review.

The overall objective of this assignment was to evaluate progress towards achieving goals, identifying challenges or obstacles, and recommending appropriate measures to improve project implementation and outcomes. It further aimed to assess the effectiveness of project strategies, processes, and interventions, expected sustainability of activities and outcomes, and the level of stakeholder participation and engagement. This review during the mid-term stage aimed to assist in assessing the relevance, effectiveness, and efficiency of the project.

The evaluation focused on studying institutional structures, coordination mechanisms, roles and responsibilities, activities planned versus undertaken, systems for project management, monitoring, communication, capacity building, community participation, and grievance redressal among others. It was to form the basis for assessment of whether the project, through its structures, systems, and interventions, had been able to meet the desired levels of relevance, efficiency, and effectiveness. Further, the evaluation intended to enable isolation of key bottlenecks that need to be addressed to ensure achievement of objectives by the time of project completion.

This evaluation was conducted through an assessment of project documents and MIS, discussions with stakeholders, and visits to project sites. The key step of data collection included a mix of various methods including quantitative surveys, In-Depth Interviews (IDIs), Focus Group Discussions (FGDs), and observations. This Executive Summary documents the major findings and recommendations of the mid-term evaluation.

Component-1: Sustainable Forest Management

1. Afforestation:

In Component 1, a wide range of plantation activities, including ANR, AR (Mixed and Bamboo), and TPM, were undertaken to restore degraded forest areas. The average survival rate across the sites was found to be above 80%, which is encouraging. However, the Teak Plantation Management (TPM) interventions fell short of their target, achieving only 20% progress at the mid-term stage. Similarly, Silvi-Pastoral Plantations showed limited progress.

AR (Mixed): The project aimed to cover 3000 Ha, and the achievement was 2659 Ha (89%). However, the quality of fencing at some sites was inadequate, leading to biotic pressures such as cattle grazing.

AR (Bamboo): This intervention exceeded the target of 2000 Ha, with 2472 Ha (124%) covered. However, fencing challenges persisted.

ANR: With a target of 21,000 Ha, the project achieved 19,299 Ha (92%). The survival rate at ANR sites was high, but biotic pressures and the need for stronger protection measures were noted.

TPM: The progress on TPM was significantly below target, with only 20% of the planned 15,000 Ha achieved. The survival rate at sites was relatively high (above 80%), but there is a need for enrichment plantation.

2. Species Diversity

The plantations demonstrated a reasonable diversity of species, particularly in AR Mixed and ANR models. Species like Terminalia, Dillenia indica, Parkia speciosa, and Teak were found in many sites. However, some JFMCs (Joint Forest Management Committees) lacked clarity on how species were selected, indicating a need for better community engagement in species selection. Choice of species should be in accordance with the working plan, management plan, requirement of the sites, and should be made in consultation with the JFMC members. The entire JFMC needs to be consulted while finalising the species. Some wild endemic species that are in abundance in a particular JFMC should be encouraged through DCPN and planted during the monsoon.

3. Community Participation and JFMC Engagement

Community involvement through JFMCs was strong, but additional capacity building is required to ensure effective plantation management. For example, many sites showed signs of biotic pressures, indicating that more efforts were needed in protection mechanisms, particularly fencing.

4. Nursery Infrastructure, Technological and Skill Gaps

Upgradation of nursery-The existing infrastructure in nurseries offers a great foundation but presents opportunities for modernization. Upgrading the seed testing labs, storage units, poly-houses, and hardening chambers can significantly improve the efficiency and capacity of nurseries. Technological advancements, particularly in seed sorting, storage, and propagation systems, are needed to meet modern operational standards.

Skills of nursery work force-While the project has a strong workforce, there is potential to boost productivity and quality through focused skill development. Staff and labor in nurseries could benefit from exposure to advanced practices and cutting- edge technologies. Limited exposure to best practices in other nurseries may inhibit their ability to manage these facilities optimally.

Decentralized People's Nurseries (DCPNs) have been effectively contributing to skill development but remain under-utilised in generating significant market engagement. Their potential to contribute year-round through the production of floriculture and horticulture products is yet to be fully tapped.

Key Findings for Component 1

- Due to remoteness of the plantation sites, the cost of carrying seedlings to plantation sites is high. This cost should be added to the existing budgetary provisions under plantation. Delays in fund disbursement impacted time-sensitive activities like TPM.
- Benefit-sharing mechanisms in agroforestry plantations are not being implemented effectively, leading to lower community engagement in plantation protection and upkeep. Interaction between Joint Forest Management Committees (JFMCs) and project officials is insufficient, resulting in limited understanding of community benefits.
- Information on plantation activities was scattered across multiple documents including plantation journals.
- Limited availability of high value NTFPs and kanak kaich bamboo in the plantation area.

Recommendations for Component 1

- **Strengthen Fencing and Protection Measures -** Introduce stronger protection mechanisms, including barbed wire or chain-link fencing, especially in high-pressure sites. Evaluate protection needs on a site-by-site basis to prevent sapling damage and ensure long-term success. Develop more robust social fencing mechanisms through community engagement. Regular monitoring and stronger enforcement of protection measures will help in mitigating biotic pressures. As explained in the main body there are few sites which need fencing and some sites have natural advantages such as high hillocks, stream as fencing. Barb-wire or chain link fencing could be installed at strategically weak points in consultation with the respective JFMCs and RMUs.
- **Revisit Teak Plantation Management (TPM) Strategy -** It is advised to reduce TPM target based on the recommendation of the RMUs and DMU. Consider enrichment plantations (e.g., planting shade-tolerant species like black pepper) alongside teak to increase livelihood opportunities for communities. Thinning and coppicing should be prioritized to improve the quality and growth of teak. Mapping of Teak areas and inventory is required. Scope of encouraging teak plantation in private FRA land can be thought of in consultation with the JFMC to increase teak plantation area outside the forest land.
- **Improve Fund Flow Mechanisms -** Streamline fund disbursal processes to frontline staff. Ensure timely fund releases to avoid disruption in plantation activities, especially during critical pre-monsoon periods.

- **Enhance Community Engagement and Capacity Building -** Strengthen capacity-building programs for JFMCs, particularly focusing on species selection, protection strategies, and plantation management. Increase awareness and participatory decision-making to foster better community ownership.
- **Promote Livelihood-Oriented Silvi-Pastoral Models -** Encourage silvi-pastoral plantations by linking them to dairy enterprises through the provision of fodder. Engage FRA (Forest Rights Act) titleholders and incentivize them to participate in silvi-pastoral land development.
- **Introduce Flexibility in Agroforestry Models -** Develop flexible agroforestry models based on local demand and market potential. Introduce a mechanism for JFMCs to suggest and approve modifications to plantation models in line with local needs and market conditions. Project should also need to work out alternate support to wage in case not available through MGNREGA.
- **Ensure the Availability of Quality Planting Material (QPM) -** Invest in the development of high-quality planting materials, including seed orchards and plus trees, to ensure long-term survival. This includes better seed testing and procurement from reliable sources.
- **Develop a Consolidated Documentation System -** Implement a centralized documentation system to consolidate plantation data, making it accessible to all stakeholders. This will enhance transparency and support better decision-making.
- **Introduce Enrichment of Plantation-** SCATFORM must consider to introduce enrichment of plantation in the existing AR/ANR areas by planting high value NTFPs and kanak kaich bamboo. The reduced target of TPM should be compensated with increased enrichment plantation in AR and ANR plantation.
- **Species Diversity and Species Selection:** Choice of species should be in accordance with the working plan, management plan, requirement of the sites, and should be made in consultation with the JFMC members. The entire JFMC needs to be consulted while finalising the species. This would bring diversity in species.
- **Nursery Technology, Skills and Potential** - To fully capitalize on the potential of nurseries, modernizing infrastructure is key. Upgrading facilities like seed labs, storage units, poly-houses, and hardening chambers will allow nurseries to scale up their capacity and production quality. Incorporating advanced technologies in seed sorting, propagation, and germination systems will help produce healthier, more robust saplings. This modernization will ultimately result in stronger plantations and contribute significantly to the project's sustainability goals.
- **Training of Field Staff:** The project's workforce has immense potential that can be unlocked through focused training programs and exposure to modern nursery management practices. By organizing training sessions and exposure visits to high-performing nurseries in other regions, staff will be empowered with advanced techniques and technologies, driving efficiency in nursery operations. This continuous learning process will help transform the nurseries into centers of excellence, capable of producing high-quality planting material. Some of the best shaped nurseries recommended for exposure visits of nursery staff are Hi-Tech nurseries in North Bengal, West Bengal, Chennai, Tamil Nadu, Bengaluru, Karnataka and Lucknow, Uttar Pradesh. Seed labs, storage units, poly-houses, hardening chambers and research laboratory could be the areas need to be improved for ensuring sustainability of nursery facilities.
- **Revisit the DCPN:** There is an excellent opportunity to revise the DCPN guidelines and position DCPNs as key players in the plantation supply chain. By allowing DCPNs to produce flower, fruit, and vegetable saplings, they can diversify their operations and generate consistent year-round income for local communities. Encouraging DCPNs to meet departmental demands for saplings will strengthen their role in the project. The project can further support them by developing clear annual procurement targets and establishing direct relationships with the markets. Project can re-assess the possibility of DCPN Targets and accordingly device the strategy for DCPNs.

Component-2: Soil and Moisture Conservation (SMC)

Component 2 focuses on Soil and Moisture Conservation (SMC), aiming to reduce soil erosion, improve water retention, and support sustainable livelihoods in upper catchments. This section evaluates the effectiveness of SMC interventions, highlighting key findings and recommendations.

- **Soil and Moisture Conservation (SMC) Interventions**: The SMC interventions, such as check dams, gully plugging, contour trenches, and mulching, have successfully contributed to water conservation and soil **moisture** improvement in upper catchments. However, challenges like slope erosion and inappropriate placement in certain areas were noted.
- **Check Dams**: Most check dams are well-constructed and are effectively serving the communities by reducing runoff and providing water for irrigation and fisheries. However, in some areas, check dam

placement could be optimized for better productivity, and siltation remains an issue in several catchments due to lack of adequate catchment treatment. The water collection of catchments could have been more had some of the check dams were made in appropriate sites i.e., a little away from the present sites. It was observed that the appropriate sites were in possession of the community members who were unwilling to divert the patch for construction of check dams. Examples: Model-2 Check dam in Pratirai JFMC, and Model-1 check dam of Sarbajaya Para JFMC.

- **Contour Trenches**: These low-cost interventions were effective in controlling soil erosion and improving the soil moisture regime. The areas with contour trenches showed reduced runoff and erosion, but in some locations, additional measures are needed to maximize their impact.
- **Brushwood Gully Plugs (BGP)**: BGPs were found to be inadequate in managing heavy runoff due to weak construction and inappropriate placement in steeper terrains. Though the brush wood gully plugs (BGPs) have been saturated as targeted yet the construction of the BGPs could have been improved. There should be multiple BGPs along the stream to arrest the run off and prevent soil loss. Most BGPs were damaged by rain and failed to retain soil effectively.
- **Community Engagement in Fisheries**: JFMCs have successfully leased out check dams for fisheries, generating income for communities. However, profit-sharing mechanisms with landowners need to be more equitable, and JFMC members who contribute their land should receive a larger share of the income.
- **Siltation and Runoff**: Siltation remains a challenge in many check dams, especially those located in areas with high slopes and poor canopy cover. Areas with dense canopy cover and proper catchment treatment showed better outcomes in terms of soil moisture and reduced erosion.

Recommendations for Component 2

- **Top-to-Bottom Landscape Approach**: The project should adopt a comprehensive landscape approach for treating catchments from top to bottom, rather than implementing standalone interventions. This will involve using integrated methods such as contour trenches, gully plugs, check dams**, and** plantation activities to reduce soil erosion and improve water retention. This top-to-bottom approach will minimize runoff and soil loss, enhancing the longevity and efficiency of the dams.
- **Grass Patching and Bund Strengthening**: Grass patching in check dam areas should be done post-monsoon to stabilize soil and prevent erosion. Additionally, bund strengthening activities should receive second-year funding to ensure long-term effectiveness, and outlets should be equipped with filters to protect fish populations.
- **Capacity Building of JFMCs**: Capacity-building initiatives should focus on decision-making, profit-sharing, and land management to ensure that JFMC members are well-equipped to manage interventions. Those who contribute land for strategic interventions should be prioritized in livelihood components. The de-facto land owners should be convinced to relinquish his possession for SMC interventions and in return should be incentivised. Examples. Fisheries is promoted through the check dams and the land donor should be given a big share of the income from the fisheries if he donates that piece of land for construction of check dams.
- **Promoting Agroforestry**: Encourage agroforestry models on Forest Rights Act (FRA) lands**,** integrating fruit orchards and other diversified crops. Rubber plantations can be complemented by additional crops that restore biodiversity while maintaining farmers' income.
- **Reviving Water Sources**: Work with JFMCs to revive traditional water sources that have dried up due to land degradation and commercial cropping. This could involve incentivizing livelihoods and improving catchment areas to ensure water availability for local communities.
- **Additional M1 & M2 Check Dams:** Allocate more funds to Model-1 and Model-2 check dams**,** which are better suited for community involvement and more effectively improve the soil and water regime in the project context.
- **Model-3 Check Dams**: M3 check dam needs to have the RCC structure for long term sustainability. New constructions must focus on quality not on quantity. The model-3 check dam construction could not be initiated due to difficulty in finding such sites and rigidity in its budget structure. It is an outsourced activity and would be out of the control of JFMC. Thus, it is proposed to divert some portion of the budget from Model-3 to construction of model-1 and model-2 check dams which are easy to execute, better impacts, cater to the needs of many villages, and can be implemented through the JFMC.
- **Expanding Brushwood Gully Plugs**: The technical design of brushwood gully plugs should be revised, and more plugs should be installed along streams to reduce runoff. This intervention, when enhanced, will play a crucial role in slowing runoff and preventing soil loss. Though the target for BGPs has been

saturated yet there is a great scope to increase its numbers. It is advised to mobilize some fund for such interventions from other SMC interventions.

- **Utilization of Topsoil**: Topsoil and dugout earth from contour trenches should be utilized in agricultural or plantation activities, especially for soil-binding monocotyledon species. This will enhance soil quality and help prevent erosion.

Component 3 – Livelihood Development

- The third component of the SCATFORM project focuses on livelihood development, with Self-Help Groups (SHGs) being crucial stakeholders in its implementation. The primary objective of forming SHGs is to improve the livelihoods of forest-dependent communities. The project promotes the production of Non-Timber Forest Products (NTFPs) using sustainable harvesting techniques, medicinal plant cultivation, agriculture, fishery, and livestock production. This is achieved by forming SHGs or directly involving Joint Forest Management Committees (JFMCs) in processing and marketing activities, including those requiring larger investments.
- The project also encourages cluster-based businesses from the early stages, providing specialized support in business planning, marketing, product development, and facilitating linkages with financial institutions and resource organizations. Over the past five years, 1,350 SHGs have been successfully formed, exceeding the minimum requirement of three SHGs per JFMC as per the Memorandum of Understanding (MoD).
- As part of the project evaluation, interviews were conducted with 436 SHG members across eight divisions. These interviews explored members' understanding of the project, their socio-economic situation, primary and secondary livelihoods, knowledge of social security schemes, and capacity building. SHG members received various trainings based on their livelihoods, including fish farming, livestock management (piggery), mushroom cultivation, record maintenance, broom-brush making, and areca nut leaf plate making. While secondary data indicated that 28.5% of SHG members received training, only 11% of women interviewed acknowledged training as a benefit, and they had not received refresher training.

Key Observations and Issues on JFMCs

- **Community Mobilisation and Formation of JFMCs**: The project aimed to form 450 Joint Forest Management Committees (JFMCs) and successfully engaged 457, with 306 newly formed in the last five years. The highest number of JFMCs was formed in the Gomati district. Field facilitators, project staff, and beat officers supported community mobilisation and project promotion. Exposure visits were organized for members to familiarize themselves with their roles and responsibilities.
- **Institutional Structure and Membership**: JFMCs follow the revised Joint Forest Management resolution, consisting of a General Body (GB) and an Executive Committee (EC). All households in demarcated areas are GB members, including shifting cultivators (Jhumias). Sample JFMCs have 8 to 11 EC members, adhering to the mandated one-third representation of women.
- **JFMC Micro Plan**: Micro plans detail forest plantation, conservation, and community development activities, approved by the JFMCs and the Tripura Forest Department (TFD). Participatory approaches were used in developing these plans, which include socioeconomic profiles, resource assessments, and annual action plans.
- **JFMCs Functioning and Governance**: Meetings are conducted as per guidelines, with reasonable attendance in GB and EC meetings. Leadership rotation is practiced annually. Records like membership registers and minutes books are maintained by field facilitators due to members' illiteracy. Training has been provided, but retention of content appears low.
- **Multi Utility Centres (MUC)**: Construction of MUCs has been the common entry point activity for newly formed JFMCs. Older JFMCs have existing infrastructure with some repairs undertaken.
- **Awareness about Forest Protection and Conservation**: High awareness among members is attributed to continuous engagement through the project. Most EC members understand the principles of forest conservation and management.
- **Forest Dependence**: Members heavily rely on forests for livelihoods, collecting produce like vegetables, bamboo shoots, honey, and fodder for consumption and sale. Bamboo is crucial for fencing and roofing, while grass is used for shade. Felling of large trees is not practiced.
- **Plantation Activities**: JFMC members participate in planting species such as bamboo, acacia, teak, and medicinal plants, understanding the future benefits.

- **Soil and Moisture Conservation Works**: Members were involved in identifying and constructing conservation structures like check dams and gully plugs, compensated through the project.
- **Agroforestry Initiatives**: Positive responses were received for agroforestry, with cultivation of horticulture and cash crops like pineapple and areca nut on personal land. Beneficiaries were selected through participatory methods.

Impact of SCATFORM Project

- **Improved Forest Cover**: Visible enhancement due to plantation efforts, conservation work, and increased community awareness.
- **Reduced Fuelwood Usage**: Increased LPG use has decreased reliance on fuelwood, though not entirely eliminated.
- **Decreased Illegal Activities**: Reduction in illegal tree cutting by outsiders and poaching of wild animals.
- **Social Fencing Measures**: Prevention of cattle grazing in forests has protected plantations and improved survival rates.
- **Enhanced Forest Protection and Reduced Encroachment**: Communities discourage forest encroachment, understanding legal land use rights, and forest protection issues are addressed in Gram Sabha meetings.
- **Reduction in Jhum Cultivation**: Shifting cultivation has decreased due to alternative livelihoods and land allocation under the Forest Rights Act (FRA), though some tribes continue the practice.
- **Improved Community Relations**: Strengthened relationships between the forest department and communities have secured forest resources and encouraged collective decision-making.
- **Enhanced Livelihoods**: Members benefited from employment in project activities, income from non-timber forest products (NTFPs), fisheries in check dams, and substantial earnings from rubber plantations and agroforestry. Women's financial power has increased through productive activities funded by Self-Help Groups (SHGs).

Recommendations on JFMC

Institutional and Capacity Development of JFMCs:

- Provide long-term support to literate youths for managing records and decision-making processes.
- Encourage self-driven annual planning based on the micro plans.
- Continue training and exposure visits with periodic refresher sessions.
- Integrate JFMCs with other government programs to ensure financial sustainability.
- Develop gender mainstreaming strategies to enhance women's active participation.

Forestry and Natural Resource Management Activities:

- Offer guidance on species diversity to balance the trend of rubber plantations.
- Incorporate fruit orchards and high-yield bamboo species like Kanak Kaich.
- Consider constructing monitoring sheds and implementing durable fencing solutions.
- Enhance agroforestry through project funds or collaboration with other departments.
- Increase water retention capacities of structures to support fisheries.
- Address human-animal conflicts with targeted training and capacity building.

Livelihood Support to Communities:

- Promote sustainable livestock management through pilot projects.
- Establish small kiosks for members to store and sell forest produce.
- Evaluate the feasibility of JFMCs participating in tenders for nursery development.
- Improve access within forests for better management and resource collection.
- Encourage value addition and small-scale processing of forest products.

Village Infrastructure Development:

- Include drinking water projects as entry point activities or secure alternative funding.
- Equip Multi Utility Centres with basic furniture and storage facilities.
- Utilize available spaces in MUCs and Vocational Training Centres for storing women's products.

Key Observations and Issues on Livelihood development

- **Financial Linkages:** All SHGs have bank accounts in their group's name. Records are mostly maintained by Livelihood Coordinators, Community Mobilisers, or Field Facilitators due to members' illiteracy. SHGs receive periodic loans from the project for livelihood activities and practice inter-lending within their groups. Each group received a loan of Rs. 1 lakh, with each member receiving Rs. 10,000. The loans are disbursed through JFMCs by the respective Range Management Units (RMUs). The SHG gradation guidelines established in 2021 require gradation six months after formation but do not specify the frequency of subsequent gradations. (Annexure-SHG gradation notification). There is a need to incorporate additional components and clarify the gradation process.
- **Enterprise Promotion:** Loans are primarily used for individual livelihood generation, including livestock rearing (pigs, ducks, hens, goats), fish farming, and small businesses like grocery stores, honeybee rearing, mushroom cultivation, and candle making. Notably, SHGs in Killa beat of Khowai Subdivision have started candle production linked to the famous Tripura Sundari temple. Piggery is popular due to its cross-cultural consumption. Fish farming is collaboratively conducted in check dams created by the project and has been particularly profitable, generating more revenue than other livelihoods. Women members feel a sense of ownership over these check dams. Handloom weaving is a traditional craft, but product sales are limited to local markets. Despite various livelihood activities, full-fledged enterprise formation has yet to occur.
- **Marketing Support:** SHGs have received preliminary training in marketing but currently sell their products within their villages and nearby markets. Fisheries and piggery have been the most profitable in terms of revenue generation.

Key Issues

- **Credit Linkages**: SHGs lack connections to credit sources beyond the project and group savings. The presence of another SHG structure under the Tripura Rural Livelihood Mission (TRLM) with different loan amounts and staffing has created confusion among women in the community.
- **Limited business expansion**: SHGs are operating with a ₹1 lakh loan and are consistently repaying it, but the limited revolving fund restricts their ability to expand and grow their enterprise businesses.
- **Livestock Management**: SHGs face challenges in managing livestock diseases due to insufficient training and lack of awareness about vaccinations. Limited livestock insurance exacerbates these issues.
- **Product Development and Marketing**: Training on finishing handloom products, product diversification, and advanced marketing strategies is lacking. Linkages with the NTFP Centre for Excellence (NCE) for enterprise development have not been established, though plans exist for setting up a bamboo industry in Unakoti division.

Recommendations

Training and Capacity Building:

Regular Training: Provide sustained training and mentorship to SHGs and federations to overcome local capacity constraints. Trainings should be regularized and cover overall objectives of SCATFORM project, record-keeping, communication, leadership, team-building, organizational behaviour, entrepreneurship, cluster formation, livestock rearing, digital and financial literacy, social security schemes especially for women and children, organic farming, vermin composting, nursery development, para-vet training, etc. Exposure visits within the state are recommended. Possible collaboration with the Ministry of Rural Development for training of SHGs and clusters can be explored.

Skill Enhancement: Offer more training on alternative livelihoods, livestock management, government schemes, and digital and financial literacy to empower women members.

Cluster Development:

Inclusive Clusters: The livelihood programs for SHGs always have significant impact on women's access to income, food intake, social capital and social empowerment. Expansion of cluster formation to include activities beyond NTFP or agroforestry, such as livestock production, mushroom cultivation, agriculture, and handlooms, provided the groups support forest protection. The project needs to identify trade for the SHGs based on their present knowledge and assessing the kind of training that they would require. It should also help the women to identify sustainable and environment friendly manufacturing practices. Promotion of sustainable and successful enterprises requires information collection, analysis, planning, and implementing of each micro-project formulated by SHGs. Sustainability and success of the enterprise are intrinsically depended on

skills, resources and the marketing environment. Thus it becomes imperative to have tools that can generate information enabling well-informed and quick decision-making. Assessment of value chain analysis and market demand will also act as a guiding force in order to make decisions about selection of trade. Both backward and forward linkages need to be worked out before finalising a trade. Collaboration with existing government schemes for clusters can be explored. The Ministry of Micro, Small and Medium Enterprises (MSME), Government of India (GoI) has adopted the Cluster Development approach as a key strategy for enhancing the productivity and competitiveness as well as capacity building of Micro and Small Enterprises (MSEs) and their collectives in the country. This will help the women to achieve the status of continuous income within their knowledge base and further capacity building.

Utilize SHG Strength: Form clusters with 7-10 SHGs in close vicinity to undertake larger, more profitable business ventures, reducing dependency on forests and increasing return on investment.

Livestock Management: Provide regular updates and Paravet training to SHGs involved in livestock rearing to improve animal health and loan repayment capacity.

Product Diversification: Encourage businesses like handloom products, candle making, dry fish processing, and fish farming. Technical support is needed for diversification and enhancing market appeal. Partnerships with institutions like NIFT and NID can aid in artisans' capacity building. Explore e-commerce platforms for broader marketing.

Resource Utilization: Utilize Multi Utility Centres (MUCs) for short-term storage of SHG products by providing basic storage amenities.

SHG Gradation and Sustainability:

Gradation Process: Revise the SHG gradation process to occur at least twice a year to assess eligibility for future loans and monitor savings trends, corpus fund development, and utilization of government funds. During the evaluation it was found that 1100 SHGs were in Grade A and hence they received the loan.[1]

Panchayat Involvement: Involve local Panchayats in the gradation process to enhance the sustainability of SHGs beyond the project's duration.

Linkages with TRLM: Explore linking SHGs with the TRLM program for additional training and staff support, aiding in the transition after the SCATFORM project's completion.

Enhancing Livelihood Activities:

Enterprise Promotion: Project must provide additional support to SHGs, Cooperatives, Individuals for expansion of their business beyond the revolving fund of Rs 1 Lakh.

Diversify Livelihoods: Improve the quantity and quality of livelihood activities, focusing on non-agricultural initiatives like NTFP utilization, livestock management, and small business development.

Empowerment Framework: Enable SHGs to adopt activities feasible within their local context while adhering to a basic common framework.

Consortium-Based Marketing: Implement SHG consortium-based marketing for agroforestry and livestock products, including market assessments and supply chain analysis to ensure profitability.

Market Linkages: Connect SHG products to widespread commercial markets, considering models like cooperatives to promote a producer-centric approach.

Livestock Insurance Awareness: Increase awareness and encourage the insurance of livestock to mitigate losses due to diseases, enhancing the financial stability of SHG members.

Key Issues and Recommendations on Eco-Tourism

- Ecotourism, defined as responsible travel to natural areas that conserves the environment and supports local communities, presents significant economic and conservation opportunities. Tripura, with its diverse landscapes, rich wildlife, and cultural heritage, is well-suited for ecotourism. The state's natural beauty, comprising green valleys, hilly terrains, and wildlife sanctuaries, spans two main tourist circuits: the West-South Circuit and the West-North Circuit. Despite this potential, the state lacks adequate infrastructure such as accessible roads, hotels, and visitor facilities.
- Tripura is home to six protected areas, including four wildlife sanctuaries (Sepahijala, Trishna, Gomati, and Rowa) and two national parks. The Trishna Wildlife Sanctuary, renowned for its virgin forests, perennial water bodies, and grasslands, is particularly attractive for nature enthusiasts. Recognizing these opportunities, the Tripura government has taken steps to develop ecotourism, with initiatives aimed at enhancing natural attractions and engaging local communities.
- Ministry of Tourism, Government of India has formulated a National Ecotourism strategy in the year 2022.

[1] SCATFORM

It focuses on promoting environmental sustainability, protecting biodiversity, promoting economic sustainability and promoting socio-cultural sustainability. The strategy aims to mainstream sustainability

into the tourism sector. Ecotourism and Adventure tourism are the important segments to promote sustainable tourism.[1] It will be advisable to review the guidelines offered in this strategy in order to understand the plan for ecotourism in India based on its rich biodiversity.

- This strategy also talks about the planned development of areas in and around protected areas. It also mentions the notification released by the Ministry of Forest, Environment and Climate Change on "Ecotourism guidelines in and around protected areas 2021". The evaluation recommends the project to review this guideline as Tripura has 6(six) PAs throughout state which includes 4(four) Wildlife Sanctuary and 2(two) National Parks.
- The project needs to review the existing festivals taking place in different parts of India in order attract both national and international tourists. The Hornbill Festival of Nagaland, Cherry blossom Festival of Meghalaya, Rann Festival in Gujarat, are few to be mentioned amongst the famous festivals linked with the nature, culture and land topography. Tripura with its rich resource of forests and wild life along with several ecotourism sites can also be part of this tourism in India. These festivals are opportunities to exhibit the rich and diverse ethnicity of the land through folk dances, traditional music, local cuisine, handicraft, art workshops, etc.
- The project can also explore the existing models of ecotourism in India. This includes Kaziranga National Park in Assam, Sundarbans National Park in West Bengal, Kumbalangi in Kerala, Mawphlang Sacred Forest, Meghalaya to name a few. The National parks have dedicated websites which offers several wildlife tours and packages for tourists. The website has all information which will help a tourist to plan their trip including route, means of travel, online booking options for packages and most importantly information on flora and fauna and wild life of the park. The entire process is managed by the state tourism ministry in both the states.

  Kumbalangi Integrated Tourism Village Project is a unique initiative to transform the tiny island of Kumbalangi into a model fishing village and tourism spot. It is the first of its kind in India and is located in Kochi, Kerala. It is blessed with many natural wonders and the people who visits are treated to many a rare treat. Kumbalangi is surrounded by backwaters. Chinese Fishing Nets cover the island and the village boasts of rich aquatic life. An array of mangroves separate land from water and provide for a good breeding ground for prawns, crabs, oysters and small fish. This model village tourism is also managed by the Kerala State Tourism Ministry. Similar village ecotourism can be promoted in Tripura as it has preserved several water bodies across the state.

  Mawphlang Sacred Forest, Meghalaya -For centuries now, Khasi customs and traditions have been woven into the land and the forests. One of these forests still retains its significance today – the Sacred Groves of Mawphlang. Visitors are not allowed to take anything away from this hallowed forest, not even a pebble or a twig. The visit includes guided treks within the forest and also it is accessible from the nearest city of Shillong. The site is managed under the Meghalaya Tourism Ministry. The project can explore such forest treks across the Tripura state as it is bestowed with such rich forest lands.
- The project can also explore homestay ecotourism especially in West Bengal, Sikkim, Meghalaya. It is an emerging tourism concept evolved lately in the tourism world. The homestay tourism policy of West Bengal can also be reviewed by the project for further information.

Key Observations

Ecotourism Initiatives and Progress:

- Tripura Nature Trail Resorts (TNTR) Ltd., a public company, was established by the government to oversee ecotourism development. Ernst and Young conducted a feasibility study on the state's ecotourism potential, with a preliminary report submitted.
- TNTR has developed a butterfly park at Trishna Wildlife Sanctuary, funded partially by the SCATFORM project, which charges a nominal entrance fee.
- Three eco-park sites have been identified for development: Banabithi (Khowai district), Rung Tung (Sepahijala), and Unakoti (Unakoti district), with Unakoti being included in the UNESCO World Heritage Site tentative list in 2022.
- Plans for new ecotourism destinations, including Sitacherra, Dumboor Lake, and Jampui Hill, emphasize community-based tourism. The Tripura Forest Department (TFD) intends to promote log huts and homestays at these sites to involve local residents and foster sustainable tourism.

Policy and Funding Challenges:

[1] National Strategy on Ecotourism

- The existing Tripura Ecotourism Policy, drafted in 2004, is outdated and does not include provisions for community-based organizations such as Joint Forest Management Committees (JFMCs), Eco-Development Committees (EDCs), and Self-Help Groups (SHGs). The action needs to be taken based on the recommendations of the Feasibility Study conducted for Ecotourism by external agency. Also the viability of the ecotourism sites identified needs to be revisited.
- A total of ₹4,53,278 has been spent on ecotourism against budget of ₹6.20 crores.
- Micro plan prepared for new sites requires more funds and present provision could not develop the sites.
- A new ecotourism circuit in Unakoti district is also proposed by TFD may be taken up if provisions can be made

Community Involvement and Skill Development:

- A community-based approach to ecotourism offers potential for alternative livelihoods but requires training for local residents. Skills such as hospitality, guest management, and digital payment processing are crucial for community members involved in running homestays and eco-lodges.
- Exposure visits to established ecotourism models can help local participants gain practical insights into operating homestays and managing guests effectively.

Key Suggestions
Policy Revision:

- Update the Tripura Ecotourism Policy to include modern tourism practices and emphasize community engagement. The revised policy should reflect current tourism demands while ensuring ecological balance.
- Integrate community-based organizations such as JFMCs, EDCs, and SHGs to provide local residents with opportunities for employment and alternative income sources.

Increased Funding and Allocation:

- Allocate additional funds to support the development and maintenance of existing ecotourism sites, which will help attract more visitors and boost state revenue.
- Consider private sector involvement through public-private partnerships (PPPs) to fund and accelerate infrastructure development, marketing, and management of ecotourism sites.

Community Training and Capacity Building:

- Provide community members with training in hospitality, guest management, and digital financial skills, as well as exposure visits to established ecotourism sites. This will help them understand homestay operations, guest service expectations, and business management.
- Ensure ongoing skill development opportunities to maintain high service standards and increase community engagement in tourism.

Expanded Ecotourism Development:

- Expedite the development of identified ecotourism sites, particularly through community-based tourism initiatives. Emphasizing the community's role in managing these sites can foster environmental stewardship and sustainability.
- Promote log huts, homestays, and other low-impact accommodations at new and existing ecotourism sites, allowing for increased tourist capacity and immersive nature experiences.

Strengthen Marketing and Promotional Efforts:

- Increase visibility for Tripura’s ecotourism sites through strategic marketing initiatives, targeting both domestic and international travellers. Highlight unique aspects such as biodiversity, cultural heritage, and traditional crafts to attract eco-conscious tourists.
- Establish partnerships with tour operators and travel agencies to promote Tripura as a premier ecotourism destination, drawing attention to the state’s scenic landscapes and authentic cultural experiences.
- Tripura has significant potential for ecotourism, given its natural beauty and cultural diversity. By updating the ecotourism policy, securing adequate funding, providing community training, and engaging in strategic marketing, the state can create a thriving ecotourism sector. This approach will not only boost the local economy but also foster environmental sustainability and provide meaningful livelihoods for local communities.

Agroforestry Progress and Key Observations

- Over the past four years, the SCATFORM project set an agroforestry target of 4,755 hectares, achieving

3,060.48 hectares or 60% of the goal, benefiting 4,469 individuals. Agroforestry efforts have operated in

conjunction with MGNREGA, with the SCATFORM project covering plantation costs and MGNREGA funds covering labour costs. The project has spent approximately ₹9.8 crores, while MGNREGA has contributed about ₹12.8 crores. The highest area coverage is in South Tripura district, with 548.75 hectares serving 1,164 beneficiaries.

- Beneficiaries are selected based on land ownership criteria, requiring 0.2 to 4 hectares per beneficiary. After JFMCs identify interested participants, RMUs conduct site verification and submit lists to the Panchayat for further screening. The Block level finalizes the list for agroforestry plantation approval. This initiative is well-received by communities, linking directly to income generation and allowing beneficiaries to choose plant species from five agroforestry models based on their needs. The project has also created employment opportunities for landless villagers, who participate as labourers, increasing man-days and engaging more community members.

Key Issues

- **Payment Delays**:

MGNREGA fund payment delays impact the Forest Department's ability to ensure timely plantation work, making it difficult to engage workers in other tasks until payments are received.

- **Preference for Rubber Plantations**:

Large farmers often prefer rubber plantations over agroforestry due to higher profitability. However, rubber cultivation has negative environmental impacts, including deforestation, habitat degradation, water resource depletion, and pollution from chemicals.

- **Inconsistent Beneficiary Lists**:

Discrepancies between beneficiary lists from RMUs and Block-level priorities cause implementation issues, as RMU-prepared lists may differ from those generated by the Panchayat based on landholding data.

- **Lack of Organic Certification**:

Despite agroforestry guidelines recommending marketing support and organic certification, beneficiaries lack these resources. Consequently, they are unable to pursue organic certification and miss out on premium market opportunities linked to certified organic produce.

Recommendations:

- **Plant List Revision:** Increase species options in agroforestry models in addition to locally grown plants like areca nut and pineapple, which have high local and regional demand. It is advisable that each RMU maintain an annual calendar to meet agroforestry targets. Further the plantation is done based on the available models. It is advisable that the beneficiaries need to be consulted for selection of species in order to reap proper profits from the yield. They also need to be oriented on the different agroforestry models available for plantation. The agroforestry can be an essential strategy for these small-holder farmers to improve their long-term income generation. The various benefits, such as increased crop yields, diversified income streams, improved land productivity, climate resilience, and carbon sequestration, can help farmers to improve their livelihoods and become more resilient to the challenges of climate change. Agroforestry can be a win-win solution for farmers and the environment as it promotes sustainable land use and increases carbon sequestration.
- **Benefit sharing:** In case of JFMC members not qualifying for the amount of land holding for agroforestry, need to be allowed to use the leased in land for such plantations. The benefits of the plantation can also be shared with the actual land owners. The project can facilitate such discussions on profit sharing in the form of payment of lease amount for the land and percentage of produce from the land.
- **Training:** The beneficiaries for AGF can be trained so that they can calculate their income from the plantation. The species selection can be followed with subsequent discussion on the marketability, profitability, pricing of the produce. This will help them to understand how the plants will help them to gain better profits.
- **Need for demarcation of land**: The land where agroforestry is done is not properly demarcated. This is affecting the selection process of the beneficiaries for agroforestry. The different stakeholders such as Block officials, Panchayet and TFD is facing difficulties in finalising the actual beneficiaries. It is advisable for the project to have joint discussions on the list submitted for agroforestry with Panchayet and Block officials. Joint visits for verification of the land holding are also advisable for the project along with the Panchayet and Block officials.

- **Linkage with MOVCD:** The project can explore organic certification to enhance marketability. The opportunities for partnering with Mission Organic Value Chain Development (MOVCD) can also be planned. It will help to identify pilot sites in select JFMCs where no chemical fertilizers are used, thereby supporting organic farming. Promotion of organic farming within the JFMC areas will be advisable. The project can collaborate with the agriculture department for certification for organic farming. The project can put effort for fetching premium price for organic produce from the land and help the beneficiaries earn a better income.
- **Agroforestry Task Force**: Establish an Agroforestry Task Force to coordinate activities, select plants, assess value chains, and strategize marketing. This will provide better support for beneficiaries, improve yields, and enhance market reach.
- **Beneficiary Selection**: Simplify the beneficiary selection process by enabling joint reviews by RMUs, Panchayats, and Block offices. This would streamline approvals and address inconsistencies in land demarcation and rights of forest resources (RoFR) land management.
- **Species Study**: Conduct annual studies on species selection, considering market demand and profitability. Beneficiaries should be encouraged to develop nurseries and conserve seeds to ensure sustainable growth. Small grants could be provided for nursery establishment, adding an additional income stream through sapling sales.
- **Availability of Funds for wages:** Project must ensure the availability of funds for the wages. In case MGNREGA funds are not available or getting delay, project should fund out alternate to implement this activity.

NTFP Centre for Excellence (NCE) Key Observations and Recommendation

- The NTFP Centre for Excellence (NCE) operates as an autonomous society under the Societies Registration Act of 1860, aiming to organize and develop the NTFP sector in the state. From 2018-19 to 2023-24, NCE spent INR 5.45 crore, representing 34.38% of its total budget of INR 16 crore. Spending delays were primarily due to late staff recruitment and the pandemic's impact. Currently, two “Crafts & More” outlets are in operation, selling products made by SHGs using NTFPs, including agarwood, bamboo, broom brushes, aromatic products like Gandaki, and medicinal plants. However, expansion has been limited as SHG clusters are yet to form, resulting in minimal linkage with SHGs.
- NCE has undertaken a range of activities to rejuvenate the Agarwood sector, underpinned by the Tripura Agarwood Policy 2021. Key completed initiatives include:
    - **Expansion of Agarwood Resources**: TFD through NCE has distributed over 2 million Agarwood seedlings, supported by the SCATFORM project in collaboration with JICA. This initiative enables private Agarwood plantations, primarily on community lands, to foster economic growth through local engagement.
    - **Research and Development in Resin Production**: To address the low natural resin production rates, NCE has invested in artificial inoculation research. These efforts aim to boost resin yield and provide a sustainable income source for farmers.
    - **Quality and Market Standards**: Collaborating with the Fragrance & Flavour Development Centre (FFDC) and the Central Institute of Medicinal and Aromatic Plants (CIMAP), NCE is establishing BIS certification standards for Agarwood products. This effort ensures product quality and marketability on a global scale.
    - **Product Development and Market Linkages**: Under the brand 'TriAgar,' NCE has launched Agarwood-based products, such as perfumes and skincare items. Large-scale buyer-seller meetings organized by NCE have also expanded market access, connecting local producers with international buyers.
    - The **SCATFORM project, supported by JICA**, has been integral to these activities, especially in promoting sustainable forest management and community involvement. Through SCATFORM, NCE is aiming to improve rural livelihoods by creating opportunities in Agarwood cultivation, contributing to both ecological sustainability and economic resilience in Tripura. This collaboration with JICA continues to be pivotal in enhancing local capacity and establishing Tripura as a leader in the global Agarwood market

Key Issues

- NCE’s progress has been delayed by the pandemic and the time required to achieve full project functionality.

- Out of 45 planned centers, only two are operational, with cluster formation among SHGs still pending. The NTFP Collection/Primary Processing Centre and Advanced Processing & Value Addition Unit are not yet established.

Recommendations

Extension of Project Timeline:

- An additional two years is recommended to complete planned activities, particularly SHG cluster formation. Clusters should be based on demographic locations to aid NCE expansion, involving all project staff, RMU teams, and Panchayats in planning.

Cluster Formation and Tiered Processing Model:

- Clusters should focus on specific product-based groups of artisans, with four high-potential locations identified. A three-tier NTFP model is recommended:
    - Tier-3: SHG/JFMC members for collection and primary processing,
    - Tier-2: SHG/JFMC members for secondary processing with added value,
    - Tier-1: An entity formed by SHG/JFMC members for advanced processing and value addition.

Consortiums and Product Focus:

- The project should facilitate the formation of SHG consortiums for product marketing and training through Crafts & More.
- It is advisable for the project to organise JFMC conclaves in different parts of the state in order to promote the activities done by the JFMCs, exposure to best practices and annual exchange of ideas within the state.
- The project can explore possibilities of establishing more units to process bamboo, broom brushes, and aromatic plants, as these are abundant and eco-friendly. This would require skill building of the entrepreneurs, strengthening of production unit, local advertising followed by marketing support for entrepreneurs. An in-depth market study is also advisable in order to understand the requirement of number of such units in the project areas.

Medicinal Plant and Spice Cultivation:

- NCE should promote processing of medicinal plants like Triphala (Amla, Haritaki, Bhibitaki) and encourage SHGs/JFMCs to cultivate spices like bay leaves and black pepper, which have high market demand. This cultivation can be aligned with agroforestry models.

International Networking:

- Explore partnerships with domestic and international organizations, such as Japanese institutions, particularly for expertise in bamboo crafts, to expand NCE's product offerings and market reach.

- By addressing these areas, the NCE can enhance its functionality, expand market linkages, and contribute to sustainable income generation for local communities through organized NTFP sector development.

Component-4: Institutional Strengthening

- The SCATFORM project focuses on strengthening institutions at multiple levels, guided by a structured framework involving various stakeholders. A High Power Steering Committee (HPSC), led by the Chief Secretary of Tripura, oversees the project, with a Project Director (of Chief Conservator of Forests rank) serving as the Member Secretary. The Project Management Unit (PMU), an autonomous society, serves as the primary implementing body and is managed by a Governing Body (GB) chaired by the Principal Chief Conservator of Forests. The PMU, funded through the Tripura Forest Department (TFD), includes Directors in charge of Monitoring, Training, Livelihood, and Finance & Administration, supported by Programme Managers and a Project Management Consultant (PMC) for implementation and strategic planning.
- Aligned with the TFD structure, District and Sub-Divisional Forest Offices act as District and Sub-Divisional Management Units (DMUs/SDMUs), headed by District Forest Officers (DFOs) and Sub-Divisional Forest Officers (SDFOs), respectively. Range Offices function as Range Management Units (RMUs), managed by Beat Officers who work directly with Joint Forest Management Committees (JFMCs) and Eco Development Committees (EDCs). Additionally, each range employs a Livelihood Coordinator and two Community Organisers, collaborating closely with RMU staff to support project activities.

- In addition to its organizational structure, the SCATFORM project focuses on strategic convergence with various departments and schemes. Notably, it aligns with the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) to create employment through plantation and sustainable forest management activities. The project also collaborates with the Tripura Rural Livelihood Mission (TRLM) to train women and staff in Income Generation Activities (IGAs). Other partner agencies include the National Productivity Council, Fishery Department, State Institute of Public Administration and Rural Development, Regional Water Sports Centre, Atal Bihari Vajpayee Mountaineering Institute, IBRAD, ARDD, and organizations like Art of Living and Bhaktibikas Kendra, collectively supporting the project's multi-faceted goals.

Publicity and Communication

- To raise awareness about the SCATFORM project, various publicity activities have been implemented, including the publication of newsletters, leaflets, and pictorial representations. From FY 2020-21 to FY 2022-23, 18 editions of a monthly newsletter were released, while multiple leaflets covering project objectives and government schemes were distributed in English, Bengali, and Kokborok. Pictorial representations of project activities were also created through August 2022.

Infrastructure Development

- The project has established several types of infrastructure, such as Multi Utility Centres (MUCs) at the JFMC level, buildings at RMU levels, and vehicles for DMUs, SDMUs, and RMUs to facilitate mobility. Originally, the project aimed to build 450 MUCs, out of which 279 MUCs construction is over and 26 is under process. Older JFMCs continue using Vocational Training Centres (VTCs) from Phase I, though these require repairs. Current MUCs lack basic furniture, leading to record storage challenges.

Buildings and Vehicles

- The project targets include the construction of 4 DMU, 7 SDMU, 7 RMU buildings and 56 Beat offices. Till date, 2 DMU, 3 SDMU offices and 5 RMU buildings have been completed. There are few building constructions which are in process. This includes 2 DMU, 2 SDMU and 2 RMU buildings. In case of Beat offices, the construction is complete for 20 offices and 2 are in progress. 20 more Beat offices will be constructed under the state fund.
- Vehicle allocations focused on two-wheelers, essential for range-level monitoring. However, only 8 out of the 135 beats have received two-wheelers, despite high demand for them at the range level to facilitate monitoring and mobility.

FIGS

- The Tripura Forest Integrated Geospatial Solutions (FIGS) is a specialized MIS created with funding from SCATFORM. Developed by Neo Geo Info under a contract signed in 2020, FIGS organizes and manages forest-related project data. After nearly four years of development, it is now operational, providing a centralized database for various forest project information for entire department and not restricted to SCATFORM to ensure suitability after the project.
- This FIGS, designed with 16 project verticals, supports offline data entry and reporting at all levels. It enables efficient planning, execution, and monitoring, enhancing data accessibility for project staff, even in remote areas with limited internet access.

Website

- The SCATFORM project has developed a comprehensive website, regularly updated with resources such as operational manuals, handbooks, and lists of JFMCs and SHGs.

Gender Mainstreaming

- The project has adopted a Gender Action Framework aligned with global gender mainstreaming principles. This approach, first recognized at the 1985 Nairobi World Conference on Women, integrates both men's and women's interests into all stages of policy-making. The framework includes specific output and outcome indicators to track the project's progress in promoting gender equality, following the strategy outlined by the Beijing Platform for Action and reinforced by the Council of Europe in 1998. This ensures a gender equality perspective across all project activities.

Capacity Development

- Capacity building for officials at various project levels (PMU, DMU, SDMU, and RMU) began in the initial project years, with the majority of training programs conducted at the RMU level. Although training sessions increased over time, units have not consistently maintained records, making it challenging to verify alignment between training and job responsibilities. The project requires 5-6 days of national or out-of-state training per year for PMU, DMU, and SDMU officials, though SDMU-level training and international exposure visits have not yet been conducted. The JICA Review Mission's February 2024 report highlighted the need for more national and international training sessions. Recommendations include frequent training needs assessments, master trainer identification, and training on cluster management, gender mainstreaming, ecotourism, monitoring, evaluation, and social auditing.

Forestry Research

- Forestry research, a core project component, emphasizes studies on vegetative propagation and productivity of high-value species. Research activities have focused on biodiversity assessment, forest protection, Jhum farming, biophysical intervention studies, and IEC scoping for JFMCs, often in collaboration with external agencies like IORA Ecological Solutions Pvt. Ltd. and Tripura University. These studies aim to improve forest management and conservation practices through evidence-based research.

Recommendation for Institutional Strengthening

Infrastructure

- MUCs lack basic furniture, impacting functionality. Allocating funds for furniture and equipment would improve utilization.
- MUCs and VTCs primarily host meetings but lack separate toilet facilities for men and women, which the project should address.
- Many older VTCs need repairs and renovations to be fully functional for community use.
- Explore alternative uses for MUCs and VTCs outside meeting times, such as temporary storage for commodities.
- Ensure sufficient vehicles (two-wheelers or four-wheelers) are available at RMU levels for effective monitoring.
- Set aside funds for fuel and vehicle maintenance to support uninterrupted mobility for forest officials and project staff.

Publicity and Communication

- SCATFORM should ensure requisite fund for publicity and communication activities for creation and digital contents, use of social media handles, printing of pamphlets and other materials for spreading the awareness.
- It is advisable to acquire information and materials for publicity and communication. Range of communication materials can be collected from different functioning areas and interventions of the project. It can include success stories, case studies and best practices document based on the innovations carried out within the project. Materials can be developed based on all good practices on different models of plantations, agroforestry, alternative livelihood practices, social security schemes, etc.
- The project can plan for the best possible way for design and dissemination of publicity materials. Frequency of the publications can be based on the type of information and the purpose of dissemination. The language of all materials can be decided based on target audience. The project should also explore innovative ways of publicity including wall painting especially with pictorial presentation.

FIGS

- The FIGS has been designed and now operational; data which was maintained in Excel files are being transferred to backend databases. This needs to be expedited.
- Train staff across all levels in using the FIGS, providing intensive training and troubleshooting support.

Gender Mainstreaming

- Conduct regular gender mainstreaming trainings for all levels, including SHGs, JFMCs, and project staff, covering topics like JFMC functioning, financial literacy, and government schemes.
- Empower women in JFMCs to assume leadership roles by offering supervisory support and training.

- Provide gender training to male JFMC members to foster a supportive environment for women's participation.
- Appoint Gender Coordinators and form Gender Committees, as specified in the project plan, to strengthen gender equality efforts.

Capacity Building

- Due to time constraints, develop high tech training facilities at all level to conduct online training in time bound manner.
- Organize refresher training on topics such as cluster management, gender mainstreaming, ecotourism, M&E, and social auditing, supported by an SOP for cluster formation.
- Conduct Training of Trainers (ToT) programs to establish master trainers and maintain records for ongoing training sessions.
- Arrange exposure visits for officials within the state and nationally; plan overseas visits thoughtfully.
- Develop project materials on sustainability, IGA models, and SMC, potentially in collaboration with institutions like the Centre for Forest-based Livelihoods and Extension.

M&E

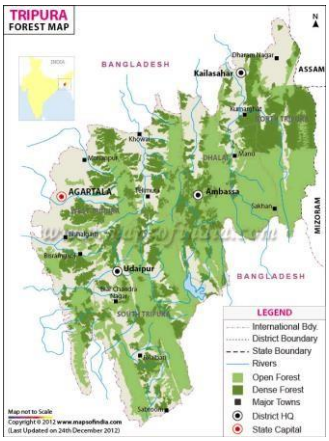
- Establish guidelines for project control mechanisms, such as resource reallocation, schedule adjustments, and budget updates, to ensure effective implementation.
- Use participatory monitoring during field visits with JFMCs and SHGs to assess progress, address challenges, and foster community involvement.
- Include qualitative aspects in monitoring checklists and emphasize situation analysis in regular review meetings.

Phase-Out Preparation

- Initiate phase-out activities alongside ongoing implementation, such as asset inventory, training for JFMCs/EDCs, and revisiting the Micro Plan.
- Conduct annual Micro Plan reviews with community involvement, facilitated by forest officials.
- Perform risk assessments based on sustainability indicators and prepare for withdrawal of activities.
- Document best practices and lessons learned for future reference.
- Transfer project assets to JFMCs, providing necessary instructions and resources for maintenance and continued use.

SECTION I: OVERVIEW OF THE ASSIGNMENT AND SCOPE OF WORK

1. Background and Context



Tripura is located in the North Eastern region and has an area of 10,486 km^2 which is 0.32% of the geographical area of India. The state has a humid climate with annual rainfall ranging between 2,250 mm to 2,500 mm and temperature varying from 7°C to 36°C.

Tripura is divided into eight districts and 23 sub-divisions with a majority of the terrain being hilly. Dhalai, Khowai, Manu and Deo are the major rivers that flow through the state. Based on interpretation of IRS Resourcesat-2 LISS III satellite data of the period October 2017 to December 2017, the forest cover in the state stood at 7,725.59 km^2 which is nearly 74% of the state's geographical area. A majority of the forest area in Tripura falls under the territorial forest divisions, further classified as Reserved Forest (4,175 sq km), Protected Forest (2 sq. km) and unclassed forest (2,117 sq km)[2]. The Protected Area Network comprises 5.7 % of the state's area with two national parks and four wildlife sanctuaries. As per the Champion & Seth Classification of Forest Types (1968), the forests in Tripura belong to two Forest Type Groups which are further divided into five Forest Types. The forests in the state are mainly tropical evergreen, semi evergreen, and moist deciduous. A sizeable area is covered with bamboo brakes which form a sub climax resulting from shifting cultivation.

In terms of forest canopy density classes, the state has 653.51 km^2 under Very Dense Forest (VDF), 5,236.19 km^2 under Moderately Dense Forest (MDF) and 1,835.89 km2 under Open Forest (OF)[3]. These are protected and managed by the Tripura Forest Department, under different jurisdictions: Protected Areas and Territorial. Long international borders make trans-border-conservation one of the most serious problems leading to degradation of existing forests in the state.[4] The state's forests and natural resources are also under tremendous pressure due to shifting cultivation and absence of alternative source of livelihood. The biennial assessment of India's Forest Cover (Forest Survey of India, 2021) reports a loss of 0.41 sq km of forestland, when compared to the previous assessment[5].

Tripura was the first state to apply the Recognition of Forest Rights (RoFR) Act and Patta Land covers 18% of the total area of the state. Although owners of Patta Land are responsible for ensuring sustainable use of lands, biodiversity conservation and ecosystem balance, this is not the case in practice and there is a significant proportion of degraded Patta Land in the state[6].

2. Overview of the SCATFORM Project

The Tripura Forest Environment Improvement and Poverty Alleviation Project (TFIPAP) was implemented till 2017 in the backdrop of these challenges[7]. Following successful completion of TFIPAP, the GoT is implementing a ten-year project for **Sustainable Catchment Forest Management in Tripura (SCATFORM)** with financial assistance from JICA. The project is being implemented in North Tripura, Unakoti, Khowai, West Tripura, Sepahijala, Gomati and South Tripura and Dhalai (Gomati Wild Life Sanctuary) districts through 450 new Joint Forest Management Committee (JFMCs) /Eco-development Committees (EDCs) spread across covering 135 beats, 36 ranges and 16 forest sub-divisions.

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[2] https://fsi.nic.in/isfr-2021/chapter-13.pdf

[3] India State of Forest Report 2019

[4] https://tfdpc.tripura.gov.in/?q=our-forest

[5] https://fsi.nic.in/isfr-2021/chapter-13.pdf

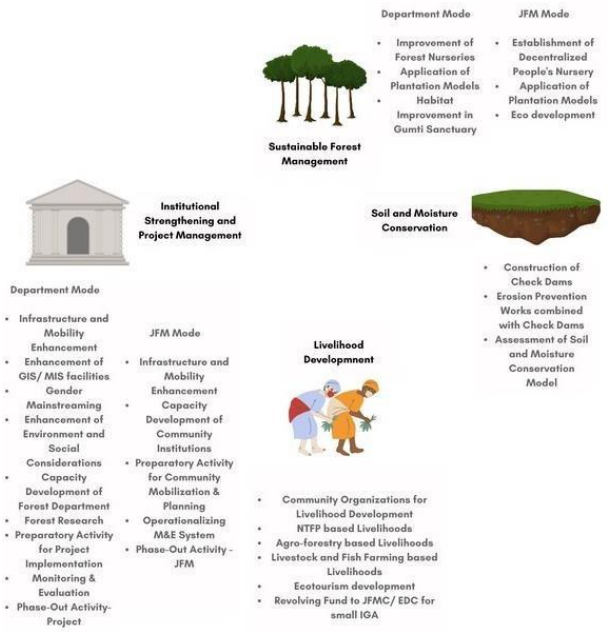
[6] EVJR2036 Ex-PostIII-5_Tripura (jica.go.jp)

[7] EVJR2036 Ex-PostIII-5_Tripura (jica.go.jp)

The overall objective of the SCATFORM project is to *'improve quality of forest in the targeted catchment by sustainable forest management, soil and moisture conservation and livelihood development, thereby contributing to development of forest ecosystem services and livelihood improvement of forest dependent communities in the State of Tripura'*. The project which is being implemented over the period 2018-28 has been structured into three phases, preparatory, implementation and sustainability.

The project is currently in the implementation phase, as part of which interventions are being undertaken as part of four components:

- **Sustainable Forest Management**
- **Soil and Moisture Conservation**
- **Livelihood Development**
- **Institutional Strengthening and Project Management**



Specific activities undertake as part of each of the components are depicted in the adjoining exhibit.

A variety of approaches are being adopted for achieving the aforesaid project objective and these are summarised in the following table.

Approach	Summary Description
Catchment protection	• Implemented mainly in upper catchments where forest is degraded and poverty issues are more severe • Forest management, soil and moisture conservation and livelihood development activities through enhanced presence of Tripura Forest Department (TFD) in remote areas with organized Joint Forest Management (JFM) structures
Developing Beat Action Plan and Micro-Plan following participatory approaches	• Forest beat is the smallest administrative unit of TFD with which JFMC makes agreement for managing allocated forestlands • Beat Forest Basic Plans (BFBP) are prepared for selected beats for carrying out project activities more effectively • BFBPs include basic information related to the beat and forest land use and soil and moisture conservation plans • JFMC micro-plans are prepared based on the BFBPs through participatory processes with forest community members.
Agroforestry development on demarcated RoFR lands	• Demarcation of RoFR lands for owners to utilize them with agroforestry • Formation of groups of RoFR landholders, Joint Liability Groups (JLGs) to treat the area
JFM formation for forest demarcation	• Formation or work with existing JFMCs wherever forest dependent communities are present • Demarcate forest lands to carry out afforestation • Assist in natural regeneration, NTFP plantation, and soil and moisture conservation activities
Protection of existing forests	• Work on protection of existing forests in collaboration with JFMCs/ EDCs which report illegal activities in their own and neighbour forests
Enhanced support for group business development and developing partnerships for processing and marketing	• Promote NTFP production with sustainable harvest techniques, medicinal plants cultivation, agriculture, fishery and livestock production through forming SHGs (or directly by JFMC itself) for simple processing and advanced processing and marketing with larger investments
Support to NTFP Centre of Excellence (NCE)	• Support NCE for five years to give focused attention to NTFP based livelihood and cluster development

Approach	Summary Description
Strengthening IT based technologies for planning and decision making	• Incorporate advanced technologies of GIS and MIS and integrate them into forest management and soil moisture conservation
Capacity development at various levels	• Clarify needs of capacity development and demonstrate strong commitments for capacity development
Support to forest communities formed in TFIPAP	• Support forest community organizations created in TFIPAP • Will include participation in capacity development activities, organized marketing, grouping for value addition, etc.
Well-planned inter-sectoral convergence to support achieving project goal	• Emphasize on convergence which supports to achieve the project goal
Organizing ecotourism development for income generation and nature education for forest communities	• Organize ecotourism development of the state by formulating new policy, institutional development and funding
Well organized outcome monitoring and impact review	• Set up scientifically biophysical and socio-economic operation and effect indicators and monitor them during the project period
Gender mainstreaming	• Incorporate gender mainstreaming action plan which specifies action points to be considered for a set of indicators for monitoring • Main points to be highlighted are women leadership program and social and economic up lift of women

The project adopts a catchment based approach to reduce soil runoff from forest areas for conserving water resources in an effective manner. While the project mainly targets territorial forests, Gomati WLS is also targeted as an intervention area due to the significance of its catchment area, which is taking water from Gomati and Khowai river catchments, wherein some areas are overly degraded by Jhum cultivation.

Four key criteria were considered for selection of beats to be covered under the project. These included status of forest degradation, vulnerability to erosion, livelihood consideration, prevalence of forest patta holder families and dependency of villagers on forests. Based on this process a total of 135 beats were selected. The list of districts, ranges and beats is provided in **Annexure 1.**

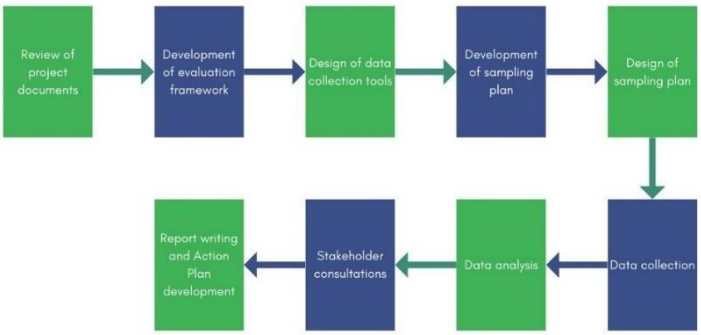
The broad implementation structure for SCATFORM includes a Project Management Unit (PMU) at the state level, District Management Units (DMUs), Sub Division Management Units (SDMUs), and Range Management Units (RMU) and at the grassroots level, JFMCs/EDCs and SHGs.

3. Objectives of Mid Term Evaluation

The SCATFORM project has completed around six years of operation. It is being implemented through a range of stakeholders at the state, district, sub-division, range, beat and community levels. A wide range of interventions and activities have been undertaken in the course of this period. These needed to be assessed keeping an eye not only on the ‘quantitative’ aspects but more crucially on ‘process’ and ‘system’ aspects, considering the focus of the mid-term review.

The overall objective of this assignment was to evaluate progress made towards achieving goals, identifying challenges or obstacles, and recommending appropriate measures to improve project implementation and outcomes. It further aimed to assess effectiveness of project strategies, processes and interventions, expected sustainability of activities and outcomes and level of stakeholder participation and engagement. This review during the mid-term stage aimed to assist in assessing the relevance, effectiveness and efficiency of the project.

Scope of Work



The evaluation focussed on studying institutional structures, coordination mechanisms, roles and responsibilities, activities planned versus undertaken and project systems among others. It was to form the basis for assessment of whether the project through its structures, systems and interventions had been able to meet the desired levels of relevance, efficiency and effectiveness. Further the evaluation intended to isolate bottlenecks that need to be addressed to ensure achievement of objectives by the time of project completion.

4. About this Report

This evaluation was conducted through an assessment of project documents and MIS, discussions with stakeholders and visits to project sites. Data collection was undertaken using mixed methods including quantitative surveys, In Depth Interviews (IDIs), Focus Group Discussions (FGDs) and observations. This Draft Report documents the major findings of the study. It offers insights into the outline of the study, methodology adopted, findings and recommendations.

SECTION II: METHODOLOGY

1. Methodology Adopted for the Assignment

The methodology for the evaluation was developed based on the activities laid down in the Terms of Reference (ToR) and keeping in mind insights obtained from discussions with representatives from the PMU and desk review. The methodology, while being comprehensive, ensured that the study remained aligned with its core objectives.

The first phase of the assignment involved a set of critical activities which lay the foundation for the midterm review. A commencement meeting was organized on 8th April 2024 in which representatives from the SCATFORM project and Sutra Consulting participated. The major outcomes of the commencement meeting included sharing of introductions, development of a common understanding of the mandate of the assignment, sharing of information related to interventions etc. Sutra Consulting requested the project to share documents and information that would form the basis for identification of indicators, design of tools and development of a sampling plan.

The Technical Proposal had laid down the sampling plan and this included representatives from institutions such as SPMU, DMU, SDMU, RMU, JFMCs and SHGs. In addition, site-based observations were also undertaken. The mid-term review also included a component of bio-physical survey. The detailed sample coverage is provided in **Annexure 2.**

Indicators are specific objectively measurable parameters which are used to measure progress of a programme towards achieving outcomes. Relevant indicators that could be used for assessing the impact of the project were identified by the consultant based on a review of the project log-frame as well as other documents. The outcome and output indicators identified in the log-frame developed for the project are indicated in the following table.

Output Indicators	Outcome Indicators
42000 ha area covered under different regeneration/ plantation models in JFM Mode	25% increase in proportion of moderate dense category forest in the targeted catchments
Artificial Regeneration – 5,000 ha	10% increase in species composition in Shannon Diversity Index for both forests and grasslands in targeted catchments
Aided Natural Regeneration – 21,000 ha	% Increase in the Forest Carbon stock
Teak Plantation – 15,000 ha	20 % Jhumia households stop practicing Jhum cultivation in the targeted catchments
Silvi-Pastoral Plantation – 1,000 ha	Water conservation structure within 500 meters from the centre of all the hamlet
80% survival rate after 3 years of plantation	% of JFMC/EDCs reporting improvement in water regime in the streams affected by the treatment area
3 High Tech, 7 centralized and 150 decentralized nurseries developed/ improved	20% increase in the income of JFMC members from sale of NTFPs
Area (in ha) covered under grassland improvement	Livelihoods of 50% SHG members in targeted SHGs improved
% Households show increased awareness on sustainable forest and water management practices	Proportion of well-functioning JFMCs/ EDCs
10% reduction in soil run-off in treated areas in targeted catchments	% of well-functioning SHGs
10% increase in soil moisture content in treated areas in targeted catchments	No. of NTFP collection/ primary processing centres established
10% increase in soil organic carbon in treated areas in targeted catchments	No. of advanced processing and value addition units established
	No. of households selling NTFPs through collection centres
	Value of trade/ profit generated by the livelihood organizations formed under the project
	Number of agroforestry plots supported under the project
	Area under agroforestry plantation
	No. of farmer's groups established for promoting agro-forestry
	Number of SHG members having income from livestock/ fisheries/ organic farming-based livelihoods
	No. and value (in ₹) of activities/ programs facilitated through convergence with other departments/ projects

Output Indicators	Outcome Indicators
	No. of eco-tourism sites renovated
	Eco-tourism policy of the state comes into force
	No. of JFMCs/ EDCs worked with
	100% of JFMCs/ EDCs have approved micro plans
	100% of targeted beats have approved Beat Forest Basic Plan
	No. of JFMC/ EDC/ SHG members trained on different aspects of sustainable forest and water management, livelihoods improvement and strengthening institutions
	No. of trainees from TFD and other concerned agencies participate in different training programs
	Gender mainstreaming action plan prepared
	Number of women in leadership positions in JFMCs
	At least X no. of forest research papers are published under the project

The mid-term review covered a wide range of stakeholders. The data collection tools that were used for the assessment included observation checklists, Key Informant Interview tools and JFMC and household questionnaires. These are provided in **Annexure 3**.

The consultant used CAPI based method of data collection for the SHG household survey. Field researchers were selected in their respective state of domicile which ensured understanding of local conditions as well as fluency in the local language. They were trained on the data collection tools and ethical norms.

A field work plan was prepared reflecting the planned movement of the team. This procedural plan helped in tracking the progress on a daily basis, supporting and monitoring, identifying and recording challenges etc. It was finalised based on the discussion with PMU. Data collection was undertaken based on the sampling plan. This was followed by analysis of primary and secondary and quantitative and qualitative data and preparation of this Draft Report which would be finalised based on feedback from the PMU.

SECTION III: SUSTAINABLE FOREST MANAGEMENT (COMPONENT 1)

1. Background and Context

The sustainable forest management component of SCATFORM aims to improve quality of forests and tree diversity in the targeted catchments through Aided Natural Regeneration (ANR miscellaneous), Artificial Regeneration (AR), Artificial Regeneration (AR- Bamboo), Teak Plantation Management (TPM) and Silvi-Pastoral Plantation in demarcated forest areas. Interventions in Gomti Wildlife Sanctuary additionally include weed eradication, fire line control and development of fruit trees.

The main objectives of this component were to control forest degradation and loss of forest cover, restore significantly degraded forest area, minimise Jhum cultivation and forest encroachment, encourage sustainable harvesting of forest resources and make communities residing adjacent to forest accountable in restoration, conservation, and protection of forest.

The implementation of the afforestation intervention was done through the institutional structure of the JFM model to ensure that forest fringe communities participate actively through JFMCs in forest rehabilitation in the project area. The involvement of JFMCs in forest plantation and management have been successfully demonstrated in the National Afforestation Program (NAP) and the TFIPAP project in the past.

2. Key Interventions under SFM

Sustainable Forest Management (SFM) interventions planned under the project includes the following:

- Improvement of Forest Nurseries both Departmental and JFMC mode
- Application of Plantation Models Departmental and JFMC
- Habitat Improvement in Gumti Sanctuary
- Construction or Engineering works
- Ecodevelopment Activities

The SFM sites visited during midterm evaluation in different DMUs are detailed in Annexure 4. This includes sample sites of different plantation models in DMUs and sample biophysical survey in limited sites. The midterm study across various sites involved observation of various project interventions, measurement of certain key parameters and in-depth consultations with JFMC members and project officials to appreciate the process of implementation of various interventions, challenges encountered and qualitative assessment regarding achievements made during the process.

3. Outcomes of SFM component of SCATFORM Project

The project log-frame identifies specific outcome and output indicators for the SFM component as well as the targets for achievement by the project.

Outcome 1: Improved quality and quantity of forests and grasslands and their management in the targeted catchment

The first outcome expected from the SFM component comprises of four indicators: i) Increase in the proportion of moderate dense category forest in the targeted catchments, ii) % increase in species composition in Shannon Diversity Index for both forests and grasslands in targeted catchments, iii) % increase in the Forest Carbon stock (tentative indicator) and iv) % Jhumia households stop practicing Jhum cultivation in the targeted catchments.

The first three indicators were to be reported by different administrative units of the SCATFORM Project while the fourth indicator was to be reported by the third party / external agency.

Indicator 2: % increase in species composition in Shannon Diversity Index for both forests and grasslands in targeted catchments

The midterm study had a limited sample size for bio-physical measurement (10 sites in total) and the Shannon Diversity Index has been computed for those sites (excluding TPM and Bamboo), which is discussed later in this section. However, it may be noted that the baseline values of diversity index for those sites is not available for an effective comparison of change and only some preliminary conclusions can be drawn from the computation. It may also be noted that these computations cannot be considered as statistically significant since the sample sites were few and a much larger sample size of different plantation model is required for the purpose. Customised technical studies may be commissioned for arriving at a more accurate estimation of the

project effect on species diversity. The Shannon Diversity index for sites has been calculated considering only newly planted stock for which counting and measurement were undertaken in sample quadrate. This table is as on July 2024.

Division	JFMC	Plantation Type	Plantation Age	Species Richness	Species Diversity	Survival Rate (%)
West Tripura	East Belbari	AR Mixed	1.5 years	9	1.696	77
Unakoti	Green Gold	AR Mixed	2 years	13	2.102	94
Unakoti	Bagaicherra	ANR Mixed	1 year	8	1.800	92
North Tripura	Parakta	ANR Mixed	2 years	12	2.131	88
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	8	1.369	90
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	4	1.307	89

Indicator 4: % Jhumia households stop practicing Jhum cultivation in the targeted catchments

The baseline study of SCATFORM conducted by an external agency reported that 16% of the sample households depended on Jhum cultivation. The household survey during midterm accessed that 7.6% of the sample household's primary occupation was based on Jhum cultivation. This gives an indication that there may be a drop in Jhum cultivation as a primary occupation. However, a sizeable percentage of households still depend on Jhum as a secondary means of occupation, due to which the extent to which households have abandoned Jhum cultivation fully in the project area cannot be ascertained conclusively.

Output 1.1 Increased area under forest in the targeted catchments

Indicator 1: Area covered under different regeneration/ plantation models in JFM Mode

The first indicator to be reported by RMUs measures the progress of plantation activities in JFM mode in the project and the progress till midterm is presented below: This table is as on July 2024

Plantation Model	Unit	Target	Achievement	Achievement (%)
Artificial Regeneration- Mixed	Ha	3,000	2,659	88.6
Artificial Regeneration (Bamboo)	Ha	2,000	2,472	123.6
Aided Natural Regeneration	Ha	21,000	19,299	91.9
Teak Plantation Management	Ha	15,000	3,014	20.1
Silvi-Pastoral Plantation	Ha	1,000	861	86.1
Total Plantation	**Ha**	**42,000**	**30,137**	**71.8**

Source SCARFORM

The progress of the afforestation interventions under the project has been good, and overall, 72% of the degraded area to be covered in the project has been rehabilitated through various plantation activities. Evidently, the progress under Teak Plantation Management has been relatively slow and is less than 50% at the midterm stage.

Indicator 2: Survival rate after 3 years of plantation

The survival rate of plantation was to be reported by DMU / PMU every six months till the end of 3 years of plantation, with a target of at least 80% survival at the end of three-year period. The midterm study undertaken in sample plantation site assessed the survival rate of plantation, which were at least 3 years old, which is presented as follows. This table is as on July 2024.

DMU	JFMC	Year of Creation	Plantation	Survival Rate (%)
Dhalai	Dalpati	2021-22	AR Mixed	83.0
North Tripura	Bireshpara	2021-22	AR Mixed	95.0
Khowai	Tuiddulnaibudal	2020-21	AR Bamboo	83.5
Gomati	Sarbojoypara	2021-22	AR Bamboo	87.0
South Tripura	Harbatali	2021-22	AR Bamboo	80.0
Sepahijala	Kamal Nagar	2021-22	AR Bamboo	74.5
Dhalai	Lakhmipur EDC	2021-22	ANR Mixed	95.5
Khowai	Tuiddulnaibudal	2021-22	Teak Plantation	82.0
			Average Survival Rate	**85.1**

The mean survival rate is 85.1 percent for plantation of age 3 years or more, which exceeds the target set for the indicator. However, it may be noted that the findings are based on small sample size and cannot be accepted

as statistically significant. Records and reports from PMU would provide more accurate achievement on the indicator.

Indicator 3: No. of High Tech, centralized and decentralized nurseries developed/ improved
Reportedly, departmental nursery improvement has been implemented in 3 High Tech nurseries and 7 central nurseries in the SCATFORM project.

Output 1.2 Increased area under grassland in the targeted catchments

Indicator 1: Area (in ha) covered under grassland improvement
Information regarding improved grassland area in the project is not available with the consultants. However, based on the financial expenditure details shared by the project, it is estimated that 137 Ha of grassland development has been completed in Gumti Sanctuary till midterm (37 percent) against the project end target of 375 Ha.

Output 1.3 Community aware about sustainable use of forest and water resources

Indicator 1: % households show increased awareness on sustainable forest and water management practices
The log frame indicates that the indicator would be measured and reported by third party / agency. The baseline report does not provide any baseline value of this indicator, which is required for reporting the change at midterm stage. The midterm survey of households indicates that 80.3% of the sample household are aware about the need for sustainable forest management and water management practices, but only 36.9 percent of the households agreed that there is a need to practice sustainable use of these resources. Additionally, 79% of the households can perceive impact of climate change, but most of them found difficulty in articulating the nature of impacts.

4. Progress in Implementation of SFM component

Some of the main interventions under the SFM for which progress data till midterm is available or was possible to estimate from the details of financial expenditure provided by the project are summarised as follows.

Implementation of Forest Nurseries under Departmental Mode

Improvement of forest nurseries under the departmental mode has been implemented in 3 hi-tech nurseries and 7 central nurseries in the state.

Application of Plantation Model using Departmental Mode

Progress on application of plantation models by the department has been estimated based on the financial expenditure incurred on various interventions in case the details of physical progress was not available. However, the same provides an indication of the extent of progress.

- **Filter Strip Plantation** – Out of project target of 96 km, till midterm approximately 107 km had been completed (31.3 percent). (from physical progress)
- **River Bank Plantation -** Out of project target of 100 km, till midterm approximately 54 km had been completed (54 percent). (from financial progress)
- **Bandalling** – No progress on bandalling had been made against the target of 222 units till the end of project

Habitat Improvement in Gumti Sanctuary

The habitat improvement in Gumti Wildlife Sanctuary under the project comprised of several interventions against which the progress made by the project is outline below. The progress achievement has been arrived using the financial utilisation by the project where actual progress made was not available.

- **Fruit Trees Planting** – The project till midterm has covered approximately 270 Ha (45 percent) under fruit trees planting against the overall project target of 600 Ha. (from physical progress)
- **Grassland Development** – Approximately, 186.5 Ha of grassland has been developed in Gumti Sanctuary against a total project target of 375 Ha. (from physical progress)
- **Weed Eradication** – Weed eradication in approximately 65 Ha has been completed against end of project target of 330 Ha. (from physical progress)
- **Fire Line Making** – 40 km of fire line making was the overall project target out of which 18 km had been completed by midterm. (from physical progress)
- **Boundary marking with pillars** – Boundary marking with pillars was completed in more than 240 sites against the overall target of 500 sites. (from financial progress)

Construction / Engineering Works by Department

The construction of check dams, gully plugging and check post / guard room directly by the department has not shown much progress evidently from the expenditure report. However, 6 Check dams and 24 Brushwood Gully Plug construction has been reported by the project till midterm.

Application of Plantation models through JFM

The application of plantation models through JFM shows good progress except for Teak Plantation Management as present earlier under Output 1.1 (Indicator 1).

JFMC / EDC DCPN Nurseries

Nursery development under departmental mode has progressed well, however the progress in DCPN nurseries is rather slow and is affected by several issues elaborated in the recommendation section.

Eco-developmental Activities

Eco-development in project area has progressed slowly and only a feasibility report of potential sites had been prepared till midterm.

5. Afforestation

5.1. Implementation Process

JFMCs in consultation with forest range offices and SCATFORM project staff identify plantation sites, obtain necessary approvals, and incorporate the plantation plan in the forest beat level plan document. Once approval is received community mobilization activities are undertaken. Labour required for plantation works are mobilized from within the JFMC. Usually one-year-old saplings are procured from central and hi-tech nurseries and are transported to the plantation sites. Many of the plantation sites have limited road connectivity and consequently manual labour had to be engaged for carrying saplings from the last transport point to the sites.

Once plantation work has been completed display boards are fixed providing details of the work as a measure of transparency and accountability. Norms are usually set by the concerned JFMCs to protect the plantation sites.

First year bamboo fencing is provisioned for in most of the sites, however some sites have a natural advantage of height, restricting access to men and cattle. Protection efforts however need to be intensified as in some of the sites visited it was observed that bamboo fences had started to weaken in the very first year itself and there was significant decay and weakening within two-three years. Signs of grazing were visible in some sites such as East Belbari of West Tripura district. Weeding, cleaning, and gap filling activities have been undertaken was concluded from observation in all the sites.

5.2. Artificial Regeneration (Mixed Plantations)

Artificial Regeneration (AR) activities are targeted in open forest catchments which have abandoned Jhum farming and are located within 5 kilometres from the villages. Species are selected based on the needs of the local people. Approximately 1100 saplings of wild endemic species were targeted to be planted per hectare in the AR mixed plantation model. Most species are wild endemic and are procured from hi-tech or central nurseries.

Terminalia was the dominant species group encouraged in the AR plantation model. Some of the major species that have been selected are *Terminalia chebulla* (Haritaki), *Terminalia arjuna* (Arjun), *Terminalia belarica* (Bahara), *Artocarpous heterophyllus* (Kathal), *Parkia speciosa* (Longchak), *Dillenia indica* (Chalta), *Acacia auriculiformis* (Akashu), *Aquilaria malaccensis* (Agar), *Holarrhena pubescens* (Kurei), *Sizygium cumini* (Jamun) and *Elaeocarpus serratus* (Jalpui), etc. These species usually meet the food, fodder, and fuel wood requirements of the local communities.

One sample site for AR (Mixed) plantation was selected in each of the eight DMUs for the midterm study. In each site a sample plot of 33m by 33m was marked and new plants were counted, measured and the overall plantation patches were analysed. Wherever the total plantation area was large, additional quadrats were selected as per the need to validate the observation. This was followed by a detailed discussion with JFMC members and departmental / project officials to validate observations. The process of assessment was similar

in other plantation models also visited during the midterm study. The following table presents the status of AR-mixed plantation sites that were visited for midterm.

DMU	JFMC	Year of Creation	Area (Ha)	No. of Species	Survival Rate (%)	Fencing Status
Dhalai	Dalpati	2021-22	5	7	83	-
North Tripura	Bireshpara	2021-22	5	6	95	Bamboo fencing but damaged
West Tripura	East Belbari	2022-23	5	9	77	Bamboo fencing but damaged
Khowai	Madhya Krishna Nagar	2022-23	5	12	86	-
Khowai	Upendra	2022-23	5	6	89	No fencing
South Tripura	Pratirai	2022-23	5	7	94	Bamboo fencing
Sepahijala	Dingroi	2022-23	14	7	72	Damaged bamboo fencing
Unakoti	Green Gold	2022-23	10	8	94	Weak bamboo fencing.
Average Survival Rate					**86**	

Species Richness

Around 6 to 12 different wild endemic species had been planted in AR mixed plantations visited during study. *Terminalia bellirica, Sizygium fruticosum, Swietenia mahagoni, Aquilaria malaccensis, Parkia speciosa, Artocarpus heterophyllus, and Dillenia indica* were the key species promoted through plantation. These species were selected at RMU level in consultation with the JFMC. However, many JFMC members were found to lack clarity on how the species were selected in their site. Greater effort is required for participatory selection of species involving JFMCs in the project. Species richness was the highest in Madhya Krishna Nagar JFMC and the least in Bireshpara JFMC.

Survival Rate

The average survival rate for each AR-mixed plantation sites was determined by calculating number of living species from the counted number of 100 species. Bireshpara JFMC had a relatively better survival rate despite being older than the other sites. This could be attributed to factors such as care, effective gap filling and strengthened protection mechanisms. The average survival rate of AR-mixed plantation sites visited is about 86%.

Dingroi JFMC and East Belbari JFMC had relatively lower survival rates due to factors such as weak bamboo fencing and approachability of the plantation sites. There is an urgent need to strengthen protection mechanisms in such plantations to achieve a good survival rate. Apart from two sites, survival rate was more than 80% in all plantations which is encouraging. The growth of plants in most of the sites was found to be good.

There were biotic pressures in most sites and traces of cattle grazing and human movement were found. It was revealed by the JFMC members that the sites were earlier occupied by community members for practicing *Jhum* farming. Efforts were made to convince the community members to relinquish the sites for plantations and these were brought under AR miscellaneous plantation activity which is a significant change.

Restoration of *Jhum* Sites

The AR mixed sites that were visited had some traces of *Jhum* farming. It was revealed by the JFMC members that the sites were once occupied by the community members for practicing *Jhum* farming, who were mobilised to stop jhum cultivation and allow plantations under the project. It is estimated that a total of 57.5 Ha of *Jhum* sites have been brought under AR miscellaneous plantation activity in the above sites, which is a significant change.

5.3. Artificial Regeneration (Bamboo)

Bamboo is an important forest produce for the community residing around forests. It is a key fencing and construction material and its shoots are also consumed. Bamboo is plentily available in all the districts and the project is encouraging its plantation. Artificial Regeneration - Bamboo targeted to develop around 2000 ha, and the project has already exceeded the target. Around 625 bamboo seedlings per hectare have been planted as a gap filling intervention in existing bamboo patches.

DMU	JFMC	Year of Creation	Area (Ha)	Species Diversity	Survival Rate (%)	Fencing Status
Khowai	Tuiddulnaibudal	2020-21	10	2	83.5	Weak bamboo fencing
Gomati	Sarbojoypara	2021-22	5	1	87.0	Bamboo fencing but weak
South Tripura	Harbatali	2021-22	5	2	80.0	No fencing
Sepahijala	Kamal Nagar	2021-22	20	1	74.5	No fencing
West Tripura	Bhrigudasbari	2022-23	6.2	3	89.0	Bamboo fencing
South Tripura	Malambari	-	5	2	81.0	No fencing
Gomati	Manthar	2022-23	5	2	82.0	Bamboo fencing
North Tripura	Alochhaya	2023-24	15	2	86.7	Natural advantage of height
Unakoti	Butui Hill	2024-25	20	1	92.3	No fencing but one side fencing is required
Average Survival Rate					**84.0**	-

The average survival rate of the bamboo plantation was found to be 84 percent (highest 92 percent and lowest 74 percent). Apart from one site in Sepahijala, all other plantations had a survival rate of more than 80 percent. Unakoti which is a current year intervention had the highest survival rate of 92.3 percent. All districts that were surveyed were found to be abundant in bamboo, bamboo shoots, bamboo stumps, etc. and these are being used for multiple purposes by communities. The growth of the plant in most of the sites was found to be good.

There are biotic pressures in most of the sites and traces of cattle grazing and human mobility were found. Fencing had been damaged in five sites and four sites did not have any fencing. The growth of bamboo was found to be proportionate with the age of the plantation. The height of bamboo ranged from 2.2 mt to 5.5 mt. This was due to the edaphic and environmental conditions. The plantation may grow into a bamboo forest with a few scattered stumps of other species.

In terms of diversity only 3 to 4 species of bamboo have been promoted. *Dendrocalamus longispathus* (Rupai), *Bambusa tulda* (Mritinga), *Melocanna baccifera* (Muli) and Barak species are being promoted through the AR- Bamboo model. In the surveyed area around 91.2 ha of forest land which was otherwise unused has been brought under bamboo plantation which is showing good growth through JFMC regulations and protection mechanisms.

5.4. Aided Natural Regeneration (Mixed Plantations)

Aided Natural Regeneration (ANR) is targeted in catchments where canopy density is less than 20 percent and tree stumps and bamboo rhizomes are present. Since vegetation already exist in these patches, therefore a maximum of 250 plants per hectare are planted in this model. The plantation aims at reviving a degraded low canopy density patch to grow into a dense forest. The sites that are chosen for such interventions are within a distance of five kilometres from the surrounding village. Needs and choices of JFMC members were considered while undertaking such plantations.

DMU	JFMC	Year of Creation	Area (Ha)	Species Diversity	Survival Rate (%)	Fencing Status
Unakoti	Bagaicherra	2023-24	20	7	92.3	Bamboo fencing
North Tripura	Parakta	2023-24	38	8	88.9	Natural advantage of height
Gomati	Khumpui	2023-24	20	6	84.3	Bamboo fencing
South Tripura	Harbatli	2023-24	10	6	83.5	No fencing

DMU	JFMC	Year of Creation	Area (Ha)	Species Diversity	Survival Rate (%)	Fencing Status
Dhalai	Lakhmipur EDC	2021-22	10	5	95.5	Good bamboo fencing
West Tripura	Twikalaikami	2022-23	5	4	90.0	Bamboo fencing
Unakoti	Bagaicherra	2023-24	20	7	92.3	Bamboo fencing
Average Survival Rate					**89.5**	

Six ANR (Miscellaneous) sites covering 103 Ha were visited during the midterm. Plantation diversity, growth, and other aspects of plantation such as protection mechanism, year of creation, etc. were assessed during the visit.

Most of the sites visited were found to be relatively new plantations undertaken in 2023-24, except for the plantation site in Dhalai district which was taken up in 2021-22 and showed a survival rate of 95.5 percent. All sites had survival rate of more than 80 percent which is reasonably good.

The concerned JFMCs and EDCs were found to be protecting the sites as in most of the sites the bamboo fencing created has weakened gradually. Apart from the planted species a lot of natural regeneration was also seen. Root stocks available at the site had put out coppice shoots and were recovering. The choice of species was appropriate and quality of work is reflected in the survival rate and good growth of saplings. These plantations will potentially grow into well wooded patches in the future. Support to the natural regeneration has helped in recovery of the sites.

Around, 5 to 8 different wild endemic species have been planted in these sites. *Terminalia arjuna (Arjun), Terminalia belarica (Behara), Dillenia indica, Terminalia chebulla (Haritaki), Sizygium fruticosum (Jamun), Parkia speciosa (Longchak), Azadirechta indica (Neem), Tectona grandis (Teak) and Lagerstroemia speciosa* were the key species seen to be promoted through ANR plantations. These species were selected at the RMU level in consultation with JFMCs. However, some JFMC members did not have clarity on how the species had been selected in their sites. This points towards need for more effort at the JFMC and community levels to create greater awareness and understanding of plantation activities.

Biotic pressure is evident in most of the sites visited. These sites were earlier under the management of the community which have now been organised into JFMCs. The additional plantation through ANR has motivated JFMCs to regulate the use of the sites. Despite this, bamboo fencing at the sites had weakened and need to be restored as the plantation are relatively young. The good growth and survival rate (89%) indicates effective institutional mechanisms that have been put in place in partnership with JFMCs to rehabilitate the sites.

5.5. Teak Plantation Management

Teak Plantation Management (TPM) is another model of plantation application under SCATFORM Project. Around 250 teak stumps are planted per hectare in existing degraded teak plantation patches, where tree canopy density is more than 20% and where teak stumps or seeds are available at the site. The site is chosen within a distance of 5 km from village. The SCATFORM project targeted to cover 15000 Ha of TPM intervention however, only 20 percent (3014 Ha) had been achieved so far. Another 1832 Ha target had been set for 2024-25 to reach 32% of the plantation target. Most of the JFMC that were visited during the survey did not have TPM model.

DMU	JFMC	Year of Creation	Area (Ha)	Survival Rate (%)	Fencing Status
South Tripura	Pratirai	2023-24	5	95.0	Bamboo fencing
Khowai	Tuiddulnaibudal	2021-22	5	82.0	-
North Tripura	Jarim Para	2022-23	10	87.0	Bamboo fencing
Unakoti	Bagaicherra	2023-24	20	93.5	No fencing
Average Survival rate				**89.0**	-

Around 40 ha of TPM work were assessed during the midterm as many places did not have TPM model. All sites had a survival rate of more than 80 percent which is encouraging. The growth of saplings was good and root stocks available were responding to the protection and treatment as they too had put forth shoots. Teak saplings had attained an average height between 1 to 5 meters. Sites had bamboo fencing in the first year of

plantation which got weakened naturally. There were biotics pressure and threats of felling will increase as stumps grow in size.

Saplings were seen to be healthy and growing well. These areas have potential to develop into good woodlots. JFMCs were regulating the use of these sites. Teak takes a comparatively longer time to grow and commercialise. Therefore, the possibility of incentivising JFMCs may be considered. The TPM sites in all the district had unwanted growth and branching, which is affecting availability of desired quality of vegetation. Thus, efforts for thinning, and coppicing to improve growth and achieve desired quality of teak must be made.

TPM interventions are typically taken up in the pre-monsoon period (March- April). Respondents reported that there had been fund flow constraints during this period which affected the interventions to some extent. TPM is mostly an ANR kind of plantation model which is designed to include coppicing and gap filling of 250 seedlings per Ha. With an ambitious target of 15000 Ha these two activities may not suffice the need. Thus, it is suggested to encourage enrichment plantation by planting shade tolerant species like black pepper and Gandaki which would not only meet the plantation targets but also create livelihood opportunities for JFMC members and strengthen conservation mechanisms.

5.6. Silvi-pastoral Plantations

The silvi-pastoral plantation model has the potential to support and develop dairy and livestock-based livelihoods. The progress made under this model was found to be relatively low. This model is designed to plant 400 seedlings per hectare in open forests near villages where tree canopy density is less than 20%. The sites chosen are usually within 2-3 kilometres from nearby villages. The need for fodder and choice of JFMCs are considered while deciding on the species to be planted. The following table is as on July 2024.

DMU	JFMC	Year of Creation	Area (Ha)	Survival Rate (%)	Fencing Status
South Tripura	Pratirai	2023-24	0.5	100.0	Bamboo fencing
Unakoti	Bagaicherra	2023-24	10	90.5	Partly bamboo fencing and partly open
Unakoti	Bagaicherra	2023-24	20	93.5	No fencing
West Tripura	Bhrigudasbari	2022-23	5	89.0	Bamboo fencing
Average Survival Rate				**93.0**	-

Three silvi-pastoral sites were surveyed covering 15.5 Ha area in 3 districts as most of the randomly selected JFMCs did not have silvi-pastoral models. A mix of trees and grass species were seen to be planted. All surveyed sites were facing biotic pressures and bamboo fencing was found to surround only some portion of the patches. Traces of grazing and cattle mobility were observed on the sites.

The choice of species was found to be appropriate and an overall survival rate of 93% was estimated. The sites identified for the silvi-pastoral interventions were suitable. In Pratirai JFMC 2000 Kgs of *Brachiaria ruziziensis* (Congo grass) and 305 saplings covering *Bambusa tulda* (Mritinga), *Artocarpus heterophyllus* (Kathal) and *Parkia speciosa* (Longchak) are promoted. In Bagaicherra JFMC, 4000 saplings of *Artocarpus heterophyllus* (Kathal), *Parkia speciosa* (Longchak), *Terminalia belarica* (Behera), *Elaeocarpus serratus* (Ceylon olive), *Dillenia indica* (elephant apple), *Citrus maxima* (Pomelo), and *Sizygium fruticosum* (Jamun) species were promoted. In Bhrigudasbari Mahagony, Agar, Champa, and Potato were promoted as part of silvi-pastoral interventions. All interventions were found to have the potential to develop into fine samples of silvi-pasture. Effective benefit sharing mechanisms should be developed and put in place so that the community derives direct and visible benefits and in turn is motivated to assist in the development of such plantations.

5.7. Bio-Physical Survey of Plantation sites

Ten sample sites were randomly selected for detailed biophysical observation, two sites per type of plantation. In selected sites, a sample plot was laid and quadrat method of sampling was used. In the sampled JFM plots, one tree quadrats of size 33 m × 33 m, approximately equal to an area of 0.10 ha were laid and all newly planted trees by species were counted and their height and Girth at Breast Height (GBH) were recorded. The details of the biophysical sample sites are provided in the following table.

Division	JFMC	Plantation Type	Plantation Age	Area (Ha)	Norm
West Tripura	East Belbari	AR Mixed	1.5 years	5	1100 seedlings / Ha
Unakoti	Green Gold	AR Mixed	2 years	10	1100 seedlings / Ha
Unakoti	Bagaicherra	ANR Mixed	1 year	20	250 seedlings / Ha
North Tripura	Parakta	ANR Mixed	2 years	38	250 seedlings / Ha
South Tripura	Malambari	AR Bamboo	2 years	5	625 seedlings / Ha
Unakoti	Butui Hill	AR Bamboo	< 4 months	20	625 seedlings / Ha
North Tripura	Jarim Para	TPM	2 years	10	250 seedlings / Ha
Unakoti	Bagaicherra	TPM	< 9 months	20	250 seedlings / Ha
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	10	400 seedlings / Ha
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	5	400 seedlings / Ha

Detailed observations were generated to analyse the growth of the plantation sampled for the purpose, as explained below. It may be noted that the computation method suffers from certain constraints: lesser number of sample plantations, contamination in observation as some existing plants prior to plantation might have been inadvertently included, and observation from single quadrat irrespective of the size of the plantation. Hence, the findings can at best be considered illustrative and it is suggested that detailed investigation may be carried out by the project using more robust techniques.

Species richness, diversity, and survival rate (trees)

The overall tree species richness in the sampled JFMCs ranged from 1 to 13, the highest was in AR Mixed plantation in Green Gold JFMC. Species richness parameter is not applicable for TPM or AR Bamboo plantation for obvious reason. The following table is as on July 2024.

Division	JFMC	Plantation Type	Plantation Age	Species Richness	Species Diversity	Survival Rate (%)
West Tripura	East Belbari	AR Mixed	1.5 years	9	1.696	77
Unakoti	Green Gold	AR Mixed	2 years	13	2.102	94
Unakoti	Bagaicherra	ANR Mixed	1 year	8	1.800	92
North Tripura	Parakta	ANR Mixed	2 years	12	2.131	88
South Tripura	Malambari	AR Bamboo	2 years	2	0.039	81
Unakoti	Butui Hill	AR Bamboo	< 4 months	3	0.469	92
North Tripura	Jarim Para	TPM	2 years	1	0.000	87
Unakoti	Bagaicherra	TPM	< 9 months	1	0.000	93
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	8	1.369	90
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	4	1.307	89

Species diversity was calculated using the Shannon diversity index formula:
$H = -\sum[(pi) \times \ln(pi)]$, where (pi) is the proportion of each species

The proportion of each species were computed from the total number of new plants of all types of species that were found in the given quadrat.

For AR mixed plantation, most of the plants in the quadrat comprise of new plantation. Hence, the diversity index calculated for AR mixed reflect the improvement / change over the baseline where the baseline diversity index is close to zero.
For ANR mixed and silvi pastoral plantation, the computed diversity index indicates the diversity of the seedlings planted under the project. For TPM and AR Bamboo the diversity index is not relevant.

It is evident from the table that the diversity in sample sites varies from 1.307 to 2.131, with a mean diversity index of 1.734. (excluding TPM and Bamboo plantation)

The survival rate of the sites is good, though none of the sample plantation have reached the age of three. The average survival rate was found to be 88.3 percent.

Density of trees and basal area

Tree density per hectare in the bio-physical sites was computed by two methods: i) Counting the number of trees irrespective of Girth at Breast Height (GBH) or Diameter at Breast Height (DBH), and ii) Counting the number of trees with more than 10 cm Girth at Breast Height (GBH) or at least 3 cm DBH. Since the plantations have age less than 3 years, the criterion for DBH was set at 3 cm instead of higher DBH (> 5cm) as it would have been more appropriate for plantation of age at least 5 years.

Basal area was calculated using the formula: **Basal Area (m^2) = π x (DBH/2)^2** where DBH is in meter. It can be observed that the mean plant density at DBH of at least 3 cm correlates directly with the age of plantation and basal area of plantation increases with age in the same plantation category. Higher basal area with same or lower age would mean better growth of tree stock as it can be seen for Green Gold JFMC as compared to East Belbari. Similarly, higher density and lower basal area suggest that the plantation is young. The following table is as on July 2024.

Division	JFMC	Plantation Type	Plantation Age	Average Density / Ha	Average Density / Ha (3 cm ≤ DBH)	Basal Area (m^2/Ha)
West Tripura	East Belbari	AR Mixed	1.5 years	642.79	532.60	2.57
Unakoti	Green Gold	AR Mixed	2 years	817.26	229.57	5.18
Unakoti	Bagaicherra	ANR Mixed	1 year	477.50	119.38	0.82
North Tripura	Parakta	ANR Mixed	2 years	826.45	211.20	4.30
South Tripura	Malambari	AR Bamboo	2 years	688.71	569.33	5.00
Unakoti	Butui Hill	AR Bamboo	< 4 months	899.91	18.37	0.07
North Tripura	Jarim Para	TPM	2 years	679.52	229.57	1.22
Unakoti	Bagaicherra	TPM	< 9 months	321.40	126.56	0.57
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	596.88	64.28	0.10
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	817.26	293.85	0.21

Size Classification based on DBH

The size classification based of DBH explains the distribution of species by different growth level. Higher proportion of plants in higher DBH category can be correlated with age of plantation for specific type of plantation model as on July 2024.

Division	JFMC	Plantation Type	Plantation Age	DBH ≤ 5	5< DBH ≤10	10 < DBH
West Tripura	East Belbari	AR Mixed	1.5 years	34.3	55.7	10.0
Unakoti	Green Gold	AR Mixed	2 years	77.5	7.9	14.6
Unakoti	Bagaicherra	ANR Mixed	1 year	94.2	3.8	1.9
North Tripura	Parakta	ANR Mixed	2 years	76.7	15.6	7.8
South Tripura	Malambari	AR Bamboo	2 years	30.7	62.7	6.7
Unakoti	Butui Hill	AR Bamboo	< 4 months	98.0	2.0	0.0
North Tripura	Jarim Para	TPM	2 years	71.6	21.6	6.8
Unakoti	Bagaicherra	TPM	< 9 months	74.3	22.9	2.9
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	98.5	1.5	0.0
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	100.0	0.0	0.0

Growing Stock of Plants

Growing stock of plants was calculated using the generic volume equation instead of species-specific volume equation for simplicity. For computation of growing stock only plants with at least 3 cm DBH was considered and hence the actual growing stock would be higher than the reported volume below. This provides a quick estimate of wood stock the plants matured enough have generated from plantation.

Volume (m^3) = 0.8 × DBH^2 × H where DBH: diameter at breast height, H: height of tree in meter
The mean annual increment was obtained by dividing the growing stock in tonnes per hectare by the age of the plantation.

Division	JFMC	Plantation Type	Plantation Age	Volume (m^3 / Ha)	Annual Growth (m^3 / Ha)
West Tripura	East Belbari	AR Mixed	1.5 years	8.41	5.60
Unakoti	Green Gold	AR Mixed	2 years	28.48	14.24
Unakoti	Bagaicherra	ANR Mixed	1 year	10.36	10.36
North Tripura	Parakta	ANR Mixed	2 years	44.23	22.12
South Tripura	Malambari	AR Bamboo	2 years	25.85	12.92
Unakoti	Butui Hill	AR Bamboo	< 4 months	0.24	-
North Tripura	Jarim Para	TPM	2 years	10.02	5.01
Unakoti	Bagaicherra	TPM	< 9 months	1.66	2.21
Unakoti	Bagaicherra	Silvi-pastoral	< 9 months	0.17	0.23
West Tripura	Bhrigudashbari	Silvi-pastoral	1.5 years	0.26	0.17

Plant with DBH of at least 3 cm

The average volume irrespective of the age of plantation is 12.97 cubic meter per Ha, which approximately translates to 5.2 ton of wood stock per Ha by assuming conversion rate of 400 kg per cubic meter. The mean annual growth of AR Mixed is 9.9 cum per Ha, ANR Mixed is 16.2 cum per Ha, AR Bamboo is 12.9 cum per Ha, TPM is 3.6 cum per Ha, and 0.2 cum per Ha for Silvi-pastoral plantation. This is as on July 2024.

5.8. Summary Findings of the Plantation Interventions

Of all the five types of plantation interventions, AR (miscellaneous) interventions are found to have reclaimed Jhum patches. It is evident from the interventions that area under Jhum farming has reduced significantly. This was also validated with JFMCs. Jhum farming was not observed in any of the surveyed plantation sites. Overall, plantation interventions have contributed to improving forest cover, increasing species diversity and ensuring good survival rate and growth. This is in line with the findings presented on the Forest Survey of India (FSI) assessment reports which state that there has been an increase in open forest (10% to 40% canopy density) (1836 km^2 in 2019 to 1863 km^2 in 2021) though change in very dense and moderately dense category of forest has not been as significant.

Diversity of forestry species through AR and ANR miscellaneous was observed and on an average around 6 to 8 different species have been planted through these interventions. TPM and Silvi-pastoral interventions were found to have inherent limitations of unavailability of plantation patches.

There are few plantation sites such as TPM and AR (Misc) of Pratirai JFMC, South Tripura, AR (Misc) of Dingroi JFMC of Sepahijala, ANR (Mixed) of Harbatali JFMC of South Tripura, AR Bamboo of Kamalanagar JFMC of Sepahijala, AR Bamboo of Malambari JFMC of South Tripura, TPM & Silvi-pastoral plantation of Bagaicheera JFMC of Unakoti that need some fencing provisions. The RMUs to be consulted and strong barb-wire or chain link fencing can be installed at strategic entry points to prevent entry of cattle into the plantation sites. There are few sites such as AR (Misc.) of Bireshpara JFMC of North Tripura and ANR (Bamboo) of Butui Hills of Unakoti which have natural advantage of high hillocks and streams which prevents cattle entry into the plantation sites.

6. Habitat improvement in Gumti Wildlife Sanctuary

Some of the key interventions that were included in the proposal for habitat improvement in Gumti wildlife sanctuary included fruit tree plantations, grass land development, weed eradication, fire-line control, check dams and EDC level nursery development. These interventions were planned keeping in view the wildlife in the sanctuary and were to be undertaken in a non-benefit sharing mode with the EDCs.

Type	Unit	Target	Total Achievement	Actual Achievement (%)
Filter Strip and River Bank Plantation				
Filter Strip	Km	96	104	108
River Bank Plantation	Km	100	107	107
Habitat Improvement				
Fruit Tree Plantation	Ha	600	745	124
Grassland Development	Ha	375	270	72
Agroforestry Development				
Agroforestry Plantation	Ha	8880	2850	32

Source: SCATFORM

Among various intervention, progress has been low with respect to grassland development and agro-forestry plantations. Other components of habitat improvement such as filter strip, river bank plantation, fruit trees plantations targets were achieved by the end of 2023-24. The following table presents the achievements of Gandacherra range office in habitat improvement intervention.

Activity	Achievement
Fruit Trees Plantation	256 Ha (JFMC- 157 Ha, EDC-99 Ha)
Grassland development	186.5 Ha
Weed Eradication	65 Ha (JFMC-15 Ha, EDC- 50 Ha)
Fireline Control	18 Km
Check dams	6 Nos
Brushwood Gully Plugs	24

Some of the habitat improvement interventions of Gandacheera forest range were surveyed and the findings are presented as follows:

- **Fruit Tree Plantation:** The key species found are Embelica officinalis (Amla), Terminalia belarica (Bahara), Baccaurea sapida (Latkan), Averrhoa carambola (Karmanga), Tamarindus indica (Tetul) , Sizygium cumini (Java Plum) and Artocarpous heterophyllus (Kathal). The fruit trees had been developed to meet the feed requirements of wild fauna. It was observed that they were consuming it and had made nests around the plantation areas.
- **Grassland Development:** A total of 186.5 Ha of grassland has been developed in the wildlife sanctuary as reported through the data. 5 Ha of grassland in Laxmipur EDC was surveyed. Bamboo fencing has been done to protect it from cattle in the initial years. Now the grassland has good growth and ready for wild herbivores to consume.
- **Weed Eradication:** Around 65 Ha weed eradication work was undertaken where weeds like Lantana camara, bagaiya thorn and wild berry were eradicated. 10 ha of weed eradication work was surveyed in Laxmipur EDC. It was found to be free from weeds however, the activity was done recently and so the patch was seeming to be weed free. Weed eradication is a continuous process which needs to be done at least once a year.
- **Fire-line Control:** Fire-line control interventions was undertaken for 18 kilometres to prevent forest fires from spreading. Cleaning was visible to some extent. However, some grassy patches have grown in absence of regular cleaning and maintenance. Regular maintenance and capacity building of EDCs on preventing forest fire is a much needed activity.
- **Improved Awareness on Sustainable Forest Management:** Plantation and habitat improvement interventions through JFMCs and EDCs have encouraged forest dependent communities to develop, manage, and conserve forests for future generations. Some of the JFMCs had taken proactive measures to protect forest and plantation works which was reflected through good growth and high survival rate of the planted species. If some agro-forestry model which are capable of encouraging diversity and good income, then the remaining FRA land can be made more productive with respect to sustainable forest management.

7. Nurseries

Nurseries are responsible for providing good quality planting material / saplings for different afforestation / plantation interventions by the forest department. Nurseries comprise of Hi-Tech Nursery, Central Nursery and Decentralised People's Nursery (DCPN) at the JFMC / EDC level. The project aimed to create three hi-tech nurseries at identified places with at least 1.5 Ha area with annual seedling production capacity of 5 lakhs. The objective of such nurseries is to produce high quality seedlings, especially for species requiring intensive care (bamboo, cane), conduct research on propagation methods of difficult but economically important plants and standardization of propagation methodology for indigenous rare, endangered, and threatened species.

The project also aimed to improve the seven existing central nurseries to produce high volume of seedlings of reliable quality for plantation under the project, and 150 DCPNs in areas which are difficult to access. It aimed to create one DCPN per three JFMCs with minimum area of 0.25 ha and minimum annual production capacity of 20,000 seedlings.

Type of Nursery	Number	Name	Remarks
Hi-Tech Nursery	1	Hi-Tech Nursery, Hatipara, West Tripura	Around 1,43,415 saplings covering 45 species (including 3 bamboo species) were found during the time of visit.
Central Nursery	2	Khasiamangal Central Nursery, Khowai and Champaknagar Central Nursery, Mandai, West Tripura	Khasiamangal nursery had raised around 3.39 lakhs of saplings of 22 species and had around 30,000 saplings stocks during the time of visit. Champaknagar nursery had production capacity of around 3 lakhs saplings
Decentralised People's Nurseries	2	Hamjakma Bodal SHG nursery, Mungiakami, Khowai; Kalsimura JFMC nursery, Boxanagar, Sepahijala	There are very few DCPNs found during the survey as most of the places DCPN concept are not working.

Hi-Tech Nursery: The Hi-tech Nursery at Hatipara is in Agartala city close to the project headquarter and is well connected and easily accessible. There is an entry gate and small building for staff. Water and electricity facilities are uninterruptedly available. Overhead water tanks are also available.

Concrete internal path, nursery beds, protection wall, vermin-compost infrastructure, labour shed, office room, labour availability (10 male and 10 female labourers) were some of the key features of the nursery. The beds had provisions for putting up shade nets during the peak summer months. The nets were put on iron frames that are fixed in place. Seedlings produced were of good quality and raised through traditional methods such as from seed or from cuttings. Staffs were found to be informally trained. The species raised were as per requirement of the field and some ornamental plants had also been raised to meet the requirements of city dwellers.

Seeds reportedly are procured from the market. Nursery journal and other relevant records were available and well maintained. The nursery also had good drainage system. However, infrastructure such as seed testing laboratory, seed storage facilities, hardening chamber, poly-house, seed treatment pit, research facilities, etc. were not available. Hi tech equipment such as cutting bed, propagation frame, poly tunnel, culture room, mist chamber were also not available.

Central Nursery: Both the Champaknagar and Khasiamangal Central Nursery were found to be a good source of planting materials. Both nurseries had annual production capacity of more than 3 lakhs and raised around 20 diverse forestry species. The nurseries were located along a metalled road and were well connected and easily accessible. Both the nurseries had good drainage systems. The internal path was brick lined and useable in all weather conditions. Provision for supply of water also existed. However, alternate arrangements for water during crisis period needs to be improved in both the places particularly in Khasiamangal nursery.

Many beds had provisions for putting up shade nets during the peak summer months. The nets were put on iron frames that are fixed in place. The nurseries were well protected and labour shed was available. Five male and ten female labourers were working in the nursery at the time of the visit. Reportedly, the labourers engaged have been trained informally. Vermicomposting was being made in the nursery.

Infrastructure such as seed testing laboratory, seed storage facilities, hardening chamber, poly-house, seed treatment pit, research facilities etc. were unavailable in both the nurseries. Hi tech equipment as required for a central nursery such as mist chamber, ply tunnel, culture room, cutting bed were not available. Seedlings and saplings were found to be of good quality, well organised in the beds, properly graded and maintained with weeding and shifting. Plants were being raised by traditional methods from seed or from cuttings. Root trainers were not found to be in use. The species raised were as per the requirement of the department. Seeds were reportedly being procured from identified trees. Nursery journal and other relevant records were being maintained.

Decentralised People's Nursery (DCPN): Most of the JFMCs that were randomly covered during the survey did not have DCPNs and only two DCPNs could be covered during the survey. One was being managed by Hamjakma Bodal SHG of Khowai and the other was managed by Kalsimura JFMC of Sepahijala. Both nurseries had a production capacity of around 20,000 to 25,000. The DCPN at Khowai did not have adequate fencing for protection from cattle. It had limited number of species and members had not been trained to

manage the nursery. Water crisis was reportedly a concern. The beds were earthen and weeding around the saplings was not enough. Rubber saplings were observed in the nursery and reportedly belonged to one of the SHG members, but the SHG claimed that rubber was not being promoted by them. Suitable regulations and norms need to be set in place to enable JFMCs to understand the purpose of DCPN.

Saplings had been raised in polybags that are arranged in 10 m long beds. Seeds for growing the saplings were collected from good quality trees in the locality. The departmental staff had provided technical guidance on nursery management to the SHG. SHG members admitted that the DCPN nurseries were not adequately remunerative. The policy on DCPN needs to be revisited and perhaps annual procurement target from DCPN may be set so that it is remunerative enough for the SHG managing the nursery. Saplings for floriculture, fruit, and vegetables could be included in DCPN nurseries so that there is adequate demand for planting material round the year. The produce from DCPNs could be integrated using cluster livelihood approach so that larger number of project households could be supported with good quality planting material.

8. Recommendations

Following recommendations are suggested for the SFM component of the project based on the observations and lessons captured during field consultations.

Area	Recommendation
Streamlining of fund flow mechanisms	• The flow of funds to the front line or field formations needs to be streamlined. Field staffs admitted that time taken for releasing funds after demand has been placed is high and effects field activities. Certain activities such as TPM plantations are time sensitive and frontline offices reported that delay in fund availability impacts such interventions.
Strengthening protection measures	• Some sites as mentioned in the findings need strong fencing. The RMUs to be consulted and strong barb-wire or chain link fencing can be installed at strategic entry points to prevent entry of cattles into the plantation sites. There are few sites such as AR (Misc.) of Bireshpara JFMC of North Tripura and ANR (Bamboo) of Butui Hills of Unakoti which have natural advantage of high hillocks and streams which prevents cattle entry into the plantation sites. Some points in such sites are still open to entry of cattle which should be fenced with barb-wire in consultation with the concerned RMU and JFMC There is a need for establishing suitable fencing so that the damage by humans and cattle is largely mitigated. This could be considered even for sites where plantations / afforestation work has been completed to provide better protection, which can be decided on a case by case basis. It was observed and JFMC members and frontline staff also stressed that more efforts are required in protection rather than plantation activities as there is plenty of forest cover (around 60% of the state's TGA) and rootstocks. With improved protection mechanisms (mostly physical fencing), the vegetation status of the area can be improved significantly.
Transportation of saplings	• Carrying cost of saplings should be added under the existing budgetary provision as most of the plantation sites are remote and manpower are required to physically carry saplings from transportation sites to plantation sites.
Review of TPM activity	• The target of TPM was 15000 Ha. It is becoming difficult for the RMUs and JFMCs to find huge Teak patches for its management. Only 20% of the target has been achieved by 2023-24 and is expected to achieve 32% by the end of 2024-25. • Thus it is advised to reduce TPM target based on the recommendation of the RMUs and DMU. DMU in consultation with the RMUs and by referring to the working plan must identify and delineate teak coup and revised the target accordingly. • FRA land titled in favour of the JFMC members can be encouraged for teak plantation after due consultation with the JFMC members. This would increase the TPM area outside the forest area. • TPM activity needs to be revisited. Teak is most prone to felling and tree felling instances are common in the project context. TPM is designed to include coppicing and gap filling with a target of 15000 Ha, which may not be sufficient to meet the plantation target. It is suggested to encourage enrichment plantation such as planting shade tolerant species like black pepper and Gandaki which would not only meet the plantation target but also create livelihood opportunities for JFMC members and strengthen conservation mechanisms. • TPM sites in all districts were found to have unwanted growth and branching which affected availability of quality of vegetation (teak). Efforts should be taken toward thinning and coppicing to improve growth and achieve desired quality of teak.
Promotion of silvi-pasture plantations	• Silvi-pastoral plantations ensure a good base for promotion of dairy enterprises and other livestock based activities. Fodder availability would support the development of such enterprises. Individual FRA title holders who have already relinquished Jhum farming may be clubbed together, negotiated with and incentivised through JFM to develop silvi-pasture

Area	Recommendation
	land for encouraging dairy enterprise. The provision for community forest rights can be looked into to create more land for fodder promotion.
Agro-forestry plantations	• Benefit sharing mechanisms need to be better implemented especially in agro-forestry plantations. This can be made possible through greater interactions with JFMCs. Project officials may mentor and mediate in this effort so that community have better understanding of benefits that they would accrue. This would encourage greater effort by community towards effective protection and upkeep of plantations. • More models based on the demands of the communities/stakeholders needs to be developed for agro-forestry plantations. The project may provide some flexibility to the field officials to approve reasonable modifications to the recommended models as per the needs of the community. This would also be helpful in achieving the targets for the project. The project may provide to JFMCs a list of trees detailing both positive and negative aspect in their cultivation that can be used for deciding on agro forestry model. A market scoping study may also be commissioned to map the demand of forest and agro-forestry products in different districts. Agro forestry models to be promoted must align with market realities ensuring improved benefits to the community.
Documentation	• The details of works done in plantations are available in several documents but not in a consolidated form. It is suggested that the available information is collated, compiled, and placed appropriately in the plantation journals that are maintained at the range offices or at any other suitable level. The format of the plantation journals could be relooked to develop a more comprehensive and all-encompassing document that is available to the concerned stakeholders.
Quality planting material	• Suitable steps should be taken to ensure the availability of Quality Planting Material to the department during and beyond the project period. Mature saplings are expected to have a better survival rate compared to the young ones. Though this would increase transportation costs yet it would significantly reduce the gap filling cost. • Procurement of seed should be from known as good sources only. The development of seed orchards, identification of Plus Trees and seed hedgerows could be one of the activities taken up during the remaining project period so that there is a generation of long term assets and skilling of the staff. Seed material procured from the market should be put through quality testing so that the objective of QPM is fulfilled.
Best practices	• Staff and stakeholders should be sent to other states / areas to learn about best practices related to sustainable forest management that could be replicated in the project area.
Improvement of Infrastructure in nurseries	• The infrastructure available in the nursery should be upgraded and enhanced so that it may develop into a model hi-tech nursery. This includes physical infrastructure alongside procurement of suitable equipment and tools and machinery. Infrastructure such as seed testing laboratory, seed storage facilities, hardening chamber, poly-house, seed treatment pit, research facilities etc should be made available.
Technological up-gradation	• Technological inputs in the nursery should be enhanced. Seed sorting, seed storage, etc. are the areas where there is ample scope for improvement and development. Hi tech equipment such as cutting bed, propagation frame, poly tunnel, culture room, mist chamber should be made available to them. • Seed labs, storage units, poly-houses, hardening chambers and research laboratory could be the areas need to be improved for ensuring sustainability of nursery facilities.
Skill up-gradation	• Skilling of labour and staff should be given priority. They could be sent to other nurseries within or outside the state so that they may imbibe the best information and be able to apply in their nursery. Efforts should be made to expose them to various advanced infrastructure.
Exposure Visits	• The staff, both frontline and senior staff, could be sent on exposure visits to other states that have well developed hi-tech nurseries. Project team should explore possibilities of such knowledge exchange platform and make necessary contacts with the suppliers for procurement of technology and skills. Some nurseries in the state can be developed into a Centre of Excellence for nursery practices. • Some of the best shaped nurseries recommended for exposure visits of nursery staff are Hi-Tech nurseries in North Bengal, West Bengal, Chennai, Tamil Nadu, Bengaluru, Karnataka and Lucknow, Uttar Pradesh.

Enhance status of DCPN	• As long as DCPNs are viewed as a skill development initiative on nursery themes, JFMCs will not be adequately motivated to develop them. Instead DCPNs should be established based on the identified plantation plans and should be made remunerative for JFMCs. The proposed plans must procure saplings from the concerned designated DCPN so that the activity would be remuneratively interesting for its members. Plantation targets are usually met from central and Hi-tech nurseries and DCPNs have limited scope to sell to the department. They should be capacitated to raise flower, fruit and vegetable saplings to increase market reach and to ensure round the year engagement in the nursery. The DCPN nursery policy needs to be revised to incorporate such changes. Further, annual targets for procurement from DCPNs must be set and order should be placed with DCPNs for

Area	Recommendation
	plantation activities. Necessary skill upgradation should also be ensured among JFMCs and other stakeholders. • Senior officials should visit the plantation sites and nurseries to support improvement in quality of field works. The issue of social fencing could be addressed proactively. Repeated visit by officials to JFMC would strengthen the bonding of JFMC and forest department which would result in better social mechanisms for protection and management of the plantation activities.

SECTION IV: SOIL AND MOISTURE CONSERVATION (COMPONENT 2)

1. Background and Context

The SCATFORM project is being implemented mainly in upper catchments where forest degradation and soil erosion are severe and there exist major challenges with respect to livelihoods of communities residing in the areas. Forest cover loss and degradation have mainly been caused by shifting cultivation in the state which has led to increased soil erosion risks on hill slopes especially in upper catchment areas. Furthermore, this has not only reduced the capacity of irrigation facilities but also decreased access to drinking water.

The second component of the SCATFORM project focusses on interventions on soil and moisture conservation (SMC), aimed at supplementing forestry plantation activities under component 1 of the project. The relevance of this component is critical, since the project is being implemented primarily in upper catchments where forest degradation and soil erosion are severe, and adequate soil and water conservation measures are necessary for better survival and growth of plantations implemented during the project. The midterm evaluation findings are mainly based on observations of sites visited, interaction and consultation with JFMCs and departmental functionaries.

2. Key Interventions under SMC

Soil and Moisture Conservation (SMC) interventions planned under the project includes the following[8]:

- Construction of Earthen Check Dam (Model 1)
- Construction of Earthen Check Dam (Model 2)
- Construction of Earthen Check Dam (Model 3)
- Gully plugging
- Brushwood Check Dams
- Contour tranches
- Mulching and plantation
- Bandalling

The SMC sites visited during midterm evaluation in different DMUs is detailed in Annexure 5.

3. Outcomes of SMC component of SCATFORM Project

The project log-frame identifies specific outcome and output indicators for the SCM component as well as the targets for achievement by the project.

Outcome 2: Improved water regime in the targeted catchments

The outcome 2 would measure the effect of soil and moisture conservation component in the project and it comprises of two indicators to be measured by external agency.

Indicator 1: Water Conservation Structure within 500 m from the centre of hamlet

By the end of project, at least one water conservation structure / interventions need to be implemented in all the project hamlets / villages. The baseline value of this indicator is zero. Across all the SMC sites visited water conservation structure has been created, but not necessarily within 500 m from the centre of hamlet. It may be noted that the location of water conservation structure and other associated interventions are guided by the site feasibility, terrain and ecological condition and may not strictly be decided based on distance alone. However, it may be noted that the SMC sites visited are limited in number and it is suggested that this indicator can be reported by the RMU so that an overall picture of the achievement may emerge.

Indicator 2: JFMC / EDC reporting improved water regime in treated area

The project target set for the indicator is 50%, meaning at least half of the project JFMCs / EDCs reporting improvement in water regime after the treatment. All the sample JFMCs / EDCs covered during the midterm study where SMC interventions had been completed reported improvement in soil moisture regime. 45.4 percent of the samples covered reported some improvement in water regime, while 27.3 percent of them reported reasonable improvement and the remaining 27.3 percent reported significant improvement in water regime.

[8] SCATFORM Operational Manual

It may be noted that actual quantitative improvement in soil moisture regime can only be estimated by a specialised technical study, and it is suggested that a small study may be commissioned by the project to delve in technical parameters that have changed in some of the project locations.

Output 2.1 Reduced soil run-off in targeted catchments

The reduction in soil run-off in targeted catchments was to be measured and reported by the RMU and a project target of reduction of 10% from the baseline had been set. The baseline study conducted for the project by an external agency does not provide baseline values of the indicators. The quantitative measurement of soil run-off is a highly technical subject and requires dedicated team and instruments for the measurement.

The midterm study indicates that there is a decrease in soil surface runoffs due to the SMC interventions, but exact estimation of the reduction was not feasible. Insights available from observations and consultations on reduction of surface run-off has been briefly explained later in this chapter. The project may commission a technical agency to measure this output, since RMU may also lack the capacity to make an accurate estimate of the reduction in surface run-off due to SMC interventions.

Output 2.2 Increased soil moisture in the targeted catchments

Indicator 1: % increase in soil moisture content in treated areas in targeted catchments

The increase in soil moisture content in targeted catchments was also to be measured and reported by the RMU and a project target of 10% improvement over the baseline has been fixed. No baseline values were found in the baseline report for the project. The measurement of this indicator is technical in nature and requires a specialised agency. RMUs can only provide a quick guess-estimate, but this may not be accurate. Some qualitative observations from the field survey are present later in the chapter.

Indicator 2: % increase in soil organic carbon in treated areas in targeted catchments

The indicator was also to be measured and reported by RMU. The measurement of this indicator requires a technical agency.

4. Progress in Implementation of SMC component

Two main interventions under the SMC component were construction of check dams of different models and erosion prevention works in treated catchment. However, no physical progress data was available for the component and some estimates of progress has been made from the financial progress report made available to the consultants.

Construction of Check Dams

900 check dams of model 1, 450 check dams of model 2, and 85 concrete check dams of model 3 are planned to be constructed under the project. Based on financial progress it appears that about 800 check dams of type 1 and 340 check dams of type 2 have been constructed so far (actual physical progress may vary from this figure). It has been confirmed that the project has not implemented any model 3 check dam so far.

Erosion Prevention Work in Catchment

Brushwood check dam for gully plugging, contour trenches, and mulching and plantation were the main activities under the erosion prevention works in the project. Based on the financial progress data it can be estimated that the brushwood check dam for gully plugging has been mostly completed, while 250 Ha of area of contour trenches have been created under the project. Details on mulching and plantation are not available.

5. Check Dams

One of the main structural interventions under the SMC was construction of check dams at appropriate sites in the project area. While the main purpose of these in stream storage structures were to improve ground water recharge and in situ moisture retention in surrounding areas, field observations indicate that these water impounding structures have assisted the community in incidental irrigation support and fisheries activities where water was available perennially or for at least few months.

Construction Protocol

The construction of check dams under the project has followed the Soil and Moisture Conservation Manual prepared by the SCATFORM / TFD. Consultations indicated that feasibility of check dams was ascertained by the RMU with support from JFMCs, but the location and design of the structures was largely undertaken by the RMU. The check dam sites are mostly gentle or moderate slope (about 20%) and the design of the structure was decided based on the size of the catchment area (5-10 Ha).

Structural Models

The SMC manual outlines three different models of check dams under the project depending on the geophysical situation and on site conditions. The SMC sites visited shows that all the check dams constructed were of model 1 or 2, which are small earthen structures with spillway and planting around depending on site conditions. Model 3 check dams which are recommended for large catchment were not found in any site, and it appears that the project has not used this model so far. Perhaps, large size reinforced concrete structure or concrete core embankment pose design challenge and construction / management difficulty for JFMCs. Designing and constructing small earthen check dams seems to be suitable for JFMCs in the project.

Model 1 check dams are smaller in size as compared to model 2 check dams, appropriate for catchment area within 5 Ha and water impounding accordingly is also lower. Reportedly, the benchmark budget for model 1 check dams is INR 1.25 Lakh, while INR 8.40 Lakh has been provisioned for model 2 construction in the project.

Location of Structures

Most check dams have been built in strategic points and are serving multiple needs of the community such as water for domestic purposes, supportive irrigation, and pisciculture. However, in few places the site of the structure could have been better or more water productive such as in Pratirai JFMC of South Tripura (model 2 check dam) and Sarbojoypara JFMC of Gomati (model 1 check dam). The water collection of the catchment could have been little more had these interventions were made in appropriate sites i.e. a little away from the present sites. It was observed that the appropriate sites were in possession of the community members and the traditional landowners of the site that would have been most suitable for the check dams refused to relinquish their land in both the places.

Design and Construction

Check dams visited were found to be well built, strengthened, and had limited fissures. The earthen bunds were tight enough in most of the check dams. Most of the check dam's catchments had a slope of more than 50%, which is on the higher side as per the recommendation. However, the catchment size was relatively small and hence did not pose serious challenge to structure stability. The catchments were mostly located in moderate to heavy dense forested areas, however some sites had cultivated patches which had been distributed to beneficiaries under the FRA.

Rubber in the private FRA land of the catchment does not allow diversity and causes shade which prevents good growth of grass. Grass is a good soil binder which prevents soil loss from the catchment and minimises siltation of check dams thereby enhancing longevity of the check dams.

Siltation

Silt deposits were observed on the check dams as expected, but these were not severe enough to have reduced water impounding significantly. Signs of splash erosion were observed in some sites and in a few catchments where the slope was high and forest density was low, sheet erosion was also observed. Signs of rill and gully erosions in catchment were observed in Butui hills, Harbatali, Manthar and Sarbajoy para JFMCs.

Impact of check dams constructed

Livelihood enhancement

Most of the JFMCs have leased out check dams to SHGs where fisheries were feasible. Ex. Guliraibari and Kamal Nagar JFMCs of Sepahijala, Malambari and Harbatali JFMCs of South Tripura, Upendra and Tuiddulnaibudal JFMCs of Khowai, and Twikalaikami and Khumpui JFMCs of Gomati. Apparently, some of the SHGs had already started reaping benefits as reported in Guliraibari, Harbatali, Gojroimalsom para, Upendra, Tuiddulnaibudal, and Kamal Nagar JFMCs. Reportedly, the estimated profit from fisheries was between INR 20,000 to 30,000 annually for the SHGs.

Reduced soil erosion and improved soil moisture regime

It was observed that slope, canopy density and other soil and moisture intervention in the catchments influence site specific surface run off, soil moisture regime and soil erosion. Existence of other plantation and SMC interventions in the catchment also influence these parameters. JFMC members were found to be familiar with how slope and crown density of catchment impacts these ecological parameters. Ocular estimation of factors such as slope and canopy density of catchments was used to assess the impact of check dam on run off, soil erosion and soil moisture regime, which is presented in the following table.

District	JFMC	Year of Creation	Type	Slope of Catchment	Catchment Status	Other Interventions under SCATFORM	Change in Silt Deposit	Change in Soil-Moisture Regime
Gomati	Sarbajoy para	2021-22	1	70%	Moderately Dense	No interventions	Moderate	Improved
	Manthar	2022-23	2	30%	Open Vegetation	Plantation	Moderate	Moderately Improved
	Khumpui	2022-23	2	60%	Very Dense	No interventions	Negligible	Moderately Improved
Khowai	Tuiddulnaibudal	2020-21	2	50%	Very Dense	Plantation	Negligible	Significantly Improved
	Upendra	2021-22	2	30%	Very Dense	Plantation	Negligible	Improved
	Madhya Krushnapur	2022-23	1	35%	Very Dense	No interventions	Negligible	Moderately Improved
	Madhya Krushnapur	2022-23	2	50%	Very Dense	No interventions	Negligible	Moderately Improved
North Tripura	Alochhaya	2021-22	1	30%	Moderately Dense	Plantation	Negligible	Significantly improved
	Alochhaya	2021-22	2	30%	Moderately Dense	Plantation	Moderate	Improved
	Jairam Para	2021-22	1	40%	Open Vegetation	Plantation	Moderate	Improved
Sepahijala	Guliraibari	2022-23	1	20%	Moderately Dense	No interventions	Negligible	Significantly Improved
	Guliraibari	2022-23	2	25%	Moderately Dense	No interventions	Moderate	Significantly Improved
	Gonjroi Malsompara	2021-22	2	25%	Moderately Dense	No interventions	Moderate	Improved
	Kamal Nagar	2021-22	2	50%	Moderately Dense	Plantation	Moderate	Improved
South Tripura	Harbatali	2020-21	1	50%	Moderately Dense	No interventions	Moderate	Significantly Improved
	Harbatali	2020-21	2	50%	Open Vegetation	No interventions	Moderate	Significantly Improved
	Malambari	2023-24	1	60%	Moderately Dense	No interventions	Moderate	Moderately Improved
	Pratirai	2022-23	2	60%	Moderately Dense	No interventions	Moderate	Moderately Improved
Unakoti	Green gold	2022-23	1	50%	Very Dense	No interventions	Negligible	Moderately Improved
	Green gold JFMC	2022-23	2	60%	Moderately Dense	No interventions	Moderate	Moderately Improved
	Butui Hill	2023-24	1	60%	Moderately Dense	No interventions	Moderate	Moderately Improved
West Tripura	Athukiri	2022-23	2	40%	Very Dense	No interventions	Negligible	Moderately Improved

** Very dense (above 70% canopy cover), moderate dense (40-70% canopy cover), open forest (10-40% canopy density) and scrub vegetation (less than 10% canopy cover) as per the definition of Forest Survey of India.*

Significant improvement in soil and water regime was observed in Alochhaya JFMC of North Tripura, Guliraibari JFMC of Sepahijala, Tuiddulnaibudal JFMC of Khowai and Harbatali JFMC of South Tripura. Agricultural land located near the structure showed improved irrigation allowing farmers to take up additional crops. Improved moisture regime in surrounding areas was visible. Surrounding soil water regime was found to be better in older the check dams, due to extended water percolation and improved ground water recharge. More than one check dams in catchment shows greater improvement in soil water regime in the area.

Low lying agriculture lands showed good soil moisture, which was confirmed by JFMC members. Construction of check dams had resulted in arresting run off and silt on the bund, protecting low lying

command areas from siltation. The check dams had been built on lower catchments, and by the time the run off reaches these areas it loses its velocity and gets stored alongside of the bunds.

In some catchments rubber plantations (on private FRA land) were found which while increasing canopy density, reduces permeability of the soil thus affecting soil moisture regime. In Sepahijala and South Tripura good soil moisture regime was visible despite having rubber plantation in their catchments which could be due to existence of check dams for a longer period. However, it was noted that the catchment soil water regime in areas with rubber plantations was lesser as compared to rubber free catchments.

Validation of field observation

The data collected through physical observations and in-depth probing with the JFMC members was analysed with the help of SPSS for correlation of bi-variate data (Pearson Correlation). This revealed that the independent variables have significance level of correlation with the dependent variables. (0.01 level for status of silt deposit and 0.05 for change in soil moisture regime). The –ve sign represents inverse correlation between dependent and independent variables. To simplify it further if the slope of the catchment increases then the silt deposit on the check dams increases whereas if the status of the catchment improves w.r.t. increased canopy density then the silt deposit on the check dams decreases. Similarly, if the slope of the catchment increases status of soil moisture regime declines. The analysis corroborates with the observations made on each site. The table represent the correlation coefficient.

	Status of Silt Deposit	Change in Soil Moisture Regime
Status of silt deposit	1	-
Slope of catchment	0.222	-.426*
Canopy density	-.764**	-0.287
Availability of other interventions	0.027	-.485*
Change in soil moisture regime		1
**. Correlation is significant at the 0.01 level (2-tailed) for change in the status of silt deposit		
*. Correlation is significant at the 0.05 level (2-tailed) for change in soil moisture regime		

It is evident that the overall soil moisture regime has improved significantly across sites. In some of the sites JFMC members reported permanent moisture availability which was encouraging land owners to take up a second crop. With additional interventions in the catchment areas such as contour trenches, plantations etc. soil moisture regime would increase further in the future as was observed in few sites visited.

6. Contour Trenches

Contour trenches are low-cost interventions and help in improving the soil-moisture regime, reducing run off and minimising soil erosion. A number of good quality contour trenches were found in Kamal Nagar JFMC of Sepahijala, Sarbojoypara JFMC of Gomati, Bagaicherra JFMC of Unakoti, and East Belbari JFMC of West Tripura. All contour trenches had a good amount of silt and water deposit. The adjacent patches of contour trenches appeared to have good soil and water regime as corroborated by the JFMC members. The trenches were constructed in strategic points i.e. along slopes to arrest run off as suggested in the technical manual. The moisture regime of the areas had improved. JFMC members reported that the moisture regime of the intervention sites had improved to a great extent. Detailed technical research can be undertaken to quantify the changes witnessed during the study.

Most of the sites visited were either very dense or moderately dense and only few were open vegetations. Run off had slowed down due to improved canopy density in the catchment. All the contour trenches were of staggered design and had good amount of soil and water deposit in them. The following table presents outcomes of contour trenches.

District	JFMC	Year of Creation	Slope of Catchment	Catchment Status	Other Interventions	Change in Silt Deposit	Change in Run off	Change in Soil Erosion
Sepahijala	Kamal Nagar	2022-23	25%	Moderately Dense	No interventions	Moderate	Moderately reduced	Moderately reduced

District	JFMC	Year of Creation	Slope of Catchment	Catchment Status	Other Interventions	Change in Silt Deposit	Change in Run off	Change in Soil Erosion
Gomti	Sarbojoypara	2021-22	30%	Moderately Dense	No interventions	Moderate	Moderately reduced	Moderately reduced
Unakoti	Bagaicherra	2023-24	50%	Moderately Dense	Plantation	Negligible	No change	Moderately reduced
North Tripura	Bireshpara	2022-23	60%	Moderately Dense	No interventions	Moderate	Moderately reduced	Moderately reduced
West Tripura	East Belbari	2022-23	20%	Open Vegetation	Plantation	Moderate	Moderately reduced	Moderately reduced

Ordinal data was collected by probing with the JFMC members. For assessing silt deposits findings were categorised as very high, moderate, and negligible. Similarly change in run off and change in soil erosion were categorised as reduced significantly, moderately reduced, no change, and increased. Community observations were collected on these parameters and coded. This data was coded and analysed through SPSS. The correlation between change in run off, soil erosion and slope of the catchment, status of the catchment, year of construction are presented in the following table.

	Change in Sun Off	Change in Soil Erosion
Change in run off	1	-
Slope	.957*	.957*
Canopy density	-.408	-.408
Change In soil erosion	1.000**	1
**. Correlation is significant at the 0.01 level (2-tailed) t		
*. Correlation is significant at the 0.05 level (2-tailed)		

The table reveals that the higher the slope of the catchment, the higher was the run off and higher was the soil erosion. Similarly, improved status of the site inversely affected run off and soil erosion. Both independent variables significantly determined the status of run off and status of soil erosion.

3 independent variables slope of the catchment, canopy density of the catchment, and other interventions in the catchment are tested against 2 dependent variables i.e. status of the silt deposit and change in the soil moisture regime. It calculated by using Pearson correlation coefficient which ranges from -1 to +1. -1 means significantly correlated but inversely in relation. +1 means significantly correlated but directly in relation.

In most of the surveyed sites, the status of soil erosion and run off had reduced moderately due these interventions. The physical observations of the contour trenches, clearly showed huge deposits of silt and water in them. Had there been no such intervention the same silt and water would have been washed away with the run off. It is also evident from those interventions that the run off were arrested frequently by the contour trenches and loses its pace because of which soil erosion is minimized.

7. Brushwood Gully Plugs

Brushwood gully plugs (BGP) are significant interventions for reducing run off and preventing soil loss. The following table presents the effects of brush wood gully plugs in changing the soil-moisture regime, run off and soil erosion observed during field visit.

District	JFMC	Year of Creation	Status of Site	Other Interventions	Silt Deposit	Change in Soil-Moisture regime	Change in Run off	Change in Soil erosion
South Tripura	Harbatali	2021-22	Moderately Dense	No interventions	High	No Change	No Change	No Change
Khowai	Madhya Krushnapur	2023-24	Very Dense	Check dam	High	No Change	No Change	No Change
Khowai	Tuiddulnaibudal	2023-24	Very Dense	No interventions	Moderate	No Change	No Change	No Change
North Tripura	Jarihampara	2021-22	Very Dense	No interventions	High	No Change	No Change	No Change
Dhalai	Daliraipara EDC	2022-23	Very Dense	No interventions	Moderate	No Change	No Change	No Change
West Tripura	Bhrigudasbari	2021-22	Moderately Dense	No interventions	Moderate	No Change	No Change	No Change

The construction material used for BGPs is bamboo which is plentifully available. However, there were a limited number of BGPs in the sites that were visited as the heavy rains had damaged most of them. BGPs were not strong enough to check the run off as the slopes of terrain were found to be more than 50% in most cases which causes high runoff and leads to possibility of damage to the gully plugs. The interventions at South

Tripura and Khowai were found to be damaged due to heavy rush of water due to ongoing rain. The brushwood gully plugs in Khowai and South Tripura were not aligned with the width of the stream, causing them more prone to being washed away. However, the silt deposit across the brushwood gully plugs in all the intervention sites were more than 1 feet. In all the sites visited, it was observed that the streams did not have top to bottom treatment of brushwood gully plugs and just one or two brushwood gully plugs on the stream constructed were not strong enough to check the heavy run off caused due to heavy rain.
Though the brush wood gully plugs (BGPs) have been saturated as targeted yet the construction of the BGPs could have been improved.

8. Recommendations

The following are the key issues and corresponding recommendations related to the SMC component of the project that have emerged from the site visits and document review.

Area	Recommendation
Adoption of top to bottom-up landscape approach	• Most of the interventions were found to be standalone works which could have been more impactful if a top to bottom landscape approach had been adopted. The project should potentially develop a good catchment treatment model (plantation, check dams, brushwood check dams, contour trench, etc.) as a tool for reduction of soil erosion and flood prevention, particularly for flood damage area instead of standalone, discrete works. Such a model should be monitored and evaluated scientifically using required measuring equipment. Measurement and mark pillars can be installed at strategic points of the catchment and check dam to measure the soil erosion and silt deposit. Other interventions such as riverbank plantations and filter strip models can be revisited and expanded for prevention of riverbank erosion. This approach was also prescribed in the MoD but the field implementation could not be done due terrain challenges and social challenges.
Treatment of catchment areas of check dams	• The check dams visited by the team had a high level of silt deposition which could affect their water holding capacity. The catchment areas of such check dams need to be treated through a top-to bottom approach with interventions like contour trenches, series of gully plugs and plantations so that the run off from the catchments could be reduced and soil loss could be minimized.
Grass patching	• Grass patching could have been improved in all the check dams that were assessed. Grass patching in post monsoon period is recommended which would allow enough time to stabilise.
Bund strengthening activity	• Bund strengthening needs at least a year and therefore second year fund allocation for check dams should be provisioned. Outlets to have some sieve or filter kind of mouths so that fish could be saved while releasing excess water.
Capacity building of JFMCs	• It is apparent that the JFMC members are largely unaware of the design aspects of SMCs being implemented, particularly the check dams. Better awareness and integration of community knowledge of the site in designing check dams and other measures would be useful. Awareness on technical aspect must also be improved to a reasonable level for better maintenance of structures in future. • Efforts need to be made for capacity building of JFMCs on improved decision making, profit sharing mechanisms etc. to ensure appropriate interventions at strategic points without compromising the return of the landholders. The *de-facto* land owners should be convinced to relinquish his possession of land and in return should be incentivised. Examples. Fisheries is promoted through the check dams and the land donor should be given a bigger share of the income from the fisheries or should be given priority in livelihood components if he donates that piece of land for construction of check dams. Such arrangements can be made internally. Example: bigger share of profit from fishery could be provisioned for the beneficiaries who relinquished their possessions for intervention.
Vegetable plantations	• Plantation of various vegetables such as papaya, lentils, leafy vegetables, drumsticks could be encouraged to meet the nutrition requirement of the pregnant women and lactating mothers.
Promotion of agro-forestry	• The Agro-forestry model such as fruit orchards with desirable flexibility may work in these lands if a proper orientation can be given to the community and linking them with envisaged producer clusters.

Reviving water sources	• Interaction with JFMC members and local forest officials revealed that 30-40 years back there were multiple points of water supply throughout the landscape which served as drinking water sources and were used for many other purposes. Increasing population pressure, resultant land degradation, preference for commercial crops, loss of forest, loss of forest diversity, jhum cultivation, drying off water streams etc. have led to drying up of most of the water points. These could possibly be revived by tracking the historical discharge lines and ensuring JFMC negotiates with community members who may have

Area	Recommendation
	physical control of these lines in the catchment. The negotiations should be built around incentivising livelihood options and at the same time improvement of the catchment.
Model 3 Check Dams	• Model-3 Check Dams are high value and require expertise of civil works. A fixed budget of INR 23.17 lakhs is allotted per unit of model-3 check dams which is not suitable in all contexts. The support of National Project Construction Corporation Limited (NPCCL) has been asked in this context to execute the work. One of the immediate benefits that the community derives from the project is the wage labour that they earn from SMC and SFM works. If the model-3 check dams are executed through NPCCL, the involvement of JFMC members in labour work may get compromised. Further, the Model- 3 check dams would require more catchment and subsequently more numbers of community members may have to be negotiated to relinquish their rights over the catchment. It is worth to reduce the target for model-3 check dams and instead the fund can be reallocated to model-2 and model-1 check dams which are easy to execute, have better impacts, cater to the multiple needs of many villages, and can be implemented through the JFMC.
Bandalling	• Bandalling is a highly technical intervention and needs to be assessed for its feasibility in the project context. A small study can be commissioned in this regard to assess the feasibility of the bandalling structure as most of the project officials were found to be unaware of it.
Multiple brushwood gully plugs	• Though the target and budget provisioned for brush wood gully plugs have been exhausted (1269 BGPs and INR 2,00,71,773) yet this activity needs to be increased. The technicality of this intervention needs to be revised before allocating any budget. Multiple brushwood gully plugs need to be created all along the streams so that run off can be slow down and damage to the BGPs could be avoided. The availability of bamboo in the project context is plenty and this particular intervention could be cost-effective. This should be considered as one of the key interventions of the landscape approach. Some Dioscorea species (tubers) could be promoted along the length of the stream as tubers grow well in silt deposited area and have the ability to bind the soil. These are very significant interventions and capable of preventing soil loss and arrest the pace of run off. It is advised to mobilize some fund for such interventions from other SMC interventions.
Use of top soil and dug out earth	• The dugout earth of the trenches is not utilized properly. These top soil and good quality of earth which should be utilized for improved agriculture or plantation activity. The top soil excavated during the process of contour trenches could be used in promoting soil binding monocotyledons species.

SECTION V: LIVELIHOOD DEVELOPMENT (COMPONENT 3)

1. Background and Context

A key component of the SCATFORM project relates to livelihood development of forest dependent communities residing in project areas. Rural communities in the state live in difficult conditions and many of them depend on unsustainable livelihood sources such as shifting cultivation (*jhum*). The project focuses upon introducing and supporting communities in taking up alternative livelihood sources. The key institutions through which such livelihood development activities are undertaken or facilitated include Joint Forest Management Committees (JMFCs) and Self Help Groups (SHGs). This chapter discusses the various activities undertaken as part of the livelihood development component, outcomes and impacts witnessed along with challenges and recommendations for improvement.

2. Project Outputs and Outcomes at Mid-term Stage

The status of project outputs and outcomes at the mid-term stage as per the log-frame is indicated in the following table.

Indicator	Baseline	Mid-term	Target	Frequency of Measurement	Data Collection Responsibility
Outcome 3: Improved Livelihoods of the Communities in the targeted catchments					
% increase in the income of JFMC members from sale of NTFPs	5% [9]	Primary source of income-3.4% Secondary source of income - 28.7%[10]	20% over baseline	2020, 2021, 2022, 2025, 2028	Third party
Livelihoods (income, expenditure, savings, loans and assets[11]) of % SHG members in targeted SHGs improved	INR 57,437[12] INR 73358[13]	INR 93,256 (Increase of 27.12% from baseline recall income value of MTR sample. Increase of 62.36% from baseline income) Savings and loans are primarily an SHG level indicator and not a household indicator in context of the project. Over 78% of households had taken a loan in the last year and of them 82% had sourced the loan from SHGs. The purpose for which loans were taken primarily related to livelihood and business development activities The change in asset ownership status is provided in the SHG section of this chapter	50% over baseline	2020, 2021, 2022, 2025, 2028	Third party
Output 3.1 Institutions of NTFP based livelihoods created and/or strengthened					
No. of NTFP collection/ primary processing centres established	Not applicable	11 centres as per SHG household survey conducted in the mid-term review	45	Monthly	DMU
No. of advanced processing and value addition units established	Not applicable	[14]	1	Monthly	DMU
No. of households selling NTFPs through collection centres	NA	[15]	-	Monthly	DMU

[9] As per the baseline study report. This denotes percentage of households depending on NTFP collection/processing for income

[10] As per the MTR SHG household survey. The question was asked separately for primary and secondary sources of income

[11] Income and expenditure, either can be used for computing livelihood. The income-based approach was used in the baseline and MTR surveys

[12] As per the baseline study report

[13] Based on income indicated through recall method in MTR SHG household survey

[14] Information awaited from PMU

[15] Information awaited from PMU

Indicator	Baseline	Mid-term	Target	Frequency of Measurement	Data Collection Responsibility
Value of trade/ profit generated by the livelihood organizations formed under the project	NA	[16]	-	Monthly	DMU
Output 3.2 Agro-forestry based livelihoods on RoFR lands strengthened					
Number of agroforestry plots supported under the project	NA	4469[17]	-	Monthly	DMU
Area under agro-forestry plantation	NA	3040.68 ha[18]	-	Monthly	DMU
No. of farmer groups established for promoting agro-forestry	NA	[19]	-	Monthly	DMU
Output 3.3 Livestock/ fisheries/ organic farming-based livelihoods strengthened					
Number of SHG members having income from livestock/ fisheries/ organic farming-based livelihoods	SHG members having income from livestock: 17.0%[20] SHG members having income from fisheries: 3%[21]	SHG members having income from livestock: 26% as primary source, 22% as secondary source [22] SHG members having income from fisheries: 3.7% as primary source, 3.9% as secondary source[23]	-	2020, 2021, 2022, 2025, 2028	Third party
Output 3.4 Convergence on livelihood activities with other departments/ agencies					
No. and value (in ₹) of activities/ programs facilitated through convergence with other departments/ projects	Not applicable	[24]	-	Monthly	DMU
Output 3.5 Eco-tourism in the state strengthened					
No. of eco-tourism sites renovated	Not applicable	[25]	-	Annually	PMU
Eco-tourism policy of the state comes into force	Not applicable	State adopted the Tourism Policy 2020-25 with a focus on development of eco-tourism[26].	-	Annually	PMU

3. Sub-Component Analysis

3.1. Joint Forest Management Committees

Background of JFMCs

The National Forest Policy 1988 recognised that forest fringe communities have a substantive role to play in conservation, development, and management of forests. The Joint Forest Management (JFM) resolution of 1990 followed by subsequent 2000 and 2002 guidelines provide d the broad framework for state level

[16] Information awaited from PMU
[17] Information provided by PMU
[18] Information provided by PMU
[19] Information provided by PMU
[20] From baseline survey report, based on sample
[21] From baseline survey report, based on sample
[22] As per the MTR SHG household survey. The question was asked separately for primary and secondary sources of income
[23] As per the MTR SHG household survey. The question was asked separately for primary and secondary sources of income
[24] Information awaited from PMU
[25] Information awaited from PMU
[26] As per Feasibility Study conducted by TA firm

rules, resolutions and guidelines. Subsequently, various states formulated state specific JFM resolutions and guidelines while maintaining the broad framework provided by the GoI.

The Government of Tripura (GoT) issued the first JFM resolution in 1991, which was updated in a resolution of 2001. Tripura was in fact the first state in the North East region to adopt the JFM policy for improved forest management through participation of people and community institutions. The social forestry scheme which was started in the 1980s to encourage people to raise tree on their own loan and village commons to reduce the pressure on forest for fuel, fodder and timber was replaced by the JFM resolution. At present, elements of social forestry continue to be a part of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). Implementation of JFM started in a phased manner in 9 Forest Divisions in 1991 and by 1996-97 all districts in Tripura were brought under JFM.

JFMCs are constituted in villages / hamlets adjoining forests, where at least 50% of families are interested to form such a committee according to the Tripura JFM resolution. Each household within the JFMC demarcated area is eligible to become member of the JFMC and if one of the spouses becomes a member, then the other also automatically becomes one. The General Body (GB) comprises of all the members of JFMC, while the Executive Committee (EC) comprising of at least eleven elected members with at least one-third women members is appointed for a period of one year. Office members such as Chairperson / President, Vice Chairperson and Treasurer are appointed while the Beat Officer (mostly) or Range Officer is usually an ex-officio Member Secretary. The Gram Pradhan or any other nominated Panchayat member can also be a member of the JFMC. The GB meets at least once a year, while the EC once in two months. The quorum for EC meetings is 50 percent of the total members and one third of the women EC members. JFMCs are expected to maintain membership registers, minutes books for recording proceedings of meetings, cash books to record financial transaction and other records as prescribed by the GoT.

The forest area under JFMCs normally covers degraded forest and beneficiaries are allocated 5 ha for natural regeneration and 2 ha for intensive planting per beneficiary, initially covering areas up to 3 km from village boundaries. JFMCs may also be allocated other good forest area (crown density above 40%) other than protected areas up to a maximum extent of 100 ha within 2 km of the village boundary. In case of good forest areas JFMCs are primarily responsible for NTFP management without altering basic silvicultural activities prescribed in the working plans.

JFMCs are responsible for forest protection, conservation and execution of Forestry works in demarcated areas. Preventing forest offences, reporting illegal activities in forest and protected areas, protection of wildlife, controlling shifting cultivation, ensuring usufruct rights of members, and assisting local agroforestry based livelihoods are other important responsibilities.

JFMCs are entitled to several usufruct benefits from forests under their management. Benefits from forest under Natural Regeneration / ANR under JFMC areas includes benefits of thinning and final harvest of trees if they are protected for at least five years. JFMC members can collect NTFPs, dead and fallen twigs, leaves, small branches, and fodder free of cost from forest on a sustainable basis. Households under JFMC can receive a maximum of 1 cum of timber from thinning and maximum of 2 cum of timber from main felling free of cost for domestic use with approval from TFD in silviculture operations. Additionally, JFMCs are eligible to get 50 percent of net sale proceeds after deducting harvesting cost from surplus harvest during silvicultural operations, which can be distributed among member households.

By March 2017, 1005 JFMCs / EDCs were formed in the state, mostly under TFIPAP and the National Afforestation Programme (NAP) of GoI. 417 JFMCs, 16 Regrouped Villages (RGV) and 30 Eco Development Committees (EDCs) were established under the JICA assisted TFIAP. GoT had started regrouping projects with the objective of conserving forests and providing socio-economic rehabilitation to dispersed remotely located tribal families in forests. Such families were regrouped and relocated to more accessible locations with basic infrastructure, namely Regrouped Villages.
Membership fees, penalties and levies, sale of forest produce, forest management / plantation and maintenance fund received from TFD, development fund from TFD, funds from Panchayat and other department / agencies are the main source of funds for JFMCs. These funds are deposited in the bank accounts of JFMC, operated jointly by the Member Secretary and Treasurer. A resolution of the EC is necessary for withdrawal of funds from this account.

Key Observations and Issues

Community Mobilisation and Formation of JFMCs

Community mobilisation was undertaken in villages for building awareness about the SCATFORM project and formation of JFMCs. Field facilitators were responsible for community mobilisation and project staff at the range level, namely, Livelihood Coordinators and two Community Coordinators provided support. Beat Officers were also actively involved in promoting the project. 450 JFMCs were targeted to be formed under the SCATFORM project and a total of 457 JFMCs were successfully engaged. Of these 457 JFMCs, 306 were formed in the last five years. All JFMCs have prepared micro plans which have been approved by the TFD or District Level Committees. JFMC members were sent for exposure visits for familiarising them with the roles and responsibilities of JFMCs and forest conservation works that needs to be undertaken.

District Highlights: JFMCs

- Largest number of JFMCs (69) formed in Gomati district
- All JFMCs are newly formed in Dhalai district
- Largest number of old JFMCs (43) engaged in Khowai district

Institutional Structure and Membership of JFMCs

The institutional structure of JFMCs that was noted during field visits was as per the revised JFM resolution following the recommended structure of GB and EC. Households in demarcated JFMC areas are members of GB. Shifting Cultivators or *Jhumias* have also been included as members. The sample JFMCs covered during the mid-term review had 8 to 11 members in the with at least 3 women members. It appears that the mandated one-third women members in EC has been adhered to in all the JFMCs visited.

Micro Plans

Preparation and Approval: Micro plans prepared by JFMCs articulate forest management, biodiversity conservation, silvicultural practices, soil and moisture conservation works, infrastructure development, NTFP harvest, value addition and marketing, promotion of SHGs and various livelihood activities that are to be undertaken in the respective villages/hamlets. These micro plans had been approved by the respective GBs. Concerned forest officers were responsible for approving plans by the GB of JFMCs while ensuring that they were broadly consistent with the divisional working plan.

Process of Preparation: Consultation with JFMCs revealed that participatory approaches were adopted in developing these plans. Socio-economic profile, village need assessment and identification of potential works were collectively prepared using Participatory Rural Appraisal (PRA) techniques.

Governance and Functioning of JFMCs

Meetings: Meetings were being conducted by the sample JFMCs as per guidelines. Annual GB meetings were being conducted and EC meetings were being held either monthly or bimonthly. Some of the JFMCs had conducted emergency meetings which are allowed as per the norms. Participation in GB meetings was noted to be satisfactory with more than 60 percent attendance being reported. EC meetings generally had good attendance however, it appears that the consideration of quorum in EC meetings was not applied strictly in some cases. Rotation of leadership through annual dissolution of the EC and selection of new members was seen to be ensured.

Maintenance of Records: Records such as membership registers, minutes books, cheque registers and cash books were available and were being maintained by field facilitators with assistance from Beat Officers. It was evident that the committee members were yet to become competent to maintain books and records on their own, mainly on account of their lack of basic education.

Trainings: JFMC members had been trained at the block level on topics such as the SCATFORM project, book keeping, JFMC management and forest protection. Retention related issues were however noted as several respondents could not recollect learnings from trainings received.

Entry Point Activities

In case of JFMCs which have been newly formed the most common entry point activity was the construction of Multi Utility Centers (MUC). Older JFMCs which were part of the earlier phase of the project had Vocational Training Centers (VTC) or Multi Utility Centers (MUC). However, in some cases minor repairs were undertaken in the existing structures. The fund was allocated by the SCATFORM project for new MUCs.

Awareness about Forest Protection and Conservation

Awareness about forest protection and conservation among JFMC members was seen to be relatively high. Most EC members were familiar with the principles of forest conservation and management. One of the possible contributors for this is the SCATFORM project as part of which there has been regular engagement of officials and project personnel with communities.

The SHG household survey also revealed encouraging findings with respect to awareness among communities regarding forest protection and conservation. 80.3% of the respondents were aware of the importance of forests and environment. Nearly 80% women stated that they were able to perceive impacts of climate changes. However, less than 37% of respondents agreed that they the need to use forest resources in a sustainable manner. This indicates that while community members may claim to understand climate and environment related matters, they may not necessarily understand how sustainable use of forest resources is a vital requirement to mitigate climate change and other natural hazards. This is also in line with the finding that only 8.3% of respondents stated that they had adopted climate resilient practices. Worryingly nearly 30% of respondents stated that they had not adopted any such practices. Nearly half of the respondents did not understand the importance of using water in a sustainable manner. Similarly, a negligible proportion of respondents affirmed that they were aware of practices such as decreasing chemical usage and/or increasing organic usage in crops, using micro irrigation systems and recharging ground water.

Dependence on Forests

JFMC members were found to be highly dependent on forests for securing their livelihoods. Male and female members of households were seen to collect various forest produce including vegetables such as forest potato, spinach, Gandaki, bamboo shoot, tubers and lemons, and fodder for their animals. Bamboo was one of the principal products that communities depended on for fencing and roof construction work. Forest produce was primarily meant for self-consumption and only if a surplus exists was there a sale in the local markets. JFMC members claimed that felling of large trees was not practiced in their respective villages.

Plantation in JFMC Areas

JFMC members were involved in plantation activities in areas demarcated to them. Some of the main species that have been planted include bamboo, acacia, jalpai, segun, teak, and medicinal plants such as haritaki, amlaki, bohora, etc. The members were aware of the trees that had been planted in the demarcated areas and the benefits they expected to accrue.

Soil and Moisture Conservation Works by JFMCs

JFMC members were seen to be involved in soil and moisture conservation works undertaken in forests adjacent to their villages as per approved micro plans. The locations of various structures were identified by JFMC members in consultation with other stakeholders such as SHG members. The possible sites for various structures such as check dams and other water harvesting structures, contour trenches, brushwood dams, gully plugs etc. were shared by the JFMCs with the concerned Range Officers and a suitable site was finalised. JFMC members were engaged in construction of these structures and other soil and moisture conservation measures for which they were paid from the project.

Agro forestry in JFMC Villages / Hamlets

Agroforestry initiatives received a good response from the communities. JFMC members cultivated horticultural and cash crops such as pineapple, areca nut, agar, etc. on their own land (patta). The JFMC members who were to receive agro-forestry support were selected in a participatory manner involving EC, SHGs and project / forest officials. However, the final selection was done by the block officials along with the Panchayat.

Impact

According to JFMC members' considerable improvement of forest cover has been achieved due to plantation and conservation work, soil and moisture conservation measures and community awareness undertaken as part of the project. An increase in the use of LPG cylinders for cooking fuel is reported to have reduced the use of fuelwood, though this has not stopped entirely. Felling of big trees was not reported within the community, however, JFMC members mentioned that there have been instances of illegal tree cutting by outsiders. Poaching of wild animals has also reduced during the last few years.

Social fencing measures have been undertaken by JFMCs to prevent cattle from open grazing in the forest which in turn has protected the plantations and led to improved survival rats. Social fencing has been successful since there is an increased understanding regarding the importance of forest cover among JFMC members.

Compensatory planting of trees was reported in some JFMCs, where for every tree felling, 4 to 5 trees are planted in lieu, which was not the practice earlier. It was also reported that villagers seek permission from JFMCs before cutting trees especially bamboos, which are usually used for house construction and religious functions.

Improved Forest Protection and Reduced Encroachment

JFMC members stated that they were aware of the contribution of forest cover in protecting the environment due to which they have taken forest protection activities seriously. Forest protection issues are taken up in the Gram Sabha meetings of the Panchayat, which has been possible due to the linkages between JFMCs and local Panchayats. Community members are discouraged from encroaching forests and are served with fines if required. According to JFMC members, community members understand that only land which is legally owned by households (having patta) can be used for plantation or farming and forest / government land cannot be encroached upon.

Incidents of forest fires were not reported by any of the JFMC members interviewed during the midterm evaluation. It was shared that the main source of forest fire is Jhum cultivation and since this practice has reduced, there have been no such incidences.

Reduction in Jhum Cultivation

Shifting cultivation or Jhum, which is quite common among forest dwellers with no land entitlement to grow paddy and vegetables, has reportedly reduced due to livelihood measures under the project and allocation of land under FRA. However, the practice has not stopped entirely. Certain household families belonging to the Reang tribe are still engaged in Jhum and separate measures may be necessary to create awareness and provide alternate livelihood options to them.

Improved linkage between Forest Department and Community

JFMC members stated that there has been an improvement in the relationship shared between the TFD and the communities. This has been due to regular engagement between JFMCs and SHGs with the TFD on various aspects of project planning and implementation. Trainings, meetings and other interactions have helped develop a common understanding and have encouraged JFMCs to adopt collective decision making for the welfare of their villages and communities.

Improved Livelihoods

JFMC members stated that they have benefitted from the project through identification and access to alternate livelihood sources. Some of the alternate sources include income from non-timber forest products (NTFPs), fisheries in check dams, soil and moisture conservation activities, rubber plantations and agroforestry.

Sale of NTFP from the nearby forest lands and rearing of short duration fish in the check dams have also enhanced their income. The JFMCs members have been quite satisfied by the dual advantage of check dams, in improving moisture conservation and promoting short duration fish cultivation in the impounded water. One of the major sources of earning for JFMC members has been from extensive rubber plantations that have been undertaken across all forest divisions. Earnings from rubber plantation are reportedly higher than other sources of livelihood. Agroforestry support has also enhanced income of several households in the village who have undertaken cultivation of fruits and other cash crops in their land.

Funds received by SHGs have been used for various productive activities by members, which has enhanced the financial and social power of women in their villages. Reportedly, most families including male and female

members of the committees have improved income from different sources and they have greater financial security due to the project. Due to project implementation in the Tripura Tribal Areas Autonomous District Council (TTAADC) areas, the remote villages and the backward communities could be well connected and have benefited from various project activities.

Recommendations

The following are the key recommendations related to the JFMCs that have emerged from the site visits and document review.

Area	Recommendation
Institutional and Capacity Development of JFMCs	• JFMC members were observed to face constraints in independently managing and maintaining their basic records and books. The primary reason for this was the fact that most had not received even a basic level of education. A possible way of addressing this issue and making the JFMC operations more sustainable is by engaging educated local youth in the villages for supporting JFMC members in undertaking these activities. The project could explore ways of providing support to the JFMCs in engaging educated youth from their respective villages for maintaining records, books and other necessary documentation. • Even though the microplanning process was conducted in a participatory manner, it appears to have been driven largely by the project. However, going forward if JFMCs are to be positioned as independent and sustainable bodies, emphasis has to be laid on providing them rigorous training on the basics of village and local level planning, management and monitoring functions. One of the fall-outs of this would be that the annual planning process would become self-driven, based on the overall agreed micro plan for the JFMCs. • Training and exposure of JFMCs need to be continued with intermittent low cost village level refresher training and exposure visit to nearby areas. Understanding of the basic concepts of forest conservation and protection has filtered in to some extent among JFMC members, but there is continued need to strengthen this further. • JFMCs are mainly dependent on the project for their financial sustenance, with funds under the project being tied to specific purposes. For ensuring financial independence as well as sustainability, JFMCs must integrate with various other programmes / schemes being implemented by the GoT so that they eventually reduce their dependence on the project. • The participation of women in JFMCs both as GB or EC members or even in leadership positions appears to be limited. It may be noted that in all the consultations held with JFMC members as part of the mid-term assessment, not even a single female member was present. The minutes books indicated presence of women during meetings and proceedings of JFMCs, but their active and substantive participation remains wanting. Real participation of women in community institutions (with the exception of women centric organisation such as SHGs or health committees) has always posed challenge for development projects, but the project must explore innovative mechanisms that would allow for more inclusive functioning of the JFMCs.
Forestry and NRM Activities under JFMCs	• It is apparent there is a growing trend of rubber plantation within the community as it is more profitable than any other plantations. In cases where rubber plantations are cultivated on the household's own land there may not be any issues, however it would still be appropriate to provide advice to the former on need for species diversity and other profitable plantations that could be taken up. • Fruit orchards and high return bamboo production model (e.g. Kanak kaich) can be a good alternate source of income generation for the JFMCs. Kanak Kaich bamboo, as *Thyrsostachys oliveri* is locally known, is one of the most commercially important bamboo species of Tripura. Farmers of Katlamara in West Tripura have been cultivating this bamboo at close spacing and selling it in semi-processed form, earning annual income as high as Rs 2.6 lakh per hectare from fourth year onwards, making it one of the most profitable activities[27] (Refer Annexure). Continued promotion and encouragement for cultivation of such orchards may be provided by the project going forward. • The plantation sites presently have bamboo fencing which gets destroyed easily due to rain and other wear and tear. Monitoring of plantation sites is also reported to be difficult during monsoon. Interventions such as barbed wire fencing and construction of bamboo sheds for monitoring of plantation sites were provided by some of the JFMCs. The project can consider the inclusion of such interventions in their package of activities.

[27] Manjari 2014 edition, a monthly newsletter of NCE

Area	Recommendation
	• Agroforestry has been beneficial to households and can be further enhanced using project funds or in convergence with other departments such as the Horticulture Mission. More species such as Gandaki, jalpai, coconut, mango, jackfruit, and ginger could also be included in the agroforestry models. • Water harvesting structures such as check dams where water is available perennially or for most of the year have been used for fisheries with success in the project area. While design of water harvesting structures is based on technical considerations, the water impounding capacity of these structures can be moderately enhanced wherever feasible to enable fisheries activities without substantially increasing cost and maintaining primary focus of water conservation. • Instances of man-animal conflict have been reported e.g. at the Karbook and Teliamura Ranges under Khowai Division. Casualties have mainly been on account of conflicts with wild elephants. In April 2024, an 85-year-old man was killed by a wild elephant named Moti in the Khowai district. A youth was critically injured in a wild bear attack while working in a remote Jhum farm area this year. The district has seen several such attacks in the last year. Tripura has a population 102 elephants as per the data of MoEF and is one of the states under Project Elephant. The state has an elephant rescue centre at Khowai as well as a Task Force. Training of frontline staff is required on manual developed under Project Elephant on Managing Human Elephant Conflict along with regular capacity building workshops for sensitizing mahouts, veterinary officers, field officials and staff of line departments such as railways, power, NHAI etc.
Livelihood Support to Communities	• Most villages lack veterinary services or para-vets which discourages animal husbandry as a livelihood activity. Sustainable livestock management needs to be promoted to enhance income while not endangering forest due to open and uncontrolled grazing. Pilot projects with suitable checks and balances may be attempted to evaluate whether livestock based livelihoods can be promoted in small numbers without compromising on forest protection and growth. Stall feeding practices or promotion of poultry and aquatic birds that provide good income with low investments can also be considered. • Forest produce collected by JFMC members are sold on the road side and in local markets without any proper structure or shed. Construction of kiosks can help members to store and market produce in a better way, leading to improved incomes. • The saplings developed in the DCPN are used by TFD for plantation and JFMC members are paid labour charges for maintenance. Suggestions that JFMCs should also be allowed to participate in tenders for DCPN was also received during consultations. The feasibility of such an option may be evaluated by the project. • JFMC members were of the opinion that narrow roads within the forests can help in better management and provide better access the forests and may help them in NTFP collection for consumption and sale. The merit of this may be evaluated by the project considering various aspects of conservation and sustainable harvesting. • Value addition, and processing of forest produce in small scale needs to be promoted. Areca nut plate making; bamboo charcoal production, black pepper packaging, wild honey packaging, etc. emerged as some of the options during the discussion.
Village Infrastructure Development	• Most of the JFMC villages do not have suitable drinking water facilities and in many villages provision of such facilities was put forward as one of the possible entry point activities for the project. However, such interventions were not considered under the project as entry point activities. It is suggested that in future phases, drinking water projects may also be included as entry point activities. Alternately, funding may be dovetailed from other schemes if such funding is restricted in SCATFORM project. Linkages through Panchayats can also be explored by project staff to address this serious problem. • The MUCs created in the new JFMCs lack basic furniture such as chairs, tables and storage space for record keeping. The Vocational Training Centres constructed in the previous JICA supported project had all necessary furniture. The project may consider to provide some basic furniture and storage space for proper utilisation of the infrastructure. • The MUC / VTC at present are mostly being used for conducting meetings and training programs. Some of the JFMCs suggested that the space available can also be used as small godowns to store products made by the community.

3.2. SHGs

SHGs are one of most crucial stakeholder groups involved in implementation of the project. The primary objective for creating the SHGs was to undertake livelihood improvement of communities that are dependent on forests. The project promotes NTFP production with sustainable harvest technique and medicinal plant

cultivation as well as agriculture, fishery and livestock production through forming SHGs (or directly by JFMCs) for simple processing and advanced processing and marketing with larger investments.

The project also promotes cluster based business from early stages, provides specialized business promotion support for business planning, marketing, product development and facilitating linkages with financial institutions and other resource organizations and financially supports cluster SHGs. As per the MoD, there should be a minimum of 3 SHGs in one JFMC. The number can go up to 7 SHGs based on the requirement. The project has successfully formed 1350 SHGs in the last 5 years.

Key Observations and Issues

As part of the mid-term review a primary survey was conducted among 436 SHG members spread across all districts. It may be noted that a household survey had also been conducted at the baseline stage of the project and wherever data was available, comparisons were drawn between the baseline and mid-term. The households covered during the baseline survey and the ones visited during midterm evaluation are from different cohorts. Robust sampling of two different cohort from the same population, ideally would have provided comparable sample means under good randomisation. Also the MTR questionnaire unlike the baseline questionnaire had several areas of inquiry regarding the effect and impact of SCATFORM for which corresponding baseline values were not available. The sample used for the midterm were members of existing or newly formed SHGs in the SCATFORM project areas. Key findings from the SHG household survey undertaken at the mid-term stage are discussed as follows.

Social Group: In consistence with the demographic profile of the areas surveyed, a majority of the respondents belonged to the Scheduled Tribe category (81.2%), followed by those belonging to the Scheduled Caste category (13.3%). A marginal proportion of respondents were from general and Other Backward Caste (OBC) groups. 9.2% of respondents stated that their respective households were female headed.

Educational Status: Respondents were asked to share their own educational status as well as that of their heads of households. The highest proportion of respondents indicated that the heads of their respective households had completed standard 10 (26.4%), followed by 25.2% who stated that the they had completed standard 8 and 19% who claimed that they had never been enrolled in school. The scenario was similar with respect to the educational status of the respondents themselves. Over 28% of respondents claimed to have completed standard 8 and over 27% had completed standard 10. Around 16% of respondents had never been enrolled in school.

Household Size: The average household size stood at 4.35 members. The highest proportion of households (35.3%) had four members, followed by 27.8% who had 3 or less members.

Ration Cards: Respondents were asked to indicate the type of ration cards which their households possessed. The highest proportion of respondents (53.4%) stated that they possessed Below Poverty Line (BPL) cards. This was followed by 31% who had Above Poverty Line (APL) cards and 14.9% who were Antyodaya card holders. A marked change was noted in case of this indicator when compared with the baseline profile. At the baseline stage a significantly larger 21% of respondents had stated that they did not have access to a ration card or they had some ad hoc form of card. This proportion was significantly lower in the mid-term sample.

Poverty Category (%)	Baseline	Midterm
APL	26.0	31.0
BPL	40.0	53.4
Antyodaya	14.0	14.9
Ad hoc BPL / Ration Card Not Available	21.0	0.7

Housing: In terms of housing also, it was noted that a comparatively lower proportion of households covered in the survey resided in kuccha houses compared to the sample that was covered in the baseline stage.

House Type (%)	Baseline	Midterm
Kutcha	68.0	44.0
Semi-Pucca	20.0	26.6
Pucca	13.0	29.4

Primary Source of Drinking Water (%)	Baseline	Midterm
Piped water supply	33.0	60.6
Public stand post	7.0	0.7
Hand-pump	10.0	12.4
Public hand-pump	4.0	1.6

Rain water	0.0	2.5
River, streams, ponds, lakes	13.0	12.8
Wells	29.0	3.4
Other	-	6.0

Drinking Water: Access to piped water supply in households improved significantly from 33% at the baseline stage to 60.6% in the midterm stage. Dependence on wells, public stand posts and public hand pumps was seen to be significantly less compared to the baseline stage. However, despite these improvements, the proportion of households with access to piped water supply is far from universal at this stage. The fact that entry point activities for future phases of the project could include provision of appropriate drinking water sources is therefore suggested for consideration.

Distance of Primary Source of Drinking Water from House (%)	Baseline	Midterm
Within household premises	39.0	68.6
Outside household premises at < or = 200 m	42.0	14.9
Outside household premises at 201-500 m	14.0	11.9
Outside household premises > 500 m	3.0	4.6

Alongside an improvement in the proportion of households which have access to piped water supply at home, there is also a marked increase in the proportion of households with drinking water sources within their premises. Ironically, a slight increase has also been noted in the proportion of households with access to water outside premises at a distance of greater than 500 metres.

Sanitation: While there has been a slight increase in the proportion of households with access to individual household latrines between the baseline and mid-term stages, universal access to household latrines is yet to be achieved.

Toilet Type (%)	Baseline	Midterm
Individual household latrine	93.0	97.9
Community toilet	3.0	1.6
Open defecation	4.0	0.5

Access to Electricity: The proportion of households with access to electricity increased from 93% to 96.1%. However, it must be noted that despite having access, long and frequent power outages affected the quality of life of communities.

Primary Cooking Fuel (%)	Baseline	Midterm
Wood	90.0	92.4
LPG cylinders	3.0	4.4
Kerosene	5.0	3.2
Electricity	3.0	0.0

Cooking Fuel: The practice of using wood as the primary fuel for cooking persists and in fact has witnessed a slight increase. Usage of LPG cylinders is very low and this can be explained by multiple reasons. First of all, community members find the price of refilling the cylinders to be beyond their means. Secondly, the villages being located in remote areas, do not receive direct delivery of cylinders. They have to hire vehicles to be able to go to the nearest accessible point and collect the cylinders. This involves an additional transportation cost. Finally, most households are habituated to using wood for cooking and prefer the taste of food cooked on it compared to food made using other types of fuel.

Ownership of Household Assets (%)	Baseline	Midterm
Furniture	74.0	84.9
Kitchen utensils	-	100.0
Gas connection	-	69.0
Television	34.0	58.0
Mobile phone	70.0	92.2
Bicycle/Tricycle	22.0	12.8
Motor cycle/Scooter/Moped	17.0	31.7
Four-wheeler	3.0	2.8
Refrigerator	13.0	25.7

Asset Ownership: A comparison of household asset profiles across the baseline and mid-term stages of the project revealed that there has been a change in the types of assets owned. For instance, the proportion of households owning furniture, TVs, mobile phones, motor cycles/scooters/mopeds and refrigerators was higher at the mid-term stage.

Ownership of Agricultural Assets (%)	Baseline	Midterm
Tractor	1.0	2.8
Power tiller	-	1.4

Thresher	-	0.0
Combined harvester	-	0.0
Chaff cutter	0.0	0.5
Pump	6.0	6.2
Power weeder	-	0.0
Sprayer/Duster	-	0.7
Micro irrigation systems	-	0.2
Poly House	0.0	2.5

Ownership of agricultural assets was relatively low across both the baseline and midterm stages of the project. The only assets which a relatively higher proportion of households owned at the mid-term stage were pumps (6.2%), tractors (2.8%) and poly houses (2.5%).

Membership of JFMCs: The proportion of households where at least one member was part of a JFMC was seen to be significantly higher at the mid-term stage compared to the baseline. This could potentially be accounted for by the efforts made by the project to forming new JFMCs, strengthening old ones and creating awareness.

JFMC Membership (%)	Baseline	Midterm
At least one member part of JFMC	32.0	62.6
At least one member part of EC or in leadership position	-	19.0

The proportion of households where at least one members occupied a position in the EC or any leadership position stood at 19%. This however cannot be compared with the baseline status as corresponding data is not available.

# of JFMCs	# of EC Members	# of Women in EC	% of Women in EC
457	1113	1376	33. 5

A review of secondary data related to gender based composition of ECs revealed that nearly 33.5% of members in ECs were women. This is in line with the mandate laid down in the JFMC guidelines.

Income and Livelihood: At the baseline stage, respondents were asked to share the main livelihood activities they were engaged in. There was no differentiation between the primary and secondary sources of income. The highest proportion of households (43%) earned mainly through wage labour under MGNREGA, wage labour under projects/schemes other than MGNREGA (22%) and agriculture (17%) and animal husbandry (17%).

At the mid-term stage, respondents were asked to separately indicate their primary and secondary sources of income. A major shift was noted. The highest proportion of respondents (26.1%) stated that they relied on animal husbandry as their primary source of income. This was followed by 25.2% of respondents who depended on rubber plantations for earning their income and business and trade (11.5). Wage labour under MGNREGA or otherwise was the primary source of income for a much smaller proportion of households. A relatively high 30% of households indicated that they depended on *Jhum* cultivation for providing a secondary income source. This is higher than 17% at the baseline stage (though this was not considered a secondary source at the baseline stage). This points to the need to provide greater focus on identifying alternative livelihood options and supporting transitions to these by community members. Other important secondary sources of income at the mid-term stage were NTFP collection/processing (28.7%), wage labour (MGNREGA) (27.3%) and animal husbandry (22%).

Income Source (%)	Baseline	Primary Occupation: Mid-term	Secondary Occupation: Midterm
Agriculture	17.0	5.5	9.6
Jhum Farming	16.0	7.6	30.0
Horticulture	1.0	1.6	2.1
Agri-Labour	16.0	0.2	0.0
Rubber	7.0	25.2	5.0
Areca Nut	NA	0.7	2.1
Handloom and Handicraft	1.0	8.0	3.4
Animal Husbandry	17.0	26.1	22.0
Wage Labour (MGNREGA)	43.0	0.0	27.3
Wage labour (Non-MGNREGA)	22.0	2.8	3.6

Income Source (%)	Baseline	Primary Occupation: Mid-term	Secondary Occupation: Midterm
NTFP (collection or / and processing)	5.0	3.4	28.7
Business and Trade	7.0	11.5	0.9
Fishery/aquaculture	3.0	3.7	3.9
Private Job	4.0	0.5	0.5
Govt. Job / Pension	3.0	0.5	0.0
Others	4.0	2.8	0.0

Annual Household Income (Rs)	Baseline	Baseline (Recall)	Midterm
Up to 24,000	19.0	10.3	4.8
24,001 to 60,000	43.0	37.6	28.4
60,001 to 1,20,000	27.0	39.4	45.4
1,20,001 to 1,80,000	7.0	12.2	15.4
More than 1,80,000	0.0	0.5	6.0

Current annual household income and annual household income before the SCATFORM project was recorded during the mid-term assessment using recall method. This indicator had also been assessed at the mid-term stage. On considering the baseline values obtained through recall method at the mid-term stage it was seen that the highest proportion of respondents had an annual household income in the range of Rs. 60,001 to Rs. 1,20,000 (39.4%). On the other hand, the baseline survey indicated that the highest proportion of respondents earned an annual household income in the range of Rs. 24,001 to Rs. 60,000 (43%).

At the mid-term stage over 45% of respondents stated that their annual household income ranged between Rs. 60,001 to Rs. 1,20,000. It is evident that an increasing trend was noted between the baseline and mid-term stages of the project, which could be attributed to several factors including interventions taken up under SCATFORM.

Baseline- Annual Household Income (Rs)	Baseline (Recall)- Annual Household Income (Rs)	Midterm- Annual Household Income (Rs)
57,437.50	73,358.90	93,256.40

The absolute average annual household income at the baseline stage is not available, but using the mean of each range the baseline value of annual household income can be computed as Rs. 57,437.50. The average annual income from the reconstructed baseline at mid-term was Rs. 73,358.90, while the average household income at the midterm stage was Rs. 93,256.40, which is an increase of 27.12% compared to the reconstructed baseline.

Savings and Loans: Respondents were asked to indicate their household savings in the last year. The highest proportion of respondents, over 46% indicated that their household had annual savings in the range of Rs. 5,000- Rs. 10,000. Nearly 30% of respondents stated that their households did not have any savings in the last year.

Annual Household Savings (Rs)	% of Households
No Savings	29.4
< 5000	5.7
5000 – 10000	46.6
10001 – 20000	9.6
20001 – 30000	5.3
> Rs. 30000	3.4

The mid-term findings show that 78.9% of households had taken loans last year. Some members had taken loans from more than one source. The highest proportion of over 82% households had taken loans from SHGs. The proportion of households accessing other sources was comparatively lower. SHGs were not linked with other credit linkages under the project. The sources of funds are project and group savings.

Sources of Loan)	% of Households
Bank	2.5
SHG	82.2
Micro Finance Institutions	8.6
JFMC	5.3
Others (TRLM, Local Lender)	1.4

Purpose of Loan	% of Households
Asset purchase	4.0
Education	5.0
Small business	12.0
Personal expenses	3.0
Handloom	6.0
Animal husbandry	61.0
Plantations	6.0
Agriculture	3.0

The highest proportion of respondents had taken loans for animal husbandry activities, mainly piggery. Of the 61% of households which had taken a loan for animal husbandry, 32.7% had specifically taken the loan for piggeries. Availing of loans for other purposes was relatively much lower. A majority of 61% of respondents stated that their households had taken loans up to Rs. 20,000. Over 77% of household who had taken loans had not been able to repay till the time of the mid-term survey.

Since SHGs are self-regulated institutions, status of loan repayment is a measure of internal co-ordination and one of the most significant indicators in the Panchasutra. There are no explicit measures to impose stringent action on recovery of loans, and therefore members have to persuade each other to repay loans in time, based on their social affinities. It is recommended that the loans given by SHGs to their members should be classified into three categories, in-time repayment, late repayment and default. Any loan given to a member, if repaid within six months after the expected month of closure, should be classified as in-time repayment.

Type of Land Ownership	Baseline		Mid-term	
	% of HH	Average Landholding (Acre)	% of HH	Average Landholding (Acre)
Leased-in Land	-	NA	20.0	0.73
Own Land	49.0	0.9	71.8	1.40
RoFR Land	39.0	1.2		
Encroach Land	24.0	0.7	12.2	0.69
Leased-out Land	NA	-	1.1	2.18
Any land available with Household	76.0	-	88.8	-

Land Ownership: Availability of agricultural land is one of the key indicators of socio-economic condition and capacity of households. The proportion of households with land (own and RoFR taken together at mid-term stage) stood at 71.8% at the mid-term stage, compared to 88% of households who had their own land and RoFR land. The proportion of households with encroached land declined from 24% at the baseline stage to 12.2% in the mid-term evaluation. In a positive development the proportion of households with any type of land increased from 76% at the baseline stage to 88.8% at mid-term. The average land holding of own land and RoFR land stood at 0.9 acre and 1.2 acre respectively at the baseline stage. At the midterm stage this increased to an average ownership of 1.4 acre.

Irrigation and Crops: The mid-term findings show that only 5.9% of the cultivable land has access to irrigation, leading to a deleterious impact on yield and cropping intensity. Cultivable land under field crops such as paddy and other cereals was 17.2%, under fruits and vegetables was 6.6%, and under commercial crops or plantation such as rubber (primarily), areca nut, etc. was 72% at the mid-term stage. Corresponding figures for baseline are not available.

***Jhum* Cultivation:** Households were asked to report on the Jhum practices they adopted at present compared to previous years. Around 7.6% of respondents reported Jhum as the primary occupation now, as compared to 10.3% households in the past (midterm source) and 16% households as reported in the baseline study. However, nearly a third of the households acknowledged *Jhum* as one of the secondary occupations, indicating that its control in forest fringe villages continues to be a challenge. The main crops cultivated in *Jhum* are paddy, vegetables, and millets. Quite encouragingly over 79% of households reported that they had discontinued Jhum because of the SCATFORM project. This can more sagaciously interpreted as a reduction in Jhum and not full discontinuation. Certain respondents acknowledged difficulties in discontinuing the practice due to a lack of alternate livelihoods.

Livestock Ownership and Practices: Over 72% of households reported ownership of livestock of one or more type at the mid-term stage. The largest proportion of households owned pigs (46.8%), followed by goats (31.9%) and poultry (30%). The average annual income of households engaged in livestock rearing or animal husbandry stood at Rs. 17,692.00 at the mid-term stage.

Category	% HH with Livestock	Average Holding Size
Cows	28.0	2.6
Buffalos	0.5	1.5
Pigs	46.8	1.8
Goats	31.9	3.4
Sheep	0.5	7.5
Poultry	30.0	14.8
Duck	13.3	6.4

Nearly 36% of households having large ruminants did not have animal sheds. Over 41% households practiced free grazing followed by 34.8% who adopted stall feeding. Around 38.1% respondents claimed that they provided nutritionally balanced diets to their livestock.

Around 61.3% of respondents shared that they went to government veterinary hospitals for treatment of animals and 34.2% went to private practitioners. Nearly 70% of households did not report regular vaccination or regular deworming of their animals. Only 6.5% of livestock rearing households reported to have insured their animals. Respondents stated that women require Para Vet training to handle health issues faced by livestock, so that they can do basic treatment themselves.

NTFP: Households are dependent on forest produce for consumption as well as sale. The main types of NTFP collected by communities are fuel wood, vegetables including spinaches which are wildly grown in the forests, wild potato, forest yam, bamboo and bamboo shoot. Bamboo shoot is sold mainly during the monsoon seasons and is consumed in a local cuisine '*Gudok*'.

Type of NTFP	% Collecting for Self-use	% Collecting for Sale
Bamboo Shoot	70.9	10.1
Dekishak	47.0	7.3
Kalarmucha	37.6	6.7
Wild Potato	34.2	2.3
Bon Kachu	34.6	3.2
Lati	32.3	3.2
Gandaki	27.1	2.3
Bamboo	23.9	3.4
Fuel Wood	22.0	7.8
Sajana	5.5	-
Thankuni	7.3	0.5
Basak (Kala)	3.2	0.5
Other Minor Forest Produce	3.9	0.5

Collective Membership: A negligible proportion of respondents stated that any member of their household had membership in a collective. A relatively higher proportion of respondents indicated that someone in their household was a member of a livestock based collective (3.4%), followed by those claiming membership of NTFP collectives. One of the key requirements for communities to prosper is collectivisation so that they are able to market and negotiate for sale of produce. The low level of membership in such collectives is a key gap that needs to be addressed through project interventions.

Type of Collectives	% of Households with Membership
Agri based	2.8
Livestock	3.4
Non-farm / Craft	0.2
NTFP	3.0

Access to Services and Facilities: Respondents were asked to indicate whether they had access to various services and facilities. A surprisingly high proportion of respondents stated that they had access to market information (64.2%), followed by 15.8% of respondents who stated that they could access institutional credit.

Type	% of Households with Access
Market information	64.2
Institutional credit	15.8
Custom Hiring Centres	3.0
Processing and Value Addition Units	3.9
Farmer Groups operating in village	2.5

Type	% of Households
Agri and allied activities	2.5
NTFP collection and sale	1.4
Work in SHG/JLG	43.3
Own business	21.3
Other	6.7

Women's Livelihoods: Respondents were asked to share the type of livelihood activities women in households undertook. Around 65.4% of respondents stated that at least one woman was engaged in livelihood activities in their respective households. Among women who worked, the highest proportion worked in SHGs or JLGs (43.3%), followed by 21.3% of women who were engaged in their own business.

SHG members were provided various types of trainings under the project. The topics of trainings included record maintenance, fish farming, livestock management including piggery, mushroom cultivation, broom-

brush making, areca nut leaf plate making etc. Secondary data revealed that 321 (28.5%) members of SHGs had received trainings under the project.

Aspect	% of Households
Received livelihood training	34.2
At least one adult female member has bank account	92.4
Received training on digital and financial literacy	11.0
At least one female has secured some form of livelihood under SCATFORM	34.2

As part of the primary survey over 34% of respondents stated that they had received livelihood training and the same proportion said that at least one woman in their household had secured a livelihood under SCATFORM. The proportion of respondents who stated that at least one woman in their household had secured livelihood support under the project. Quite encouragingly over 92% of respondents stated that at least one female member in their household had a bank account.

Benefits from SCATFORM Project: Respondents were asked to share the various benefits that were receiving from the project. The highest proportion of respondents stated that they had received marketing support (51.4%), followed by 9.6% of respondents who stated that they had been provided training through the project. Only a small proportion of respondents indicated that they had received other types of support through the project.

Financial Linkages: All SHGs interviewed had bank accounts in their group's names. The records of SHGs were usually maintained by Livelihood Coordinators, Community Mobilisers or Field Facilitators. They also practiced inter-lending within their groups. Each group received a loan of Rs. 1 Lakh and resultantly each member received Rs. 10,000/-. The loan was sent to each JFMC by the respective RMU. The JFMC further disbursed the loan to the groups.

SHG Gradation: An SHG gradation guideline was prepared in 2021. The guideline states the gradation is to be done after 6 months of formation. It does not mention any frequency of gradation.

Enterprise Promotion: The loans provided to SHGs are for individual livelihood generation. Loans are mostly used for livestock rearing, fish farming and small businesses such as grocery stores, honeybee rearing, mushroom cultivation and candle making. The SHGs in Killa beat of Khowai Subdivision produce candles and their sale is linked with the Tripura Sundari temple. SHGs are also undertaking livestock rearing using the loan amount. Fishery is also done in check dams created under the project. Handloom is an age old art of these communities. However, sale of the products is concentrated in the local vicinity only. Though the groups have taken up the different means of alternative livelihood, enterprise formation is yet to take place.

Marketing Support: SHGs have been given preliminary training on marketing their products. At present they are mostly selling their products within the same villages and nearby markets. The most profitable have been the fisheries in terms of revenue generation.

TRLM Programme: Presently another parallel structure of SHGs is available in villages through the TRLM programme. Since the loan amount provided under TRLM is different compared to SCATFORM, there is confusion in the minds of the community. The staff structure is different and TRLM has more staff for managing the SHGs.

Recommendations

The following are the key issues and corresponding recommendations related to the SHGs that have emerged from the site visits and document review.

Area	Recommendation
Training and capacity building	• **Regular Training:** Sustained provision of training and mentorship to SHGs and federation is recommended to overcome capacity constraints. SHG trainings should be regularised and provided at frequent intervals. Trainings should be regularized and cover overall objectives of SCATFORM project, record-keeping, communication, leadership, team-building, organizational behaviour, entrepreneurship, cluster formation, livestock rearing, digital and financial literacy, social security schemes especially for women and children, organic farming, vermin composting, nursery development, para-vet training, etc. Exposure visits within the state is also recommended for SHGs. Provide sustained training and mentorship to SHGs and federations to overcome local capacity constraints. Possible collaboration with the Ministry of Rural Development for training of SHGs and clusters can be explored. • **Skill Enhancement:** Training on alternative livelihoods, management of livestock, government schemes and digital and financial literacy are required for women
Cluster development	• **Inclusive Clusters**: SCATFORM supports cluster formation for NTFP or agroforestry based activities. Livestock production, mushrooms, cow rearing, agriculture, handlooms and others are not considered since they are neither NTFP nor agroforestry based. The project could consider inclusion of these activities in cluster formation as well. The livelihood programs for SHGs always have significant impact on women's access to income, food intake, social capital and social empowerment. Expansion of cluster formation to include activities beyond NTFP or agroforestry, such as livestock production, mushroom cultivation, agriculture, and handlooms, provided the groups support forest protection. The project needs to identify trade for the SHGs based on their present knowledge and assessing the kind of training that they would require. It should also help the women to identify sustainable and environment friendly manufacturing practices. Promotion of sustainable and successful enterprises requires information collection, analysis, planning, and implementing of each micro-project formulated by SHGs. Sustainability and success of the enterprise are intrinsically depended on skills, resources and the marketing environment. Thus it becomes imperative to have tools that can generate information enabling well-informed and quick decision-making. Assessment of value chain analysis and market demand will also act as a guiding force in order to make decisions about selection of trade. Both backward and forward linkages need to be worked out before finalising a trade. Collaboration with existing government schemes for clusters can be explored. The Ministry of Micro, Small and Medium Enterprises (MSME), Government of India (GoI) has adopted the Cluster Development approach as a key strategy for enhancing the productivity and competitiveness as well as capacity building of Micro and Small Enterprises (MSEs) and their collectives in the country. This will help the women to achieve the status of continuous income within their knowledge base and further capacity building. • **Utilize SHG Strength:** Clusters of SHGs with at least 7-10 groups in the close vicinity are yet to be formed under the project. The network of 1350 SHGs need to be utilised properly in order to form clusters. This will help SHGs run bigger business ventures and earn better profits. This will in turn reduce their dependency on the forests. Federation can be formed with these clusters of SHGs in order to have established linkage with the NCEs. • **Livestock Management:** The SHGs dealing with livestock needs regular update on management of livestock. Paravet training is also essential for SHGs members to be able to manage the health of animals. • **Diversification:** Businesses such as handlooms, candles, dry fish and fish farming should be encouraged. Diversification and customisation of traditional products will make them lucrative for the market. SHGs require technical support for such diversification and customisation. Collaborations can be undertaken with NIFT and NID for artisans' technical capacity building. E-commerce platforms can also be explored for marketing of these products. • **Resource Utilization:** Each JFMC has been provided with a Multi Utility Centre (MUC). Presently they are mainly used for meetings. These MUCs can be also used for short term storage of products prepared by different SHGs with basic storage amenities. • **Gradation Process:** The present SHG gradation format was developed as per a circular of 2021. The format is in local language based on the Pancha sutra of gradation. The Pancha Sutra parameters include regular meetings, regular savings, internal loaning, timely repayment and proper book keeping. The circular however does not mention the frequency of conducting the gradation other than the first time. SHG gradation should be done at least twice a year in order to understand the status of the SHG before and after any credit linkage. Further this will help evaluate if the SHG is eligible for future loans. The format also needs to capture details of yearly savings, change in amount of savings, members' understanding in terms of building corpus fund, utilisation of government funds etc.

Area	Recommendation
	• **Involvement of Panchayat**: The Panchayat should be involved in the gradation process as presently its done by the project staff only. The involvement of local government will help SHGs to be sustainable in near future. • **Linkages with TRLM:** The project can start exploring possibility of establishing linkages between the SHGs and the TRLM programme. This will help the groups access training and staff support. It will also help support SHGs post completion of the SCATFORM project. • **Enterprise Promotion:** The project may consider provision of additional support to SHGs, cooperatives and individuals for expansion of businesses beyond the revolving fund of Rs 1 Lakh. • **Diversification:** Diversification of livelihoods activities and focus on non-agricultural activities could be undertaken. This can include use of NTFP, livestock management and other small business initiatives. • **Consortium-Based Marketing:** Consortium based marketing should be supported as in the case of agro-forestry /livestock along with training. Market and supply chain assessment are necessary along with cost-benefit analysis and study of consumption patterns. Various models including SHGs/JLGs, cooperatives etc. can be considered for promoting a producer-centric approach. • **Livestock Insurance Awareness:** There is need for increasing awareness and encouraging insurance of livestock to mitigate losses due to diseases, enhancing the financial stability of SHG members.

3.3. Eco-tourism Development

Tourism Policy 2020-25

The state of Tripura is endowed with hilly terrains, green vegetation and flowing rivers. The ethnic diversity of the state offers diverse lifestyle and culture. The state has 6 Protected Areas (4 sanctuaries and 2 national parks) and 4 Wild Life Sanctuaries (WLS). This includes Sepahijala WLS, Trishna WLS, Gomati WLS and Rowa WLS. Tripura offers vast potential for growth to tourism, with two tourist circuits. One is the west-south Tripura circuit covering the tourist destinations of West, Sepahijala, Gomati and South Tripura Districts and the other is the west-north Tripura circuits covering the tourist destinations of North Tripura, Unakoti and Dhalai Districts. Tourism has been adopted by the State Government as one of the core sectors of economy in Tripura. Several initiatives have been undertaken by the state government for overall development of the tourism sector in Tripura. The State adopted the Tourism Policy 2020-25 with a focus on development of eco-tourism. The eco-tourism activities that are to be promoted as per the policy include the following.

Tripura Tourism Policy (2020- 2025)

The policy promotes developing eco-tourism as a thrust area. It recommends creation of infrastructure facilities for eco-tourism sites and eco-friendly accommodations

Wildlife	Wetland	Forest
• National park visits • WLS visits • Biological parks/zoos • Bird watching • Jungle Safari • Nature walks • Eco-friendly accommodations • Visitor interpretation centres • Wildlife photography	• Development of Dumboor lake into a world class destination • Angling fishing • Fishing • Water sports • Boating • Bird watching • River cruise • House boats • Eco-friendly accommodation	• Nature camps • Trekking • Rock climbing • Forest trails • Nature walks • Camping • Log huts • Eco-friendly accommodations • Visitor interpretation centres

The state also promotes entrepreneurship in the tourism sector by introducing 'Interest Subvention Scheme' under the flagship scheme of 'Paryatan Sahayak Prakalp'. This scheme has also been extended for eco-tourism activities offering a loan amount of Rs. 5 lakhs. The objective of the scheme is to promote entrepreneurship in tourism sector by providing interest subsidy to eligible persons to enable them to take up activities in tourism sector. Through this scheme, it is intended to facilitate the access of loans to tourism related projects and upon successful repayments, as an incentive, the interest component will be borne by the State Government.

Feasibility Study for Establishment of Ecotourism on PPP Basis

The SCATFORM Project proposed appointment of a Transaction Advisory (TA) firm to conduct a feasibility study to formulate development strategies utilizing Public Private Partnership (PPP) mode through joint ventures/enterprises in Tripura. The feasibility study envisaged exploration of potential ecotourism-based activities and development of ecotourism-based enterprises/ joint ventures establishment with the objective of development while ensuring sustainable environment conservation and enhancement of livelihoods of the local community. In line with this, Ernst & Young LLP was selected as the TA and an agreement was entered on 20th April, 2023. The scope of work of the TA included the following:

- Assessment of recent ecotourism development trends and business potential in ecotourism.
- Review ecotourism policy and PPP requirement relevant to ecotourism development.
- Review potential ecotourism development sites and select the sites for analysis.
- Assess modality of PPP mode (role of private sectors and government/TFD and project including use of eco development fund) of the selected potential sites.
- Identify potential investors and organize a workshop to present the potential sites with possible modalities of PPP mode.
- Select three new destinations and eco parks with possible investors and negotiate with them regarding the PPP modality and activities.
- Prepare detail design of the potential sites with opinions of investors and project.
- Make proposal to implement ecotourism development with PPP mode with the investors (partners) for the six sites.

In discussion with SCATFORM it was decided that sites would be identified based on current tourism footfall and accordingly a detailed analysis was carried out. The final list of destinations that were shortlisted as part of the feasibility study is as follows:

- Heritage Park
- Sepahijala WLS
- Nehru Park
- Trishna Wild Life
- Chabimura
- Tepania Eco Park
- Jampui Hill
- Dumboor Lake
- Unakoti Archaeological Site
- Bharat- Bangla Maitruddan park
- Baramura Eco Park

The inception report related to the feasibility study undertaken by the TA firm was shared with the consultant. This included a brief note on each of the eleven sites listed previously. The report further stated that PPP development cannot be entrusted under the core area of the WLS and land would need to be identified outside the core area for development.

Tripura Nature Trail Resorts

A public company in the name of Tripura Nature Trail Resorts (TNTR) Ltd. TNTR was incorporated on 21st November, 2022. This company is responsible for eco-tourism development in the state. The feasibility study on eco-tourism discussed in the previous section was commissioned by TNTR.

TNTR has developed a butterfly park in Trishna Wild Life Sanctuary at Bagafa. A portion of the cost of setting up this park has been contributed by the project. This park is open for public with a minimal ticket charges.

3 eco parks locations have been identified which are well deserved in terms of historic importance and natural fauna. At present the department has taken up the development of these eco parks under the project. The locations are Banabithi (Khowai district), Rung Tung (Sepahijala) and Unakoti (Unakoti district). The work for development of the eco parks is in progress. Unakoti was on the UNESCO world heritage site tentative list in 2022. This is a prime tourist spot in the Kailashahar Subdivision of Tripura.

New ecotourism destinations like Sitacherra, Dumboor lake, Jampui hill have been identified. These will be taken upon through community-based ecotourism approach. The TFD plans to put up log huts and encourage communities to develop homestays in these locations to attract tourists.

Issues and Recommendations

One of the key issues identified is the relatively low level of spending under the eco-tourism head of the project. Of the budget of Rs. 6.2 Crore, a mere Rs. 4.5 Lakh (amounting to only 1%) has been spent thus far. There is a need to review the progress of various activities to be taken up as part of eco-tourism interventions and speed up implementation so that physical and financial targets are achieved.

The ecotourism development has been planned and in the process of implementation. The development of parks and setting up of new destinations is yet to take place. There is no fund earmarked in MoD for support to the development of existing ecotourism sites. Allocation of funds for developing existing sites will help attract more tourists and generate revenue for the state.

The key recommendations related to eco-tourism development are summarised in the following table.

Aspect	Recommendations
Policy Revision	• Update the Tripura Ecotourism Policy to include modern tourism practices and emphasize community engagement. The revised policy should reflect current tourism demands while ensuring ecological balance. • Integrate community-based organizations such as JFMCs, EDCs, and SHGs to provide local residents with opportunities for employment and alternative income sources.
Increased Funding and Allocation	• Allocate additional funds to support the development and maintenance of existing ecotourism sites, which will help attract more visitors and boost state revenue. • Consider private sector involvement through public-private partnerships (PPPs) to fund and accelerate infrastructure development, marketing, and management of ecotourism sites.
Community Training and Capacity Building	• Provide community members with training in hospitality, guest management, and digital financial skills, as well as exposure visits to established ecotourism sites. This will help them understand homestay operations, guest service expectations, and business management. • Ensure ongoing skill development opportunities to maintain high service standards and increase community engagement in tourism.
Expanded Ecotourism Development	• Expedite the development of identified ecotourism sites, particularly through community-based tourism initiatives. Emphasizing the community's role in managing these sites can foster environmental stewardship and sustainability. • Promote log huts, homestays, and other low-impact accommodations at new and existing ecotourism sites, allowing for increased tourist capacity and immersive nature experiences.
Strengthen Marketing and Promotional Efforts	• Increase visibility for Tripura's ecotourism sites through strategic marketing initiatives, targeting both domestic and international travellers. Highlight unique aspects such as biodiversity, cultural heritage, and traditional crafts to attract eco-conscious tourists. • Establish partnerships with tour operators and travel agencies to promote Tripura as a premier ecotourism destination, drawing attention to the state's scenic landscapes and authentic cultural experiences.
Exploring new models and policies	• Ministry of Tourism, Government of India has formulated a National Ecotourism strategy in the year 2022. It focuses on promoting environmental sustainability, protecting biodiversity, promoting economic sustainability and promoting socio-cultural sustainability. The strategy aims to mainstream sustainability into the tourism sector. Ecotourism and Adventure tourism are the important segments to promote sustainable tourism. It will be advisable to review the guidelines offered in this strategy in order to understand the plan for ecotourism in India based on its rich biodiversity. • This strategy also talks about the planned development of areas in and around protected areas. It also mentions the notification released by the Ministry of Forest, Environment and Climate Change on "Ecotourism guidelines in and around protected areas 2021". The evaluation recommends the project to review this guideline as Tripura has 6(six) PAs throughout state which includes 4(four) Wildlife Sanctuary and 2(two) National Parks. • The project needs to review the existing festivals taking place in different parts of India in order attract both national and international tourists. The Hornbill Festival of

[28] National Strategy on Ecotourism

Aspect	Recommendations
	Nagaland, Cherry blossom Festival of Meghalaya, Rann Festival in Gujarat, are few to be mentioned amongst the famous festivals linked with the nature, culture and land topography. Tripura with its rich resource of forests and wild life along with several ecotourism sites can also be part of this tourism in India. These festivals are opportunities to exhibit the rich and diverse ethnicity of the land through folk dances, traditional music, local cuisine, handicraft, art workshops, etc. • The project can also explore the existing models of ecotourism in India. This includes Kaziranga National Park in Assam, Sundarbans National Park in West Bengal, Kumbalangi in Kerala, Mawphlang Sacred Forest, Meghalaya to name a few. The National parks have dedicated websites which offers several wildlife tours and packages for tourists. The website has all information which will help a tourist to plan their trip including route, means of travel, online booking options for packages and most importantly information on flora and fauna and wild life of the park. The entire process is managed by the state tourism ministry in both the states. Kumbalangi Integrated Tourism Village Project is a unique initiative to transform the tiny island of Kumbalangi into a model fishing village and tourism spot. It is the first of its kind in India and is located in Kochi, Kerala. It is blessed with many natural wonders and the people who visits are treated to many a rare treat. Kumbalangi is surrounded by backwaters. Chinese Fishing Nets cover the island and the village boasts of rich aquatic life. An array of mangroves separate land from water and provide for a good breeding ground for prawns, crabs, oysters and small fish. This model village tourism is also managed by the Kerala State Tourism Ministry. Similar village ecotourism can be promoted in Tripura as it has preserved several water bodies across the state. Mawphlang Sacred Forest, Meghalaya -For centuries now, Khasi customs and traditions have been woven into the land and the forests. One of these forests still retains its significance today – the Sacred Groves of Mawphlang. Visitors are not allowed to take anything away from this hallowed forest, not even a pebble or a twig. The visit includes guided treks within the forest and also it is accessible from the nearest city of Shillong. The site is managed under the Meghalaya Tourism Ministry. The project can explore such forest treks across the Tripura state as it is bestowed with such rich forest lands. • The project can also explore homestay ecotourism especially like in West Bengal, Sikkim, Meghalaya. It is an emerging tourism concept evolved lately in the tourism world. The homestay tourism policy of West Bengal can also be reviewed by the project for further information.

3.4. Agroforestry

Tripura has a large land cover with forests accounting for approximately 60% of the total geographical area. Forest area of Tripura contains mid tropical hill and plain type agro-climatic zone. However, forest lands dedicated to livelihood under forest rights are not well managed. This land can be effectively utilised as cultivable land through agroforestry system in order to enhance livelihoods of the marginal farmers. Agroforestry system produces agriculture, horticulture and forest crops providing 5Fs, Food Fodder, Fuel, Fiber and Fertiliser on the same piece of land by optimum utilisation of land, light and time. It improves soil fertility by using trees particularly nitrogen fixing legume trees and is also highly suitable for raising crops on slope in Tripura where livelihoods with limited lands and soil erosion are main issues.[29]

Over the past four years, the SCATFORM project set an agroforestry target of 4,755 hectares, achieving 3,060.48 hectares or 60% of the goal, benefiting 4,469 individuals. Agroforestry efforts have operated in conjunction with MGNREGA, with the SCATFORM project covering plantation costs and MGNREGA funds covering labor costs. The project has spent approximately Rs. 9.8 crores, while MGNREGA has contributed about Rs. 12.8 crores. The highest area coverage is in South Tripura district, with 548.75 hectares serving 1,164 beneficiaries.

Agroforestry has been introduced as part of livelihood generation. The main objective of agroforestry plantation of SCATFORM is to provide sustainable forest cover and income generation from understorey crops in RoFR land. The opportunities of income generation from RoFR

Model	Plants
I	Agar, Areca nut, Pineapple
II	Agar, Areca nut, Gandaki
III	Agar, Areca nut, lemon, Tapioca, Ginger
IV	Agar, Areca nut, Parkia, Moringa, Tapioca, Ginger
V	Agar, Areca nut, Broom grass, Tapioca

[29] Guidelines on Agroforestry development

land will ensure the sustainability and maintenance of vegetation in RoFR land. Five agroforestry models are operating under the project as indicated in the adjoining table.
Beneficiaries are selected based on land ownership criteria, requiring 0.2 to 4 hectares per beneficiary. After JFMCs identify interested participants, RMUs conduct site verification and submit lists to the Panchayat for further screening. The block level finalizes the list for agroforestry plantation approval. This initiative has been well-received by communities, linking directly to income generation and allowing beneficiaries to choose plant species from the five agroforestry models based on their needs. The project has also created employment opportunities for landless villagers, who participate as labourers, increasing man-days and engaging more community members.

Key Issues and Recommendations

Payment Delays: MGNREGA fund payment delays impact the Forest Department's ability to ensure timely plantation work, making it difficult to engage workers in other tasks until payments are received.

Preference for Rubber Plantations: Large farmers often prefer rubber plantations over agroforestry due to higher profitability. However, rubber cultivation has negative environmental impacts, including deforestation, habitat degradation, water resource depletion, and pollution from chemicals.

Inconsistent Beneficiary Lists: Discrepancies between beneficiary lists from RMUs and Block-level priorities cause implementation issues, as RMU-prepared lists may differ from those generated by the Panchayat based on landholding data.

Lack of Organic Certification: Despite agroforestry guidelines recommending marketing support and organic certification, beneficiaries lack these resources. Consequently, they are unable to pursue organic certification and miss out on premium market opportunities linked to certified organic produce.

The key recommendations related to agroforestry are summarised in the following table.

Area	Recommendation
Revising Plant List	It is recommended to add more species within the AGF models. The existing guidelines need to be revised based on the locally grown plants. Expand species options in agroforestry models to include locally grown plants like areca nut and pineapple, which have high local and regional demand. It is advisable that each RMU maintain an annual calendar to meet agroforestry targets. Further the plantation is done based on the available models. It is advisable that the beneficiaries need to be consulted for selection of species in order to reap proper profits from the yield. They also need to be oriented on the different agroforestry models available for plantation. The agroforestry can be an essential strategy for these small-holder farmers to improve their long-term income generation. The various benefits, such as increased crop yields, diversified income streams, improved land productivity, climate resilience, and carbon sequestration, can help farmers to improve their livelihoods and become more resilient to the challenges of climate change. Agroforestry can be a win-win solution for farmers and the environment as it promotes sustainable land use and increases carbon sequestration.
Benefit sharing	In case of JFMC members not qualifying for the amount of land holding for agroforestry, need to be allowed to use the leased in land for such plantations. The benefits of the plantation can also be shared with the actual land owners. The project can facilitate such discussions on profit sharing in the form of payment of lease amount for the land and percentage of produce from the land.
Linkage with MOVCD	The project can explore organic certification to enhance marketability. The opportunities for partnering with Mission Organic Value Chain Development (MOVCD) can also be planned. It will help to identify pilot sites in select JFMCs where no chemical fertilizers are used, thereby supporting organic farming. Promotion of organic farming within the JFMC areas will be advisable. The project can collaborate with the agriculture department for certification for organic farming. The project can put effort for fetching premium price for organic produce from the land and help the beneficiaries earn a better income.
Training	The beneficiaries for AGF can be trained so that they can calculate their income from the plantation. The species selection can be followed with subsequent discussion on the marketability, profitability, pricing of the produce. This will help them to understand how the plants will help them to gain better profits.

Area	Recommendation
Need for demarcation of land	The land where agroforestry is done is not properly demarcated. This is affecting the selection process of the beneficiaries for agroforestry. The different stakeholders such as Block officials, Panchayat and TFD is facing difficulties in finalising the actual beneficiaries. It is advisable for the project to have joint discussions on the list submitted for agroforestry with Panchayet and Block officials. Joint visits for verification of the land holding is also advisable for the project along with the Panchayat and Block officials.
Formation of Agro-forestry Task Force	An Agroforestry Task Force can be set up under the project. This task force can then coordinate and plan activities such as selection of plants, linkage for organic certification, assessment of value chains and design of marketing strategies. This will provide better support for beneficiaries, improve yields, and enhance market reach.
Beneficiary Selection	The beneficiary selection process must be simplified by enabling joint reviews by RMUs, Panchayats, and Block offices. This would streamline approvals and address inconsistencies in land demarcation and rights of forest resources (RoFR) land management.
Species Study	Annual studies should be conducted on species selection, considering market demand and profitability. Beneficiaries should be encouraged to develop nurseries and conserve seeds to ensure sustainable growth. Small grants could be provided for nursery establishment, adding an additional income stream through sapling sales.
Availability of Funds for Wages	The project must ensure availability of funds for the wages. In case MGNREGA funds are not available or get delayed, the project should explore alternate sources to implement this activity.

3.5. NTFP Centre for Excellence

The NTFP Centre for Excellence (NCE) operates as an autonomous society under the Societies Registration Act of 1860, aiming to organize and develop the NTFP sector in the state. From 2018-19 to 2023-24, NCE spent INR 5.45 crore, representing 34.4% of its total budget of INR 16 crore. Spending delays were primarily due to delayed recruitments and the impact of the pandemic. Currently, two “Crafts & More” outlets are in operation, selling products made by SHGs using NTFPs, including agarwood, bamboo, broom brushes, aromatic products like Gandaki, and medicinal plants. However, expansion has been limited as SHG clusters are yet to form, resulting in minimal linkages. The NCE has undertaken a range of activities to rejuvenate the Agarwood sector, underpinned by the Tripura Agarwood Policy 2021. Key completed initiatives include:

- **Expansion of Agarwood Resources:** TFD through NCE has distributed over 2 million Agarwood seedlings, supported by the SCATFORM project in collaboration with JICA. This initiative enables private Agarwood plantations, primarily on community lands, to foster economic growth through local engagement.
- **Research and Development in Resin Production:** To address the low natural resin production rates, NCE has invested in artificial inoculation research. These efforts aim to boost resin yield and provide a sustainable income source for farmers.
- **Quality and Market Standards:** Collaborating with the Fragrance & Flavour Development Centre (FFDC) and the Central Institute of Medicinal and Aromatic Plants (CIMAP), NCE is establishing BIS certification standards for Agarwood products. This effort ensures product quality and marketability on a global scale.
- **Product Development and Market Linkages:** Under the brand 'TriAgar,' NCE has launched Agarwood-based products, such as perfumes and skincare items. Large-scale buyer-seller meetings organized by NCE have also expanded market access, connecting local producers with international buyers.

The SCATFORM project, supported by JICA, has been integral to these activities, especially in promoting sustainable forest management and community involvement. Through SCATFORM, NCE is aiming to improve rural livelihoods by creating opportunities in Agarwood cultivation, contributing to both ecological sustainability and economic resilience in Tripura. This collaboration with JICA continues to be pivotal in enhancing local capacity and establishing Tripura as a leader in the global Agarwood market

Key Issues and Recommendations

The setting up of the NCE was delayed due to the impact of the pandemic and delays in recruitment. Out of 45 planned centres, only two are currently functional. Linkages with SHGs through clusters are yet to be

established. The NTFP Collection/Primary Processing Centre and Advanced Processing and Value Addition Unit are also yet to be set up. The key recommendations related to NCE are summarised in the following table.

Area	Recommendation
Extension of Project Timeline	An additional two years should be provided to complete planned activities, particularly SHG cluster formation. Clusters should be based on demographic locations to aid NCE expansion, involving all project staff, RMU teams, and Panchayats in planning.
Cluster Formation and Tiered Processing Model	Clusters should focus on specific product-based groups of artisans, with four high-potential locations identified. A three-tier NTFP model could be adopted: • Tier-3: SHG/JFMC members for collection and primary processing • Tier-2: SHG/JFMC members for secondary processing with added value • Tier-1: An entity formed by SHG/JFMC members for advanced processing and value addition
Consortiums and Product Focus	The project should facilitate the formation of SHG consortiums for product marketing and training through Crafts & More. It is advisable for the project to organise JFMC conclaves in different parts of the state in order to promote the activities done by the JFMCs, exposure to best practices and annual exchange of ideas within the state. The project can explore possibilities of establishing more units to process bamboo, broom brushes, and aromatic plants, as these are abundant and eco-friendly. This would require skill building of the entrepreneurs, strengthening of production unit, local advertising followed by marketing support for entrepreneurs. An in-depth market study is also advisable in order to understand the requirement of number of such units in the project areas
Medicinal Plant and Spice Cultivation	NCE should promote processing of medicinal plants like Triphala (Amla, Haritaki, Bhibitaki) and encourage SHGs/JFMCs to cultivate spices like bay leaves and black pepper, which have high market demand. This cultivation can be aligned with agroforestry models.
International Networking	Partnerships with domestic and international organizations, such as Japanese institutions, particularly for expertise in bamboo crafts should be explored.

By addressing these areas, the NCE can enhance its functionality, expand market linkages, and contribute to sustainable income generation for local communities through organized NTFP sector development.

SECTION VI: INSTITUTIONAL STRENGTHENING (COMPONENT 4)

1. Background and Context

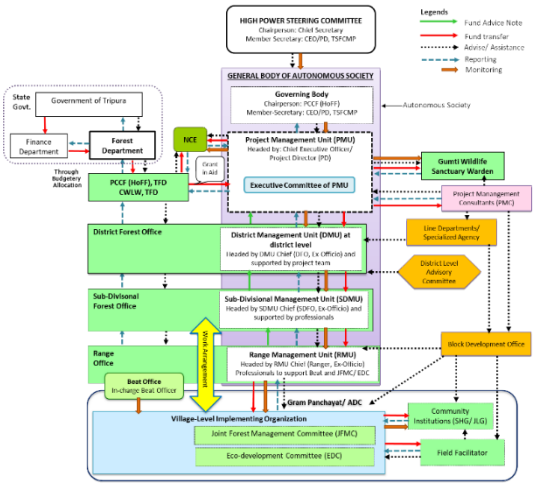
One of the core components of the SCATFORM project relates to strengthening of institutions across various levels through a slew of measures. Activities under this component are divided into two categories, institutional strengthening and project management. Activities under the institutional strengthening category relate to infrastructure and mobility, establishment of GIS/MIS facilities, gender mainstreaming, enhancement of environment and social considerations, capacity development of the TFD and community institutions and forest research. Activities under the project management category relate to preparatory activity for project implementation, Monitoring & Evaluation and phase out. Two modes of implementation are being adopted, namely Department mode and JFM mode.

1.1. Overview of Project Structure, Stakeholder Roles and Convergence

The project operates through a well thought out and robust structure comprising of representatives from various stakeholder organisations. The project is guided by a High Power Steering Committee (HPSC) which is headed by the Chief Secretary of the Government of Tripura. A Project Director of the rank of Chief Conservator of Forests/ Additional Principal Chief Conservator of Forests heads the project and is also a Member Secretary of the HPSC. A Project Management Unit (PMU) acts as the main implementing agency and is registered as an autonomous society. The project has a Governing Body (GB) and an Executive Committee (EC). The Principal Chief Conservator of Forest (PCCF) is the Chairperson of the GB and the Project Director is the Member Secretary.

The PMU receives funds for the project through the Tripura Forest Department (TFD) Head Quarters. Directors have been appointed to head various verticals such as Monitoring & Evaluation, Training, Livelihood and Accounts. They are assisted by Programme Managers who are responsible for managing implementation. A Programme Management Consultant (PMC) supports the PMU in its implementation, planning and strategy preparation.

The TFD structure runs parallel with the project management structure. The District Forest Offices also function as District Management Units (DMU) under the project. District Forest Officers (DFO) head the DMUs as ex-officio chiefs. Similarly, Sub Divisional Forest Offices functions as Sub Divisional Management Unit (SDMU) and Sub Divisional Forest Officer (SDFO) are the ex-officio chiefs. This is followed by the Range Offices which operate as Range Management Units (RMU). Each Range has a Beat Office managed by Beat Officers who are directly responsible for managing Joint Forest Management Committees (JFMCs)/Eco Development Committees (EDC). A Livelihood Coordinator (LC) and two Community Organisers (CO) have been engaged in each range and are required to work in close coordination with the Beat Officer and the Range Officer. The overall structure of the project is depicted in the adjoining exhibit.



Apart from these structures, the project converges with various Departments and schemes. One of the key schemes the project has developed convergence with is the Mahatma Gandhi National Rural Guarantee Scheme (MGNREGS) as part of which employment is being created through plantation activities as well as structures constructed under sustainable forest management. Convergence has also been established with the Tripura Rural Livelihood Mission (TRLM) for training women and staff on various Income Generation Activities (IGA). Other agencies the project is working in tandem with include the National Productivity Council, Fishery Department, State Institute of Public Administration and Rural Development, Regional Water Sports Centre, Atal Bihari Vajpayee Mountaineering Institute, IBRAD, ARDD, Art of Living and Bhaktibikas Kendra among others.

2. Project Outputs and Outcomes at Mid-term Stage

The status of project outputs and outcomes at the mid-term stage as per the log-frame is indicated in the following table.

Indicator	Baseline	Mid-term	Target	Frequency of Measurement	Data Collection Responsibility
Outcome 4 Community and other institutions for forest management and livelihood improvement strengthened					
% of well-functioning JFMCs/ EDCs	Not applicable	100% in MTR survey[30]	80%	Half yearly	DMU
% of well-functioning SHGs	Not applicable	100% in MTR survey[31]	80%	Half yearly	DMU
Output 4.1 Capacity of community institutions developed					
% of JFMCs/ EDCs have approved micro plans	Not applicable	100% of MTR sample	100%	Monthly	DMU
% of targeted beats have approved BFBP	Not applicable	[32]	100%	Monthly	DMU
No. of JFMC/ EDC/ SHG members (gender disaggregated) trained on different aspects of sustainable forest and water management, livelihoods improvement and strengthening institutions	Not applicable	35,380 participants 205 trainings 69% female participants[33]	JFMC – 423 x 10 = 4230 EDC – 27 x 10 = 270 SHG – 450 x 3 x 5 = 6750	Monthly	DMU
No. of trainees from TFD and other concerned agencies participate in different training programs	Not applicable	[34]	-	Monthly	PMU
Output 4.2 Gender aspects mainstreamed in the project					
Gender mainstreaming action plan prepared	Not applicable	[35]	-	Annually	PMU
Number of women in leadership positions in JFMCs/ EDCs	Not applicable	[36]	-	Monthly	PMU
Output 4.3 Forest research on various aspects conducted					
At least X no. of forest research papers are published under the project	Not applicable	2	-	Annually	PMU

3. Sub-Component Analysis

3.1. Infrastructure and Mobility

Implementation Progress at Mid Term

MUCs and Offices

The progress of the infrastructure and mobility interventions under the project has been good. The project has established several types of infrastructure, such as Multi Utility Centres (MUCs) at the JFMC level, buildings at RMU levels, and vehicles for DMUs, SDMUs, and RMUs to facilitate mobility. The project targets include the construction of 4 DMU, 7 SDMU, 7 RMU buildings and 56 Beat offices. Till date, 2 DMU, 3 SDMU offices and 5 RMU buildings have been completed. There are few building constructions which are in process.

[30] It may be noted that the log frame does not specify the criteria that are to be considered for categorising a JFMC as well-functioning. The consultant has considered the parameters of composition of JFMCs, regularity of meetings and maintenance of records as the parameters to classify a JFMC as well-functioning. All sample JFMCs covered in the mid-term survey were found to meet these criteria.

[31] It may be noted that the log frame does not specify the criteria that are to be considered for categorising an SHG as well-functioning. The consultant has considered inter-loaning and purpose of loans as the parameters to classify an SHG as well-functioning. All sample SHGs covered in the mid-term survey were found to meet these criteria.

[32] Information awaited from PMU

[33] Information provided by PMU

[34] Information awaited from PMU

[35] Information awaited from PMU

[36] Information awaited from PMU

This includes 2 DMU, 2 SDMU and 2 RMU buildings. In case of Beat offices, the construction is complete for 22 offices and 6 is in progress. 20 more Beat offices will be constructed under the state fund. Originally, the project aimed to build 450 MUCs, out of which 279 MUCs construction is over and 28 is under process. Older JFMCs continue using Vocational Training Centres (VTCs) from Phase I, though these require repairs. Current MUCs lack basic furniture, leading to record storage challenges.
MUCs constructed for newly formed JFMCs have been built as per approved plans. The MUCs constructed in this phase of the project lack basic furniture such as tables, chairs and storage spaces. In the absence of these records related to JFMCs are kept in the Range Office with the Beat Officer who is also the Member-Secretary of the committee or with the Field Facilitator. MUCs are being used for JFMC and SHG meetings as well as other village meetings. They are also used for community trainings as required. However, there is scope for using these spaces for additional activities so that there is greater realisation of benefits from the infrastructure.

The 151 old JFMCs which have been carried forward from Phase I, are using the previously constructed Vocational Training Centres (VTC) as MUCs. These centres require repair and renovation to make them functional. The progress made with regard to MUC and office construction is summarised in the following table.

Type	Unit	Target	Achievement as on FY 2023-24	Achievement (%)
Multi Utility Centre	No.	450	279	62%
DMU Buildings/DFO Offices	No.	4	2	50%
SDMU Buildings/SDFO Offices	No.	7	3	43%
RMU Offices	No.	7	5	71%
Beat offices	No.	56	22	39%

Source: SCATFORM

While significant progress has been made with respect to construction of MUCs and a 62% achievement level has been attained, the same cannot be said with respect to the construction of DMU, SDMU and RMU offices. The progress made by the mid-term stage was limited with respect to these buildings and it is imperative to hasten progress going forward.

Vehicles

The funds allocated for purchase of vehicles have been utilised primarily for procurement of two wheelers. The largest number of two wheelers (69) have allotted to DMUs and the largest number of four wheelers have been allotted to the SPMU. It is important to note that two wheelers are necessary at the range level so that staff can easily undertake monitoring work. However, only 8 out of the 135 beats have received two-wheelers, despite high demand for them at the range level to facilitate monitoring and mobility. A total fund of Rs. 2,12,00,000 had been allocated for vehicle procurement, and the total expenditure as per information from the PMU was Rs. 2,42,67,475, which is 114% of the total allocation.

3.2. Enhancement of GIS/MIS Facilities

FIGS

The Tripura Forest Integrated Geospatial Solutions (FIGS) is a specialized MIS created with funding from SCATFORM. Developed by Neo Geo Info under a contract signed in 2020, FIGS organizes and manages forest-related project data. After nearly four years of development, it is now operational, providing a centralized database for various forest project information for entire department and not restricted to SCATFORM to ensure suitability after the project. This FIGS, designed with 16 project verticals, supports offline data entry and reporting at all levels. It enables efficient planning, execution, and monitoring, enhancing data accessibility for project staff, even in remote areas with limited internet access. A total fund of Rs. 4,93,51,074 had been allocated for equipment procurement, and the total expenditure as per information from the PMU is Rs. 1,66,46,931, which is 34% of the total allocation. The fund allocation for satellite imagery was Rs. 55,30,000 of which Rs. 7,45,300 has been spent i.e. 13% of the total allocation.

Website

The project has a fully developed website which is periodically updated. The operational manual, various handbooks, list of JFMCs, SHGs, etc are available in the public domain through this website. Of the Rs 9,00,000 budget allocated for website development, Rs. 64,900 was spent on this activity, i.e. 7% of the available budget.

3.3. Gender Mainstreaming

Gender mainstreaming is an approach to policy-making that takes into account both women's and men's interests and concerns. The concept of gender mainstreaming was first introduced at the 1985 Nairobi World Conference on Women. It was established as a strategy in international gender equality policy through the Beijing Platform for Action, adopted at the 1995 Fourth United Nations World Conference on Women in Beijing, and subsequently adopted as a tool to promote gender equality at all levels. In 1998, the Council of Europe defined gender mainstreaming as: The (re)organisation, improvement, development and evaluation of policy processes, so that a gender equality perspective is incorporated in all policies at all levels and at all stages, by the actors normally involved in policy-making. A Gender Action Framework has been developed for the project and lays down the various output and outcome indicators that are required to be tracked as part of the gender mainstreaming strategy.

An impact study on gender was supposed to have been conducted by the mid-term of the project. A budget of Rs. 11,57,600 had been allocated for this study but it is yet to be utilised. Considering the importance of ascertaining the effect project interventions have had on gender mainstreaming, it is suggested that this study be conducted on priority.

Gender mainstreaming training was conducted for forest officials and project staff for two consecutive years in 2022-23 and 2023-24. Field Facilitators had received this training in 2022-23. However, as evidenced from the survey less than 10% of women surveyed had received training support through the project. This is one of the important areas which the project should focus on.

Some of the findings of the SHG household survey that are pertinent from the point of understanding the impact of project interventions on gender dimensions are as follows.

Involvement of Women in JFMCs: Structures such as the JFMCs have certain in-built mechanisms that promote participation of women. Basic criteria have been laid down for JFMCs such as at least 50% of General Body members being women, at least 33% of members of Executive Committee being women and at least one position holder, President/Vice-President/Secretary being a woman. The primary SHG household survey revealed that out of the 436 women interviewed, 204 (47%) women were members of their respective JFMC's EC. However, none of them held leadership positions such as President/Vice President/Treasurer. This points towards the need to orient and capacitate women to not just be members in various groups and committees but to also discharge a substantive role in decision making and implementation.

Participation and Decision Making of Women at Household and Community levels: Interviews were conducted with women SHG members as part of the evaluation. In order to understand the level of participation of women in household and community matters, respondents were asked to indicate the types of decisions that they were usually involved in. It was seen that women's participations was limited in household and community level decision making. The SHG household surveys revealed that less than 40% of women stated that they participated in decision making related to financial matters. Over 92% of respondents stated that at least one woman in their household had a bank account. This implies that they are in a position to access various Government schemes and incentives etc. However, this needs to be accompanied by financial literacy trainings so that women are able to independently handle their accounts as well as participate in financial decision making.

In the same vein, less than 36% of women stated that they participated in health and nutrition related matters. Only 11.7% of respondents stated that they always participated in community matters. This indicates that the voice and participation of women is limited and there is scope for focussing intensively on their capacity building.

Participation in Income Generation: Though women play a limited role in household and community level decision making, a significant proportion contribute to livelihood and income generation. The SHG household survey revealed that 65.4% of households had at least one woman engaged in livelihood activities. The highest proportion of women (43.3%) earned through work they did as part of the SHGs/JLGs, followed by those who had their own business (21.3%). The Average annual income of women engaged in livelihood activities was estimated to be INR 24,854.30.

Training: There is scope for provision of training to women in various areas. The SHG household survey indicated that a relatively small proportion of women had received training. Only 11% of women had received training on digital and financial literacy and 34.2% had received training on livelihood aspects.

Levels of awareness and enrolment in various developmental schemes was relatively low among women. The only schemes which a majority of respondents claimed to be aware included Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (PM-JAY) and Pradhan Mantri Awaas Yojana- Gramin. In terms of enrolment in schemes, it was seen that this too matched with awareness related data. The highest proportion of respondents stated that they had been enrolled in PM-JAY and Pradhan Mantri Awaas Yojana- Gramin.

Government Schemes	% Aware	% Enrolled
Soil Health Card	1.8	0.7
Micro Irrigation- Per Drop more Crop	0.5	0.2
Pradhan Mantri Fasal Bima Yojana	8.0	2.1
Mission for Integrated Development of Horticulture	1.4	1.1
Kisan Credit Card	29.6	8.9
Pradhan Mantri Kisan Samman Nidhi	21.8	7.6
Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (PM-JAY)	80.5	61.9
Mahatma Gandhi National Rural Employment Guarantee Scheme	33.5	31.0
Atal Pension Yojana	6.9	2.1
Pradhan Mantri Awaas Yojana – Gramin	63.5	40.1
National Livestock Mission	3.2	2.1
Animal Husbandry Infrastructure Development Fund	2.1	0.9

3.4. Enhancement of Environment and Social Considerations

A JICA project focused on social and economic development may involve a risk of causing negative impacts on the environment including air, water, soil, and/or ecosystem as well as on community, society such as involuntary resettlement or infringement of rights of indigenous peoples. In order to achieve sustainable development, thus it is imperative that the project's impacts on the environment and society must be assessed, and costs to avoid, minimize, or compensate for those impacts must be integrated into the project itself. This internalization of cost that reduces environmental and social impacts into the development cost is the gist of Environmental and Social Considerations (ESC). JICA's Guidelines for Environmental and Social Considerations (ESC Guidelines) set forth JICA's responsibilities and required procedures, together with obligations of partner countries and project proponents, in order to put ESC into practice.

As per MOD, of the SCATFORM project, significant adverse environmental and social impacts such as land acquisition, resettlement, which require EIA clearance, were not anticipated from interventions. It was also agreed that the project would establish an Environmental and Social Management System to be implemented and monitored based on Environmental and Social Assessment Framework (ESMSF) of JICA and Scheduled Tribe and Forest Dependents Plan Frame Work (STFDPF). Necessary institutional arrangements were to be made at each level by EA for implementation of ESMF/STFDPF in the project. The RMUs were to work on categorization of activities through screening in each JFMCs/EDCs. Category B activities were to be reported through monitoring from RMU to PMU/DMU, and then to JICA.

The activities that were to be undertaken by the mid-term stage included design of an institutional framework for ESMSF/STFDPF and biodiversity assessment. Only 3% of the budget allocated for design of an institutional framework for ESMSF/STFDPF had been spent by the mid-term stage. The project reported that the ESMSF had been developed and grievance redressal cells were being established based on this framework in all divisions. Trainings are reported to have been conducted for project and field staff on the ESMFS. A screening format has also been developed for preparation along with micro-plans.

Biodiversity assessment was supposed to be undertaken and a budget of Rs. 1,14,28,377 was allocated for this, against which spending of Rs. 37,63,877 had taken place by mid-term stage which is 33% of the budget. This spending is against an ongoing study.

3.5. Capacity Development of Forest Department

Capacity building of officials based at the PMU, DMU, SDMU and RMU levels started from the initial years of the project with the majority of training programs conducted at the RMU level. Although training sessions increased over time, units have not consistently maintained records, making it challenging to verify alignment between training and job responsibilities.

The project mandates provision of national/out of state training for officials of the PMU, DMUs and SDMUs for 5 to 6 days a year. Such training programmes however are yet to be provided to officials at the SDMU level. Overseas exposure visits are also yet to commence.

A budget of Rs. 13,87,23,615 was allotted for trainings against which an expenditure of Rs. 5,33,06,796 had been made by the mid-term stage, which was around 38% of the allocation. Considering the fact that the project has reached the mid-term stage, it is important to expedite the remaining trainings. Progress has been much lesser in case of exposure visits. Against a budget of Rs. 6,83,88,440, a mere Rs 32,82,955 or 4.8% had been spent at the mid-term stage. This is a crucial area and the remaining visits must be planned and organised on a war footing so that the target can be achieved in the remaining period of the project.

The JICA Review Mission's February 2024 report had also highlighted the need for more national and international training sessions. Recommendations had included frequent training needs assessments, master trainer identification, and training on cluster management, gender mainstreaming, ecotourism, monitoring, evaluation, and social auditing.

3.6. Forestry Research

Forestry research is one of the focus areas of the project and the Operation Manual specifies that research would be undertaken on vegetative propagation techniques and productivity of high value species. Desk review and discussions with the PMU indicated that forestry research activities focussed on biodiversity assessment, forest protection, Jhum farming, bio-physical interventions scoping study and IEC scoping for JFMCs. These research studies were undertaken in collaboration with external agencies such as IORA Ecological Solutions Pvt. Ltd. and Tripura University. These studies aim to improve forest management and conservation practices through evidence-based research.

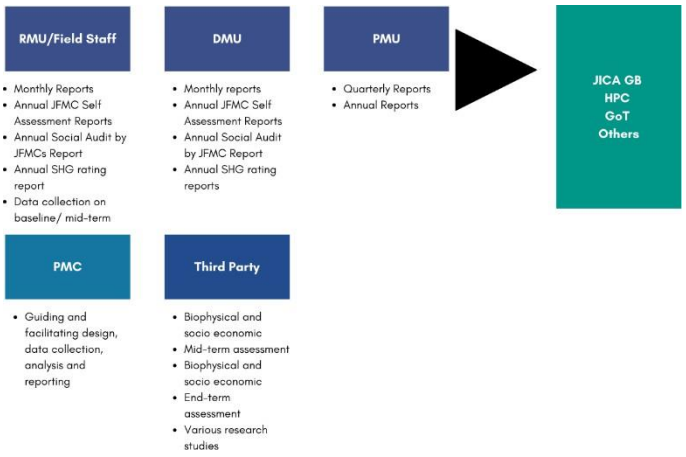
Key Research Areas	Research and Technology Transfer				
	2019-2020	2020-21	2021-22	2022-23	2023-24
Biodiversity Assessment					
Forest Protection					
Jhum Farming					
Bio-physical interventions scoping study					
IEC materials development scoping for JFMC					

Research is yet to be conducted in the area of Jhum farming. This is a crucial area in which extensive study and research are necessary. The project requires to focus on completing all remaining research studies. In addition to merely commissioning the research studies, the project must take steps to ensure dissemination of findings emerging from them so that relevant stakeholders are able to adopt recommended practices. Knowledge sharing workshops and seminars would also be helpful for disseminating useful recommendations and suggestions among a larger audience.

3.7. Publicity and Communication

Several publicity activities have been undertaken to ensure awareness creation regarding the project. The methods of publicity have included newsletters, leaflets and pictorial representations.18 editions of a monthly newsletter were published between FY 2020-21 and FY 2022-23. In addition, a variety of leaflets related to the project objectives and strategies (English and Bengali) and pictorial representation of project activities till August 2022 and awareness of government schemes (English, Kokborok and Bengali) were designed.

3.8. M&E



An M&E strategy has been designed for monitoring and assessing the project. The strategy laid down aspects such as roles and responsibilities of stakeholders, M&E plan and timing of M&E activities. The M&E strategy clearly laid down the roles that were to be discharged by various stakeholders across all levels of the project.

Each of the stakeholders/institutions had been bestowed with specific responsibilities in terms of M&E activities that they need to perform and reports they need to prepare. The RMU and DMU levels are supposed to prepare monthly reports, annual JFMC self-assessment reports, annual social audit reports and annual SHG reports. The RMUs in addition are supposed to undertake data collection at baseline and mid-term stages. The PMU is supposed to prepare quarterly and annual reports. The PMC is mandated to guide and facilitate design, data collection, analysis and reporting activities.

Apart from the reporting activities, regular meetings are to be conducted various levels. The strategy mandates that fortnightly meetings should be conducted at the RMU level. Livelihood Coordinators (LC) and Community Organizers (CO) are supposed to participate in these meetings with the concerned Beat Officers/ Forester Chiefs. The RMU Chiefs preside over these meetings which focus on planning and review of forestry, soil and moisture conservation, livelihood and institutional work at the activity level.

Monthly meetings are organised at the DMU level with participants from the RMU, DMU and field staff. The agenda of these meetings is to assess the status of activities planned and if not, the reasons thereof and course corrections required so that future plans can be implemented in a timely and effective manner. There are two forest circles viz. North and South in Tripura in which the project area of SCATFORM is located. Quarterly meetings are undertaken at the circle level and Directors, PMC experts, CFs, DMU chiefs and LCs are required to attend. The agenda of these meetings is to review plans vis a vis achievement, issues, insights and opportunities.

It was observed that as laid down in the M&E strategy, MPRs are being prepared by the divisions and are being submitted to the PMU by the tenth of the next month. These reports cover physical as well as financial progress of the project. Apart from this reporting, monthly review meetings are conducted with all DMUs either at PMU Prakriti Bhavan or at the Forest Department headquarters. Quarterly review meetings are also conducted to discuss the progress of the project and its challenges. An annual review meeting is also held with all DMUs to take note of the entire year's activities and fund utilisations. These meetings have started taking place in a structured manner from the 2022-23.

The PMU has constituted a field monitoring team consisting of six Programme Managers (PM). Each PM is responsible for at least one district and is required to administer a monitoring checklist in a specified format. The checklist captures information related to quantitative aspects of the project components only. Qualitative aspects are not covered under this checklist. The implementation challenges at the grass root level are not covered under this checklist. Any meetings conducted with JFMCs and SHGs are also not recorded in the checklist.

Designated Officer	District	No. of Ranges
PM M&E	North Tripura and Gumti Wild Life Sanctuary	6
PM Communications	Sepahijala	5
PM Livelihood	South Tripura and Gomati	9
PM FT	West Tripura	3
PM Agroforestry	Unakoti	5
PM Training	Khowai	5

Monitoring of fund utilisation is done on a monthly basis. Accounts are shared by each division in terms of budget vs expenses. MPRs are compiled by the monitoring team to check whether targets have been achieved.

4. Recommendations

The following table summarises the key recommendations that have emerged based on analysis of activities undertaken as part of this component of the project.

Area	Recommendation
Infrastructure	• While MUCs have been constructed, they lack basic furniture which is affecting their functionality. Required funds could be allocated for procurement of basic furniture and equipment which would aid in more effective utilisation of the MUCs. • MUCs and VTCs are supposed to be used extensively by community members. At present these centres are being used for conducting meetings and trainings. However separate toilet facilities are not available for men and women. This is an important lacuna which should be addressed by the project. • VTCs are being used in case of some of the JFMCs. Many of these are in need of repair and renovation. These community spaces were created in the previous phase of the project and are equipped with basic furniture. Repairing these centres would be useful for the community. • MUCs and VTCs are mainly being used as venues for meetings and trainings. The rest of the time the space is lying unused. There is a need to explore ways in which these centres can be used instead of lying empty. For instance, parts of the centres could possibly be used for temporary storage of commodities that are to be sold etc. • Effective monitoring calls for regular visits by TFD and project staff. It is therefore important to ensure that an adequate number of vehicles are made available at all levels including the RMU level. • In addition to purchase of vehicles, adequate funds should be set aside for meeting fuel and maintenance costs to ensure unhindered mobility of officials and project staff.
Publicity and Communication	• SCATFORM should ensure availability of requisite funds for publicity and communication activities for creation and digital contents, use of social media handles, printing of pamphlets and other materials for spreading awareness. • It is advisable to acquire information and materials for publicity and communication. Range of communication materials can be collected from different functioning areas and interventions of the project. It can include success stories, case studies and best practices document based on the innovations carried out within the project. Materials can be developed based on all good practices on different models of plantations, agroforestry, alternative livelihood practices, social security schemes, etc. • The project can plan for the best possible way for design and dissemination of publicity materials. Frequency of the publications can be based on the type of information and the purpose of dissemination. The language of all materials can be decided based on the target audience. The project should also explore innovative ways of publicity including wall painting especially with pictorial presentation.
FIGS	• The FIGS has been designed and now operational; data which was maintained in Excel files are being transferred to backend databases. This process needs to be expedited. • Staff across all levels need to be trained on using the FIGS and on troubleshooting support.
Gender Mainstreaming	• Gender mainstreaming trainings were conducted for JFMCs in FY 22-23 and one member from each JFMC was trained. Subsequently refresher or follow up training have not been organised. Renewed focus needs to be laid on provision of training on gender mainstreaming needs to implemented at all levels. Areas of trainings could also include functioning of JFMCs, financial literacy, relevant Government schemes etc. • Though women are members of JFMCs, most are yet to assume leadership roles in these committees. There is need for provision of training and supervisory support to women to enable them to discharge the roles assigned to leadership positions. • Male members of JFMCs need to be equipped with gender training in order to ensure a conducive environment for women's participation. • The project plan had stated that Gender Coordinators would be appointed and Gender Committees would be formed. These activities are yet to be taken up and considering the fact that the project has reached its mid-term, it is crucial to ensure that these are completed at the earliest.

Area	Recommendation
Capacity Building	• As the project has already crossed the mi-term stage, high tech training facilities should be made available at all level so that online trainings can be conducted in a timebound manner • Refresher trainings need to be organised in areas such as cluster establishment and management, gender mainstreaming, ecotourism, M&E and social audit. • An adequate number of training of trainers programmes should be conducted for officials who can be engaged as master trainers. A master trainer record should also be maintained so that frequent training programmes can be conducted. • Exposure visits need to be organised for officials within the state and also nationally. The overseas visits need to be well thought of before they are organised. All visits need to be planned and scheduled well in advance. • Project materials on sustainability, IGA models, and SMC should be developed potentially in collaboration with institutions like the Centre for Forest-based Livelihoods and Extension.
M&E	• The project should develop a set of guidelines for activities such as resource reallocation, schedule adjustments, and budget updates, to ensure effective implementation. • Participatory monitoring mechanisms should be used during field visits with JFMCs and SHGs to assess progress, address challenges, and foster community involvement. • Qualitative aspects should be included in monitoring checklists and situation analysis should be emphasised in regular review meetings.
Phase Out Preparation	• Phase-out activities should be initiated alongside ongoing implementation, such as asset inventory, training for JFMCs/EDCs, and revisiting the Micro Plan. • Annual Micro Plan reviews should be conducted with community involvement, facilitated by forest officials. • Risk assessments should be performed based on sustainability indicators and prepare for withdrawal of activities. • Best practices and lessons learned should be systematically documented for future reference. • All project assets should be transferred to JFMCs, providing necessary instructions and resources for maintenance and continued use.