

Template/Pro forma for Submission

NMHS-Himalayan Institutional Project Grant

**NMHS-FINAL TECHNICAL REPORT (FTR)**

Demand-Driven Action Research and Demonstrations

NMHS Grant Ref. No.:	GBPNI/NMHS-2019-20/MG/316
----------------------	---------------------------

Date of Submission:	3	0	0	7	2	0	2	4
	d	D	m	m	Y	y	y	y

**PROJECT TITLE (IN CAPITAL)**

**“INCREASING CARBON SEQUESTRATION AND PROMOTING CONSERVATION OF DECLINING LIFE SUPPORT FOREST TREE SPECIES THROUGH COMMUNITY PARTICIPATION IN KOHIMA DISTRICT OF NAGALAND”**

**Project Duration: from (15/10/2019) to (30/06/2024).**

**Submitted to:**

Er. Kireet Kumar

Scientist 'G' and Nodal Officer, NMHS-PMU

National Mission on Himalayan Studies, GBP NIHE HQs

Ministry of Environment, Forest &amp; Climate Change (MoEF&amp;CC), New Delhi

E-mail: nmhspmu2016@gmail.com; kireet@gbpihed.nic.in; kodali.rk@gov.in

**Submitted by:**

Shri. Supongnukshi, IFS

Chief Conservator of Forest (EBR)

Department of Environment, Forests &amp; Climate Change

Nagaland: Kohima

E-mail: supong\_1@yahoo.co.in

# NMHS-Final Technical Report (FTR) *template*

## Demand-Driven Action Research Project

DSL: Date of Sanction Letter

1	5	1	0	2	0	1	9
d	d	m	m	y	y	y	y

DPC: Date of Project Completion

3	0	0	6	2	0	2	4
d	d	m	m	y	y	y	y

### Part A: Project Summary Report

#### 1. Project Description

i.	Project Grant Ref. No.:	GBPNI/NMHS-2019-20/MG/316	
ii.	Project Category:	Medium Grant	
iii.	Project Title:	<b>Increasing Carbon Sequestration and Promoting Conservation of Declining Life Support Forest Tree Species through Community Participation in Kohima District of Nagaland</b>	
iv.	Project Sites (IHR States/ UTs covered) <i>(Location Maps attached):</i>	Only in one State (i.e Nagaland)	
v.	Scale of Project Operation:	Local	
vi.	Total Budget:	Rs.3,31,05,525 (in Cr)	
vii.	Lead Agency:	Department of Environment, Forests & Climate Change Government of Nagaland	
	Lead PI/ Proponent:	Shri. Supongnukshi, IFS Chief Conservator of Forest, Evaluation, Research & Biodiversity Department of Environment, Forests & Climate Change Government of Nagaland	
	Co-PI/ Proponent:	1. Smti. Zuthunglo Patton, IFS Conservator of Forest (Southern Territorial Circle, Department of Environment, Forests & Climate Change, Nagaland) 2. Dr. K. Chandra Sekar, Scientist-E (Department of Biodiversity Conservation) GB Pant Institute of Himalayan Environment and Sustainable Development, Almora, Uttarakhand	
viii.	Implementing Partners:	GB Pant Institute of Himalayan Environment and Sustainable Development, Almora, Uttarakhand	
	Key Persons ( Details, E-mail):	1. Shri.Supongnukshi, IFS E-mail: supong_1@yahoo.co.in 2. Smti. Zuthunglo Patton, IFS Email: cfstcnagaland001@gmail.com	

#### 2. Project Outcomes

## 2.1. Abstract/ Summary

**Introduction:** The Japfü Range and Dzükou Valley are vital components of a unique Himalayan ecosystem, providing essential ecosystem services, including water supply and biodiversity support, to Kohima, Nagaland's state capital. These regions are crucial for the area's environmental and agricultural sustainability but face significant threats from natural and human-induced factors, such as climate change and deforestation. The project "Increasing Carbon Sequestration and Promoting Conservation of Declining Life Support Forest Tree Species through Community Participation in Kohima District of Nagaland" aims to address these challenges by enhancing carbon sequestration and conserving endangered tree species through community engagement.

The project, initiated in 2021, is a collaborative effort between the Nagaland Department of Environment & Climate Change and the GB Pant Institute of Himalayan Environment and Sustainable Development, funded by the National Mission on Himalayan Studies. It targets five villages: Phesama, Kigwema, Viswema, Jakhama, and Khuzama. Key activities include generating baseline data on vegetation and biodiversity, establishing Community Conservation Areas, and engaging communities in climate change mitigation and natural resource conservation.

**Methodology:** The project focuses on baseline data collection, including plant biodiversity and socio-economic uses of plants, and aerial surveys using UAV photography. The core interventions involve community participation in plantations and soil and water conservation, especially in catchment areas.

**Expected results:** It include increased carbon sinks through mass plantations, comprehensive baseline data on plant biodiversity, documentation of plant uses, stock and thematic mapping, in-situ biodiversity conservation, development of conservation protocols, and enhanced community awareness and capacity for sustainable development and conservation efforts. This holistic approach aims to institutionalize conservation practices and promote sustainable use of land and water resources in Kohima District.

**To ensure the project's sustainability, several key strategies are recommended:**

1. Establish local governance structures to manage Community Conservation Areas, ensuring their maintenance and monitoring.
2. Continue training programs to empower local communities, especially women, in sustainable practices and alternative livelihoods like horticulture and animal husbandry.
3. Engage with policymakers to integrate the project's findings into regional and national conservation policies for long-term support and funding.
4. Develop sustainable economic activities such as agroforestry and eco-tourism to reduce dependency on natural forests.
5. Foster a sense of ownership among local communities by involving them in decision-making and benefit-sharing processes.

6. Implement a robust monitoring and evaluation framework to assess the project's impact and adapt strategies as needed.
7. Gradually transition project responsibilities to local institutions and community groups, ensuring they have the necessary skills and resources to continue conservation efforts independently.

## 2.2. Objective-wise Major Achievements

Sl. No	Objectives	Major achievements ( <i>in bullets points</i> )	Remarks
1	Generating baseline data on vegetation and plant biodiversity, collecting household data for monitoring socio-economic and ecosystem health, and aiding in formulating and implementing future conservation strategies.	<ul style="list-style-type: none"> <li>• The generation of baseline data, as outlined in the objectives, has been successfully accomplished.</li> <li>• The microplan data were successfully completed and submitted during the Monitoring &amp; Evaluation meeting held at the Ministry of Environment, Forests and Climate Change in New Delhi on May 29, 2024.</li> <li>• The floristic diversity assessment was developed with the technical expertise of a proficient taxonomist from Kohima Science College, Jotsoma, Nagaland, and has been included in the FTR Report.</li> </ul>	The details to be further summarized in DPR, Part B, Section-5 with the supporting documents attached.
2	To facilitate the establishment of Community Conservation Areas.	<ul style="list-style-type: none"> <li>• The CCA Management Plan was developed through comprehensive consultations with stakeholders, accompanied by data collection using a questionnaire addressing various CCA-related management issues.</li> <li>• CCA was established on a total area of 300 hectares, formalized through a bond of agreement between the two parties as part of an MoU. This MoU has been incorporated into the CCA Management Plan document.</li> </ul>	

3	Engage the community in climate change mitigation and conservation of land and water through forestry activities like planting and soil water conservation.	<ul style="list-style-type: none"> <li>• All five villagers have periodically organized one-day social work events to clear the jungle for plantation activities.</li> <li>• During the project's duration, community afforestation drives were organized at various CCA sites on multiple occasions. Approximately two hundred thousand trees were planted, primarily including species such as Alder, Oak, Toona ciliata, Cherry, Bauhinia, Wild Apple.</li> <li>• Nurseries were established in all five designated villages and in three Forest Department divisions, under the proper guidance and supervision of the Forest Department.</li> <li>• Throughout the plantation season, the Forest Department provided technical guidance, educating the villagers on standard plantation techniques, including proper spacing, staking, pit digging, and maintenance frequency. Frontline personnel closely supervised the entire process to ensure compliance with these methods.</li> <li>• Forest fire suppression through the deployment of stewards has successfully resulted in the establishment of a 20-kilometer firebreak.</li> </ul>	The details to be further summarized in DPR, Part B, Section-5 with the supporting documents attached.
---	---	---	--

4	To build capacity through training programs and awareness campaigns.	<ul style="list-style-type: none"> <li>• Awareness and sensitization initiatives on Climate Change issues, including biodiversity conservation in Dzukou Valley &amp; Japfu Range, climate change inequality, and the impact of climate change on biodiversity, have been conducted extensively across villages at all administrative levels;</li> <li>• Women are the most vulnerable to climate change impacts and hence their livelihood concerns are being addressed through establishing self-help groups (SHGs) and supporting them by providing trainings and materials as well as revolving fund;</li> <li>• Banning of hunting, fishing and collection of firewood, etc by the villagers and to this effect, the village community has displayed signboards and signages in different zones on prohibition of hunting, fishing etc and initiated a quick response team to check any untoward incident within their respective jurisdictions;</li> </ul>	The details to be further summarized in DPR, Part B, Section-5 with the supporting documents attached.
---	--	--	--

*Note:* Further details may be summarized in DPR Part-B, Section-5. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

### 2.3. Outputs in terms of Quantifiable Deliverables\*

Sl. no	Quantifiable Deliverables*	Monitoring Indicators*	Quantified Output/ Outcome achieved	Deviations, if any, & Remarks thereof:
1	Nursery expansion and saplings production	An aggregate area of 300 hectares was set aside under the Community Conservation Area (CCA), with each village encompassing 60 hectares.	Approximately Two hundred thousand saplings, including Toona ciliata, Oak, Alder, and Cherry, Wild Apple, Bauhinia species, were planted across all five village CCA designated areas during the plantation drive. This concerted effort significantly contributed to carbon sequestration and the	The details to be further summarized in DPR, Part B, with the supporting documents attached.

			regeneration of crucial life-supporting tree species.	
2	Acreage of Forests under community conservation	The cartographic delineation of Five Village Community Conservation Areas, along with the completion of grid survey stock mapping, has been accomplished.	The NMHS Survey team has conducted a comprehensive drone survey across all five designated Community Conservation Area (CCA) zones, followed by thematic mapping.	The details to be further summarized in DPR, Part B, section 5 with the supporting documents attached.
3	Management practices for conserving the flora of the region.	Baseline data base on plant groups.	All Five Villages have prepared the Management plan for conservation of CCAs which includes various strategies for management of flora.	Have submitted all the Five villages CCA Management plan manual during the time of M&E meeting at MOEFCC, Delhi on May 29 2024.
4	Documentation of economic/socio-economic uses of plants.	Documentation of economic/socio-economic uses of plants occurring in the region with future potentials of plants has been well documented by a proficient Taxonomist.	A skilled taxonomist from the Botany Department of Kohima Science College has meticulously documented the economic and socio-economic value of indigenous plants in the region, highlighting their potential contributions to the local economy.	The details to be further summarized in DPR, Part B, with the supporting documents attached.
5	Documentation of Flora, conservation of plant diversity through in-situ conservation	The models and knowledge products cultivated from the Five NMHS designated villages are disseminated in the Community Conserve	The comprehensive Documentation of floral diversity has been diligently undertaken and is presently being assimilated into the CCA Management Plan handbook. Documentation	The details to be further summarized in DPR, Part B, with the supporting documents attached.

		Area (CCA) Management Plan.	encompassing scientific nomenclature, colloquial appellations, and indigenous vernacular references.	
6	Number of Awareness, trainings conducted.	10 awareness sessions and training workshops were conducted across all five villages on various occasions.	<p>1. Successfully conducted orientation and discussion sessions on the CCA Conservation Plan across all five villages. A total of 127 participants actively engaged in the program.</p> <p>2. In all five villages, emphasis was placed on the recognition of climate change mitigation and the overarching project objectives. A collective sum of 345 beneficiaries participated in the program.</p>	The details to be further summarized in DPR, Part B, with the supporting documents attached.
7	Number of Awareness, cleanliness drive & trainings conducted.	10 awareness sessions and training workshops, the setting up of Signages & Display Boards were conducted across all five villages on various occasions.	<p>1. A one-day, hands-on training session for the SHGs on livelihood sustainability was conducted with the women of Five Villages. A total of 60 participants engaged in the event.</p> <p>2. Under the Merilife campaign, the NMHS team organized a seminar on Lifestyle and the Environment in five villages, led a cleanliness drive with dustbin distribution, and participated in service at village churches for World Environment Day. 1875 villagers participated in</p>	The details to be further summarized in DPR, Part B, with the supporting documents attached.



these events.

**3.** Established across the five villages are five distinct signages and two prominent display boards aimed at fostering awareness regarding climate change and conservation through the dissemination of informative posters.

**4.** A sensitization program highlighting the significance of conserving the Dzukou Valley and its implications for the broader Himalayan Biodiversity region was organized as part of the Azadi Ka Amrit Mahotsav initiative. The event garnered participation from 105 beneficiaries.

**5.** The inauguration of the CCA Management Plan manual at an event graced by delegates from five project villages, alongside other Forest officials, signifies a pivotal stride towards bolstering climate resilience and fostering sustainable development. The gathering drew a total of 87 participants.

**6.** Institutions and organizations within the NMHS-designated villages received financial aid to establish Eco-Clubs. They also organized a one-day essay competition with the theme "Green Nagaland," in which a total of 1,518 students actively participated and pledged their support for a clean environment.

**7.** In collaboration with the NMHS team, the Southern Angami Students Union (SASU) organized a one-day environmental stewardship initiative along the route to the pristine Dzükou Valley. This cleanliness effort was executed with remarkable success, resulting in the thorough collection and proper disposal of litter into designated waste pits. A total of 13 participants took part in the drive.

**8.** As part of the project initiatives, the NMHS team has provided an array of firefighting equipment and safety gear to the Southern Angami Students Union. The program was attended by a total of 20 participants.

8	No. of National & International conference attended.	The Nagaland NMHS officials participated in One National & Two International conferences and submitted Abstract & delivered a PowerPoint presentation on the project's theme.	<ul style="list-style-type: none"> <li>The SRF of NMHS, in recognition of the project's commendable efforts, was bestowed with the prestigious Best Presenter Award on occasions at International Conferences, held both at Nagaland University (Bioresources &amp; Bioeconomy) and on the esteemed platform of IIT Guwahati (River Corridor Research &amp; Management).</li> <li>Also attended One National conference sponsored by NMHS on “Reviving traditional knowledge for Biodiversity Conservation” organized by the Department of Zoology, Nagaland University Lumami, Nagaland.</li> </ul>	The details to be further summarized in DPR, Part B, with the supporting documents attached.
---	--	---	--	--

\*As stated in the Sanction Letter issued by the NMHS-PMU.

## 2.4. Strategic Steps with respect to Outcomes

Sl.no	Particulars	Number/ Brief Details	Remarks/ Attachment
1.	New Methodology/ Technology developed, <i>if any</i> :	<ul style="list-style-type: none"> <li>• The consultation for the Community Conservation Area was successfully launched across all five villages, culminating in the publication of its management plan.</li> <li>• There is a significant opportunity to enhance wildlife conservation, as villagers begin to establish their own protocols to mitigate hunting and fishing within their jurisdiction. By imposing fines and issuing severe warnings to violators, they are proactively contributing to the preservation of wildlife in accordance with the Wildlife Protection Act of 1972.</li> <li>• Surveying using High end drone applied technology for the Surveying works in the field which is first of its kind in the state.</li> </ul>	The details to be further summarized in DPR, Part B, Section-5 with the supporting documents attached.
2.	New Ground Models/ Process/ Strategy developed, <i>if any</i> :	Same as above	

Sl.no	Particulars	Number/ Brief Details	Remarks/ Attachment
3.	New Species identified, <i>if any</i> .	<ul style="list-style-type: none"> <li>Two endemic taxa to Naga Hills (Nagaland &amp; Manipur) viz., <i>Rhododendron elliottii</i> Watt ex Brandis and <i>Rhododendron macabeanum</i> G.Watt ex Balf.f. was recorded.</li> <li>Three taxa viz., <i>Calanthe lamellose</i> Rolfe, <i>Jasminum fuchsiifolium</i> Gagnep and <i>Vaccinium exaristatum</i> Kurz, which were earlier reported as new record for India was also recorded.</li> <li>The present work resulted in the documentation of a new generic record for Nagaland of Genus <i>Cissampelopsis</i>.</li> </ul>	The details to be further summarized in DPR, Part B, Section-5 with the supporting documents attached.
4.	New Database established, <i>if any</i> :	Yes, for the five village	Baseline data includes microplan and CCA management Plan
5.	New Patent, <i>if any</i> :		
	I. Filed (Indian/ International)		
	II. Technology Transfer, <i>if any</i> .		
6.	Others, <i>if any</i>		

*Note:* Further details may be summarized in DPR Part-B, Section-5. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

### 3. New Data Generated over the Baseline Data

Sl.no	New Data Details	Status of Existing Baseline	Addition and Utilisation New data
1	Microplan data.		This data can serve as a valuable reference for any other development-related activities within the village
2	CCA Management plan data.		This data can serve as a valuable reference for any other development-related activities within the village
3	Floristic Diversity Assessment data.		This data can be utilized for further research purposes.
4	Thematic mapping and surveying utilizing drones within the vegetative regions of the Five villages.		This data can serve as a valuable reference for any other development-related activities within the village.

*Note:* Further details may be summarized in DPR Part-B. Database files in the requisite formats (Excel) may be enclosed as annexure/ appendix separately to the soft copy of FTR.

#### 4. Demonstrative Skill Development and Capacity Building/ Manpower Trained

Sl.No	Type of Activities	Details with number	Activity Intended for	Participants/Trained			
				SC	ST	Women	Total
1.	Workshops	5 times (Details to be summarized in DPR Part B with the supporting materials)	<ul style="list-style-type: none"> <li>Highlighted the significance of climate change mitigation and articulated the project objectives to the stakeholders.</li> <li>Orchestrated Merilife campaign initiatives across churches and various organizations, alongside distributing dustbins and designating villages as plastic-free zones.</li> <li>Organized a sensitization program focused on the conservation of Dzükou Valley, as part of the Azadi Ka Amrit Mahotsav initiative.</li> <li>Conducted orientation sessions on CCA Management Plan.</li> <li>The unveiling of the CCA Management plan manual &amp; CCA Management Plan workshop.</li> </ul>		2539		2539
2.	On-Field Trainings	Details to be summarized in DPR Part B with the supporting materials	<ol style="list-style-type: none"> <li>Trained all the Five villages Field Assistants on how to handle GPS.</li> <li>Have trained Village stewards to ensure checking of Forest fire and to take rapid actions like cutting firelines and handling of forest fire fighting equipments.</li> <li>Trained on Nursery Maintenance to the village folks.</li> <li>Displayed planting techniques.</li> </ol>		35	8 out of 35	35
3.	Skill Development	Details to be summarized in DPR Part B with the supporting materials	Held a one-day training session on livelihood sustainability		60	60	60

4.	Academic Supports	Details to be summarized in DPR Part B with supporting materials	Institutions and organizations in the Five Villages area were actively engaged, receiving financial assistance to establish the Eco-Clubs. They also organized essay and painting competitions under the theme 'Green Nagaland'.	1518	1518
	Others (if any)				

*Note:* Further details may be summarized in DPR Part-B. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

## 5. Linkages with Regional & National Priorities (SDGs, INDC, etc.)/ Collaborations

Sl.No	Linkages /collaborations	Detail of activities (No. of Events Held)*	No. of Beneficiaries
1.	Sustainable Development Goals (SDGs)/ Climate Change/AICHI targets addressed	<p><b>SGDs- Goal 3-</b> Good Health and Well-being.</p> <p><b>Goal 5-</b> Gender Equality.</p> <p><b>Goal 6-</b> Clean Water and Sanitation.</p> <p><b>Goal 7-</b> Affordable and Clean Energy.</p> <p><b>Goal 11-</b> Sustainable Cities and Communities.</p> <p><b>Goal 13-</b> Climate Action.</p> <p><b>Goal 15-</b> Life on Land.</p> <p><b>Goal 16-</b> Peace, Justice, and Strong Institutions.</p> <p><b>Goal 17-</b> Partnerships for the Goals.</p>	4150
2.	AICHI target goals addressed	<p><b>AICHI- Goal 1-</b> Address underlying causes of biodiversity loss.</p> <p><b>Goal 2-</b> Reduce direct pressures on biodiversity.</p> <p><b>Goal 3-</b> Safeguard ecosystems, species, and genetic diversity.</p> <p><b>Goal 4-</b> Enhance benefits to all from biodiversity and ecosystem services.</p> <p><b>Goal 5-</b> Enhance implementation through participatory planning, knowledge management, and capacity building.</p> <p><b>Goal 6-</b> Mobilize resources</p>	4150

*Note:* \*Further details may be summarized in DPR Part-B, Section-6. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.



## 6. Project Stakeholders/ Beneficiaries and Impacts

Sl. no	Stakeholders	Support Activities	Impacts in terms of income generated/green skills built	Attachment
1.	Line Agencies/ Village Panchayats:	Support the guidelines, allowed to implement the project, Coordinate to ensure timely and quality data, Organize social work and provide man power as contribution to project cost, Maintenance of Plantation and structures constructed, Provide necessary local technical and logistic supports	Income generated and skills built.	The details to be further summarized in DPR, Part B, Section-6 with the supporting documents attached.
2.	Govt Departments (Agriculture/ Forest/ Water):	Bring scientific knowledge to the forefront, Carry out mapping and survey works, Data analysis and report preparation, Technical guidance to the Village Council/Community/Landholder, Provide resource person, Provide training materials, Organize camps, Exposure visits.	Skills built	
3.	Villagers/ Farmers:	Nursery-raising skills, Plantation skills, awareness.	Skills built	
4.	SC Community:			
5.	ST Community:	All the stakeholders belong to ST Community	Skills built	
6.	Women Group:	Pickle making skills	Income generated & skills built	
	Others, <i>if any</i> : Schools, Institutions, Churches etc	Organize social work and provide man power as contribution to project cost.	Sensitized on the importance of conservation and its impact on the environment.	

*Note:* Further details may be summarized in DPR Part-B, Section-6. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

## 7. Financial Summary (Cumulative)

Please attach the consolidated and audited Utilization Certificate (UC) and Year-wise Statement of Expenditure (SE) separately, *ref. Annexure I.*

## 8. Major Equipment/ Peripherals Procured under the Project\*\* (*if any*)

Sl. no	Name of Equipment	Quantity	Cost (INR)	Utilisation of the Equipment after project
1.				
2.				

\*\*Details should be provided in details (*ref. Annexure III &IV*).

## 9. Quantification of Overall Project Progress

Sl. No.	Parameters	Total (Numeric)	Remarks/ Attachments/ Soft copies of documents
1.	IHR States/ UTs covered:	1	Nagaland
2.	Project Sites/ Field Stations Developed:	5 villages	To be summarized in DPR Part-B with supporting materials.
3.	Scientific Manpower Developed (PhD/M.Sc./JRF/SRF/ RA):	Deployment of 2 SRF, 2 JRF and 5 Field Assistants	To be summarized in DPR Part-B with supporting materials.
4.	Livelihood Options promoted	Around 60 Women folks from 5 villages	To be summarized in DPR Part-B with supporting materials.
5.	Technical/ Training Manuals prepared	Microplan, CCA management plan, Floral diversity assessment	To be summarized in DPR Part-B with supporting materials.
6.	Processing Units established, if any		
7.	No. of Species Collected, if any	300	To be summarized in DPR Part-B with supporting materials.
8.	No. of New Species identified, if any	6	To be summarized in DPR Part-B with supporting materials.
9.	New Database generated (Types)	Yes (1)	To be summarized in DPR Part-B with supporting materials.
	Others (if any)		

*Note:* Further details may be summarized in DPR Part-B. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

**10. Knowledge Products and Publications:**

Sl.no	Publication/ Knowledge Products	Number		Total Impact Factor	Remarks/ Enclosures
		National	International		
1.	Journal – Research Articles/ Special Issue:	1	2		Submitted an Abstract and yet to published.
2.	Book – Chapter(s)/ Monograph/ Contributed:				
3.	Technical Reports:				
4.	Training Manual (Skill Development/ Capacity Building):	CCA Management plan manual, Microplan & Floristic assessment			To be summarized in DPR Part-B with supporting materials.
5.	Papers presented in Conferences/Seminars:	1	2		Submitted an Abstract and yet to published.
6.	Policy Drafts/Papers:				
7.	Others, if any:				

*Note:* Please append the list of KPs/ publications (with impact factor, DOI, and further details) with due Acknowledgement to NMHS. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

## 11. Recommendation on Utility of Project Findings, Replicability and Exit Strategy

Particulars	Recommendations
Utility of the Project Findings:	<ol style="list-style-type: none"> <li data-bbox="678 142 1516 483">1. Approximately two hundred thousand saplings, encompassing species such as Toona ciliata, Oak, Alder, and Cherry, were meticulously planted across all five designated Community Conservation Area (CCA) zones during the expansive plantation drive. This concerted endeavor significantly bolstered carbon sequestration efforts while fostering the rejuvenation of vital, life-sustaining tree species.</li> <li data-bbox="678 514 1516 766">2. A comprehensive drone survey was systematically conducted across all five designated Community Conservation Area (CCA) zones, meticulously followed by thematic mapping exercises to ensure a thorough understanding of the landscape's ecological nuances.</li> <li data-bbox="678 798 1516 987">3. The foundational baseline data pertaining to plant diversity within the ambit of the five villages has been meticulously compiled, serving as a crucial reference point for ongoing and future conservation efforts.</li> <li data-bbox="678 1018 1516 1218">4. Engaging sessions orienting and deliberating on the CCA Conservation Plan were effectively conducted across all five villages, eliciting active participation from a commendable total of 127 enthusiastic attendees.</li> </ol>

5. Across all five villages, concerted efforts were made by conducting awareness programs to underscore the imperative of climate change mitigation, aligning with the overarching objectives of the project. A collective assembly of 345 beneficiaries actively participated in these enlightening programs.

6. A successful workshop dedicated to formulating the CCA Management Plan was convened, culminating in the release of the Management Plan Magazine in the esteemed presence of Principal Investigators (PI), Co-PIs, Forest officials, and representatives from all five villages including the Civil Society Base Organization (Southern Angami People Organization, Southern Angami Youth Organization, Southern Angami Students Union). The assembly convened a total of 87 attendees.

7. In a commendable stride towards environmental sustainability, all five villages were officially designated as plastic-free zones, signaling a resolute commitment towards curbing plastic pollution and fostering eco-friendly practices.

8. During the Project period the team of the National Mission for Himalayan Studies (NMHS) Nagaland, owing to the project's meritorious endeavors, was honored with the Best Presenter Award on multiple occasions at International Conference, both at Nagaland University on “International Conference of Bioresources & Bioeconomy” and at the prestigious platform of IIT Guwahati on “River Corridor Research & Management”.

Replicability of Project/ Way Forward:

To replicate and advance the initiative, it is imperative to integrate local communities as pivotal stakeholders in sustainable forest management. Scaling the project to other regions involves capacity-building programs to educate and empower community members, fostering a sense of stewardship towards forest conservation. Leveraging indigenous knowledge and practices and modern scientific techniques will enhance carbon sequestration and biodiversity preservation. Strategic partnerships with governmental bodies, NGOs, and academic institutions can amplify resources and expertise, ensuring the long-term success and scalability of the project. This collaborative approach mitigates climate change and revitalizes local economies through sustainable livelihoods.

Exit Strategy:

Please describe the Exit Strategy of the project, self-sustaining and benefitting the stakeholders and local community:

1. Motivated and empowered local communities to consistently launch afforestation projects within Community Conservation Areas, utilizing mass tree planting to enhance carbon sequestration efforts significantly.
2. The CCA management plan has been documented and can serve as a reference for other related developmental activities in their localities.
3. Three Community Conserved Areas (CCAs) are to be designated as Community Reserves under the Wildlife Protection Act. Additionally, two Community Reserves, Kigwema and Viswema, have already been established.
4. Stakeholders were mobilized to actively engage in community participation, and they were encouraged to increase their efforts in conserving their areas. Dustbins were distributed to promote cleanliness, and their areas were declared plastic-free zones.
5. Involving the Southern Angami People Organization, Southern Angami Students Union and all the existing organizations in the areas to protect and engaged in the conservation.
6. Engagement of Entrepreneur Associate with the village women folks for sustainability of Market linkage.
7. Institutions and Organizations which falls under the NMHS project villages were provided financial Aid to established Eco-Clubs.
8. Have supplied the students body with modern firefighting equipment and constructed a rest shed along the path to Dzukou Valley. Our goal is to enhance their capabilities in combating forest fires using advanced gear whenever such emergencies arise in their communities.

  
(PROJECT PROPONENT/ COORDINATOR)  
(Signed and Stamped)

**Principal Investigator  
National Mission on Himalayan Studies  
Nagaland**

(HEAD OF THE INSTITUTION)  
(Signed and Stamped)

Place: Kohima  
Date: 20.07.24

\*\*\*\*\*



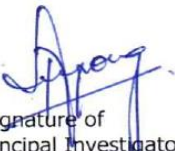
## Consolidated and Audited Utilization Certificate (UC) and Statement of Expenditure (SE)

**For the Period: October 2019-June 2024.**


1.	Title of the project/Scheme/Programme:	<b>“Increasing Carbon Sequestration and Promoting Conservation of Declining Life Support Forest Tree Species through Community Participation in Kohima District of Nagaland” under National Mission on Himalayan Studies (NMHS).</b>
2.	Name of the Principle Investigator & Organization:	Shri. Supongnukshi, IFS Chief Conservator of Forest (EBR)
3.	NMHS-PMU, G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Almora, Uttarakhand Letter No. and Sanction Date of the Project:	GBPNI/NMHS-2019-20/MG/316 dated 15-10-2019
4.	Amount received from NMHS-PMU, G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Almora, Uttarakhand during the project period (Please give number and dates of Sanction Letter showing the amount paid):	<ol style="list-style-type: none"> <li>1. GBPNI/NMHS-2019-20/MG/316 dated 15-10-2019 <b>Amount ₹ 1,54,01,880.00</b></li> <li>2. GBPNI/NMHS/2019-20/MG/316/45/64 dated 17-06-2022 <b>Amount ₹ 1,14,01,880.00</b></li> <li>3. GBPNI/NMHS/2019-20/MG/316/45/64/270/302/156 dated 16-01-2024 <b>Amount ₹63,01,765.00</b></li> </ol>
5.	Total amount that was available for expenditure (Including commitments) incurred during the project period:	<b>₹ 3,31,05,525.00</b>
6.	Actual expenditure (excluding commitments) incurred during the project period:	<b>₹ 3,08,10,780.00</b>
7.	Unspent Balance amount refunded, if any (Please give details of Cheque no. etc.):	<b>₹ 22,94,741.00</b>
8.	Balance amount available at the end of the project:	<b>₹ 4.00</b>
9.	Accrued Interest	<b>₹ 10,508.00</b>
10.	Others	<b>₹ 500.00</b>
11.	Balance Amount:	<b>₹ 11,012.00</b>

Certified that the expenditure of ₹ **3,08,10,780.00 (Rupees Three Crore Eight Lakhs Ten Thousand Seven Hundred Eighty)** mentioned against Sr. No. 6 was actually incurred on the project/scheme for the purpose it was sanctioned.

Date: 30-07-24

  
(Signature of  
Principal Investigator)  
**Principal Investigator  
National Mission on Himalayan Studies  
Nagaland**

  
(Signature of Registrar/  
Finance Officer)  
DDO  
**O/o. Principal Chief Conservator  
of Forests & Head of Forest Force  
Nagaland Kohima**

  
(Signature of Head  
of the Institution)  
**Principal Chief Conservator of Forest  
And Head of Forest Force  
Nagaland : Kohima**

OUR REF. No.

ACCEPTED AND COUNTERSIGNED

Date:

COMPETENT AUTHORITY  
NATIONAL MISSION ON HIMALAYAN STUDIES (GBP NIHE)

# Statement of Consolidated Expenditure

[Department of Environment, Forest & Climate Change, Nagaland]

Statement showing the expenditure of the period from  
Sanction No. and Date

: GBPNI/NMHS-2019-20/MG/316 dated 15-10-2019

**Amount ₹ 1,54,01,880.00**

GBPNI/NMHS/2019-20/MG/316/45/64 dated 17-06-2022

**Amount ₹ 1,14,01,880.00**

GBPNI/NMHS/2019-20/MG/316/45/64/270/302/156 dated  
16-01-2024

**Amount ₹63,01,765.00**

1. Total outlay of the project	: 3,31,05,525.00
2. Date of Start of the Project	: 2019 (but initiated in the year August 2021)
3. Duration	: 3 years
4. Date of Completion	: June 2024
a) Amount received during the project period	: 3,31,05,525.00
b) Total amount available for Expenditure	: 3,31,05,525.00

Sl. No.	Budget head	Amount received ₹	Expenditure ₹	Amount Balance/ excess expenditure	Amount carried forward ₹	Remarks
1	Salaries	51,10,344.00	51,10,340.00	4.00		
2	Permanent Equipment Purchased	24,00,000.00	24,00,000.00	0.00		
3	Travel	6,27,027.00	6,27,027.00	0.00		
4	Expendables & Consumables	2,32,026.00	2,32,026.00	0.00	86,211.00	2. * An Accrued Interest amount of ₹86,211.00 was carried forward in 2nd installment and treated as Grant in FY 2022-23
5	Contingencies	4,50,000.00	4,50,000.00	0.00		
6	Activities & Other Project cost	2,16,90,738.00	2,16,90,738.00	0.00	30,31,355.00	
7	Institutional Charges	3,00,000.00	3,00,000.00	0.00		
8	Bank Charges	649.00	649.00	0.00		
9	<b>Total</b>	<b>3,08,10,784.00</b>	<b>3,08,10,780.00</b>	<b>4.00</b>	31,17,566.00	
10	Accrued bank Interest	10,508.00		10,508.00		1. Deposited back to GP Pant- ₹35,84,09.50 2. *An Accrued Interest amount of ₹86,211.00 was carried forward in 2nd installment and treated as Grant in FY 2022-23
11	Others	500.00		500.00		
12	<b>Grand Total</b>	<b>3,08,21,792.00</b>	<b>3,08,10,780.00</b>	<b>11,012.00</b>		

Note: The difference amount of 22,94,741.00 has been shown in the table as per the total outlay of the Grant received. The said amount is the closing balance of FY 2022-23 which has been reversed to GB Pant

Certified that the expenditure of ₹ **3,08,10,780.00 ( Rupees Three Crore Eight Lakhs Ten Thousand Seven Hundred Eighty)** mentioned against Sr. No.12 was actually incurred on the project/ scheme for the purpose it was sanctioned.

Date: 30-07-24

  
(Signature of  
Principal Investigator)

**Principal Investigator  
National Mission on Himalayan Studies  
Nagaland**

  
(Signature of Registrar/  
Finance Officer)

**O/o. Principal Chief Conservator  
of Forests & Head of Forest Force  
Nagaland Kohima**

  
(Signature of Head  
of the Institution)

**Principal Chief Conservator of Forests  
And Head of Forest Force  
Nagaland : Kohima**

OUR REF. No.

ACCEPTED AND COUNTERSIGNED

Date:

COMPETENT AUTHORITY  
NATIONAL MISSION ON HIMALYAN STUDIES (GBP NIHE)

## Consolidated Interest Earned Certificate

Please provide the detailed interest earned certificate on the letterhead of the grantee/ Institution and duly signed.

**Submission of consolidated Interest Earned Certificate for Medium Grant Project entitled “Increasing Carbon Sequestration and Promoting Conservation of Declining Life Supporting Forest Trees Species through Community Participation in Kohima District of Nagaland” reg:**

The following table indicates the detailed interest earned from the period Oct 2019-June 2025

Sl. No.	Period	Interest earned	Transferred to GB Pant	Remarks
1	FY 2019-20	39,149.00	Yes	
2	FY 2020-21	3,19,260.50	Yes	
3	FY 2021-22	86,211.00	No	Treated as Grant in FY 2022-23
4	FY 2022-23			
5	FY 2023-24	5,906.00	Yes	
6	FY 2024-25	4,602.00	Yes	
	<b>TOTAL</b>	<b>4,55,128.50</b>		

This is for your kind information and record.

  
**(SUPONGNUKSHI) IFS**  
Chief Conservator of Forest (EBR)  
Principal Investigator, NMHS  
Nagaland, Kohima

**Principal Investigator**  
**National Mission on Himalayan Studies**  
**Nagaland**

## Consolidated Assets Certificate

Assets Acquired Wholly/ Substantially out of Government Grants

### 1.1 (Register to be maintained by Grantee Institution)

1. Name of the Sanctioning Authority: G.B Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD)
2. Name of Grantee Institution: Department of Environment Forest and Climate Change, Nagaland
3. No. & Date of sanction order: GBPNI/NMHS-2019-20/MG/316 dated 15-10-2019
4. Amount of the Sanctioned Grant: 31,50,000.00
5. Brief Purpose of the Grant: Purchase of Project Equipments
6. Whether any condition regarding the right of ownership of Govt. in the property or other assets acquired out of the grant was incorporated in the grant-in-aid Sanction Order: No
7. Purpose for which utilised at present: For Departmental Activities.
8. Encumbered or not: No
9. Reasons, if encumbered: None
10. Disposed of or not: No
11. Reasons and authority, if any, for disposal: None
12. Amount released on disposal: None

Any Other Remarks: An amount of 24,000,00.00 only has been utilized out of the total amount sanctioned. The remaining amount ₹7,50,000.00 has been carried over to the FY 2022-23 under budget head A. recurring (v) Activities & other project costs

  
(PROJECT INVESTIGATOR)  
(Signed and Stamped)

Principal Investigator  
National Mission on Himalayan Studies  
Nagaland

  
(FINANCE OFFICER)  
(Signed and Stamped)

D.D.O.  
O/o Principal Chief Conservator Of Forests  
& Head Of Forest Force  
Nagaland, Kohima

  
(HEAD OF THE INSTITUTION)  
(Signed and Stamped)

Principal Chief Conservator of Forests  
And Head of Forest Force  
Nagaland : Kohima

## List or Inventory of Assets/ Equipment/ Peripherals


Sl. No	Name of Equipment	Quantity	Sanctioned Cost ₹	Actual Purchased Cost ₹
1.	Workstation Desktop PC Intel Core i9-10900X / 32GB DDR4 nECC RAM / 1 TB SSD / 2 TB SATA Hard Disk / Nvidia P2000 4GB Graphics / Windows 10 Pro HP Mechanical Keyboard	1	3,69,000.00	3,69,000.00
2.	BenQ 27 inch LED Backlit Computer Monitor - Full HD, VA Panel with VGA, HDMI	1	31,000.00	31,000.00
3.	Garmin ETREX GPS Navigator	4	60,000.00	60,000.00
4.	Nikon D5600 with AF-P 18-55 mm + AF-P 70-300 mm VR Kit	1	1,00,000.00	1,00,000.00
5.	Quadcopter Drone Professional X550 Size Grade with Hardcase and Additional Batteries. Emilid DGPS with Base and Rover, RTK Antennas x 2	1	15,00,000.00	15,00,000.00
6.	Global Mapper GIS Mapping Software	1	1,00,000.00	1,00,000.00
7.	pH meter, Multi parameter for Forest soil Analysis	1	84,745.00	84,745.00
8.	P4 drone Intelligent Batteries	2	40,000.00	40,000.00

  
(PROJECT INVESTIGATOR)  
(Signed and Stamped)

Principal Investigator  
National Mission on Biodiversity and Ecosystem Studies  
Nagaland

  
(HEAD OF THE INSTITUTION)  
(Signed and Stamped)

Principal Chief Conservator of Forests  
And Head of Forest Force  
Nagaland : Kohima

  
(FINANCE OFFICER)  
(Signed and Stamped)

DDO  
O/o. Principal Chief Conservator  
of Forests & Head of Forest Force  
Nagaland Kohima

Details, Declaration and Refund of Any Unspent Balance

**GOVERNMENT OF NAGALAND**  
**OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FOREST &**  
**HEAD OF FOREST FORCE**  
**Department of Environment, Forest & Climate Change**  
**Nagaland, Kohima**

No. SNOCC/NMHS/2022-01/ 8

Dated, Kohima, the 30<sup>th</sup> July, 2024

To,

Er. Kireet Kumar  
Scientist 'G' & Nodal Officer,  
NMHS-PMU, GBPNIHESD,  
Kosi-Katarmal, Almora-263645  
Uttarkhand

**Sub: Submission of details, declaration and refund unspent balance for Medium Grant Project entitled "Increasing Carbon Sequestration and Promoting Conservation of Declining Life Supporting Forest Trees Species through Community Participation in Kohima District of Nagaland" reg:**

Sir,

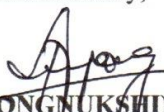
With regards to the above mentioned subject, after the completion of the project, I am submitting the following details from the period **October 2019-June 2024**.

1. Remaining Accrued amount- ₹10,508.00 (Annexure-II)
2. Others- ₹500.00 (Annexure-I)
3. Remaining Amount from the project- ₹4.00 (Annexure-I)

Therefore, the total amount to be transferred to GP Pant is amounting to **₹11,012.00 (Eleven Thousand and Twelve only)**.

**Name of NMHS A/c** : NMHS GIA General  
**Bank Name & Branch** : Central Bank of India (CBI), Kosi Bazar, Almora, Uttarakhand 263643  
**IFSC Code** : CBIN0281528  
**Account No.** : 3530505520 (Saving A/c)

Yours faithfully,

  
(SUPONGNUKSHI) IFS

Chief Conservator of Forest (EBR) Principal Investigator, NMHS  
Nagaland, Kohima

Dated, Kohima, the 30<sup>th</sup> July, 2024

No. SNOCC/NMHS/2022-01/

Copy to:

1. The Conservator of Forest (STC) & Co-PI, National Mission on Himalayan Studies, Nagaland
2. Office Copy

Chief Conservator of Forest (EBR) Principal Investigator, NMHS  
Nagaland, Kohima



## PART B: DETAILED PROJECT REPORT

### 1. EXECUTIVE SUMMARY

**Introduction:** The Japfü Range and Dzükou Valley are vital components of a unique Himalayan ecosystem, providing essential ecosystem services, including water supply and biodiversity support, to Kohima, Nagaland's state capital. These regions are crucial for the area's environmental and agricultural sustainability but face significant threats from natural and human-induced factors, such as climate change and deforestation. The project "Increasing Carbon Sequestration and Promoting Conservation of Declining Life Support Forest Tree Species through Community Participation in Kohima District of Nagaland" aims to address these challenges by enhancing carbon sequestration and conserving endangered tree species through community engagement.

The project, initiated in 2021, is a collaborative effort between the Department of Environment & Climate Change under Nagaland Government and the GB Pant Institute of Himalayan Environment and Sustainable Development, funded by the National Mission on Himalayan Studies. It targets five villages: **Phesama, Kigwema, Viswema, Jakhama, and Khuzama**. Key activities include generating baseline data on vegetation and biodiversity, establishing Community Conservation Areas, and engaging communities in climate change mitigation and natural resource conservation.

**Statement of Problem:** Management, conservation and development of natural resources as well as understanding of climate change impact on it is an imperative for development. The valley has ecologically sensitive flora and fauna, fragile hills, intensive agriculture & horticulture. Due to high altitudinal variation, the slopes are steep. Coupled with the exploitation of forests for various activities including shifting cultivation, soil erosion is widespread and some places are regularly experiencing landslides. The land holding system in Nagaland is unique in the sense that all lands belongs to individuals/families or



communities. As such, forest department has no land holding in the proposed project area, depriving it of the opportunity for need based scientific management of its forests. The management and conservation efforts need to be institutionalized. The absence of a baseline data in respect to Forest density, age-wise tree density, regeneration status etc prevents the formulation of proper management plans. Due to the unique Himalayan ecosystem of the proposed project area, there is an urgent need to establish Community Conservation Areas, which will not only be a repository of the biodiversity but act as an important buffer in sustainable management of land and water resources. The dependency on natural forests for fuelwood and minor timbers, needs to be addressed through agroforestry, assisted natural regeneration of the natural forests, and plantation on river and stream banks with local species like alnus, naga neem and some multipurpose trees like prunus species etc. These core forestry activities of soil and water conservation, agro-forestry and plantation activities will go a long way in building resilience of the project to the effects of climate change, while also increasing the carbon-sink pool. The local populace, specially the women-folk are very interested in horticulture (both vegetable cultivation and flowers) and animal husbandry (specially poultry and piggery). There is a very good scope and potential for economic empowerment and sustainable land and water use by development of these two sectors. There is a need to have a concerted awareness campaigns for sustainable land and water use and conservation of nature across all age-groups and communities. There is also a need to develop standard-operating-procedures and protocols for nature conservation and sustainable development, so that efforts can be institutionalized.

**Major objectives of the work done:** This project was formally initiated in the year 2021. This is a joint effort project executed by the Department of Environment & Climate Change, Government of Nagaland in collaboration with the GB Pant Institute of Himalayan Environment and Sustainable Development, Almora, Uttarakhand which is funded under the National Mission on Himalayan Studies. Five (5) villages under Kohima District have been selected for the pilot project viz. Phesama, Kigwema, Viswema, Jakhama & Khuzama with the following activities.

- Generating Baseline Data on Vegetation and Plant Biodiversity in the area, Household data collection in monitoring the socio-economic, and health condition of the ecosystem, and aid in formulating and implementing future conservation strategies.
- To facilitate the establishment of Community Conservation Areas.
- To engage the community in climate change mitigation measures and conservation of land and water resources through core forestry activities of plantation and soil water conservation.
- To build capacity through training programs and awareness campaigns.

**Methodology:** The Department of Environment, Forests and Climate Change, Kohima, Nagaland, proposes an intervention to provide a comprehensive, holistic approach to the sustainable use of land and water resources in the project area. Partner organizations will work in close association to effectively implement the intended interventions and disseminate the knowledge gained from the project. Capacity building and policy advocacy (at Village and State levels) will be a strong component of the process. In this light, two key research areas and two key interventions are proposed. The first key research is the collection of baseline data on plant biodiversity in the area, including Identification and documentation of economic/socio-economic uses of plants occurring in the region with future potentials of plants in the socio-economy of local people. The second key research area will focus on an aerial survey of the area through Unmanned Aerial Vehicle photography. These two key research areas will provide a rich mix of qualitative and quantitative analysis as well as an overall understanding of interventions and practices that can be adopted in the sustainable use of land and water resources (including biodiversity) in the project area. The first key intervention area will be to involve the community in plantations and soil and water conservation works, especially in the catchment areas of perennial streams and rivers. The second Key intervention is to facilitate the establishment of Community Conservation Areas.

## **Results:**

### **The following are the expected major results of the project:**

1. Increasing the carbon sink of the area through mass plantation by involving the local communities.
2. Baseline survey data of plant biodiversity along with age-wise density of trees in the area.
3. Documentation of economic/socio-economic uses of plants occurring in the region with future potentials of plants in the socio-economy of local people.
4. Stock mapping of the entire area.
5. Thematic mapping of the entire area through Aerial Photography.
6. In-situ conservation of biodiversity through the Establishment of Community Conservation Areas.
7. Generate Region-specific conservation intervention plans and protocols.
8. Build Awareness for conservation and sustainable development across all age groups and communities.
9. Capacity Building for institutionalization and communitization of nature conservation.

## 2. INTRODUCTION

### 2.1 Background

The portion of Japfü Range and Dzükou Valley is a unique Himalayan ecosystem. It serves very important ecosystem services to the state capital of Nagaland (i.e. Kohima) as it is the main catchment area and source of water. The ecosystem services provided by Dzükou Valley are critical for water, environment and agricultural sustainability and productivity in Kohima district. The water availability in the natural streams and rivers are a steady source of water to Kohima city, and neighboring villages. Dzükou valley is the major catchment area of water in Kohima and it is responsible for recharging of the aquifers. Dzükou valley is also a rich repository of biodiversity and is a pristine and unique Himalayan ecosystem, seen nowhere else in the eastern Himalayas. As with any part of Himalayan range, Dzükou valley is fragile and inherently susceptible to natural and man-made calamities.

### 2.2 Overview of the major issues addressed

Firstly, It focuses on enhancing carbon sequestration, a vital process in mitigating climate change by capturing and storing atmospheric carbon dioxide in forests. This effort is crucial for reducing greenhouse gas concentrations and curbing global warming.

Secondly, the project aims to conserve forest tree species that are declining in numbers. These species are essential for maintaining biodiversity and ecological balance, providing habitat and food for various wildlife, and supporting ecosystem services. Their decline threatens the stability and health of forest ecosystems, which can have cascading effects on the environment and human well-being.

To achieve these goals, the project emphasizes community participation. Engaging local communities is fundamental to the success of conservation efforts, as it ensures sustainable management practices and fosters a sense of ownership and responsibility among residents. By involving communities in the process, the project not only enhances local knowledge and skills but also promotes socio-economic benefits, thereby encouraging continued support and participation.

Overall, this initiative is a comprehensive approach to addressing environmental challenges in the Kohima District of Nagaland, combining scientific methods with community engagement to achieve long-term conservation and climate mitigation objectives.

### 2.3 Baseline Data and Project Scope

**Baseline Data:** Kohima district, located in Nagaland, is home to diverse forest ecosystems that play a crucial role in sustaining local biodiversity and supporting the livelihoods of indigenous communities. However, these forests face significant threats due to deforestation, land degradation, and climate change. Key baseline data include:

1. **Forest Cover and Degradation:** Kohima has experienced a notable decline in forest cover over recent years. Satellite imagery and ground surveys indicate that approximately 40% of the district's forests are in various stages of degradation.

2. **Biodiversity Status:** The district is rich in flora and fauna, with several endemic and endangered species. However, the population of vital tree species, such as *Alnus nepalensis* and *Quercus serrata*, has dwindled due to unsustainable logging practices, fire wood collections and habitat loss.
3. **Carbon Sequestration Potential:** The project sites being forested and biodiverse, likely have significant carbon sequestration potential due to their rich vegetation cover. This potential is significantly underutilized due to the degraded state of many forest areas.
4. **Community Involvement:** Local communities rely heavily on forest resources for their livelihoods. Traditional knowledge and practices are integral to forest management, yet these communities face socio-economic challenges that hinder effective conservation efforts.

### **Project Scope:**

1. **Restoration and Afforestation:** The project will focus on restoring degraded forest areas and promoting afforestation with native tree species. This includes planting 0.2 million saplings over the project duration of three years and prioritizing species with high carbon sequestration capacity and ecological importance.
2. **Community Engagement and Capacity Building:** Empowering local communities through training and capacity-building programs is a cornerstone of this initiative. Workshops on sustainable forest management, agroforestry, and alternative livelihood options will be conducted to enhance community participation.
3. **Monitoring and Evaluation:** A robust monitoring and evaluation framework will be established to track progress and ensure accountability. This includes regular assessments of forest health, carbon sequestration rates, and biodiversity indices.
4. **Awareness and Education:** Raising awareness about the importance of forest conservation and carbon sequestration among local communities and stakeholders is crucial. Educational campaigns, school programs, and community events will be organized to foster a culture of environmental stewardship.

This project aims to create a sustainable and resilient forest ecosystem in the target areas by addressing the twin challenges of carbon sequestration and biodiversity conservation through community participation.

## 2.4 Project Objectives and Target Deliverables (as per the NMHS-Sanction Order)

### Project Objectives:

The project initiatives will be conducted by Department of Environment, Forests and Climate Change, in coordination with the Village Councils of **Khuzama, Viswema, Jakhama, Kigwema , Phesama.**

The objectives of the proposed initiative include:

- Generation of Baseline Data of Vegetation and Plant Biodiversity in the area: This will help in monitoring the health condition of the ecosystem and aid in formulating and implementing future conservation strategies.
- To facilitate establishment of Community Conservation Areas: This will help in in-situ conservation of biodiversity and will facilitate sustainable use of biodiversity, while also improving the resilience of the area to stresses of climate change.
- To engage the community in climate change mitigation measures and conservation of land and water resources through core forestry activities of plantation and soil water conservation.
- To build capacity through training programs and awareness campaigns

### Target Deliverables:

The project has successfully achieved its objectives, starting with the generation of baseline data. The microplan and CCA Management plan data were completed and submitted during the Monitoring & Evaluation meeting at the Ministry of Environment, Forests and Climate Change in New Delhi on May 29, 2024. The floristic diversity assessment, conducted with the expertise of a proficient taxonomist from Kohima Science College, Jotsoma, Nagaland, was incorporated into the Final Technical Report. The manual plans were meticulously developed through comprehensive stakeholder consultations, supported by data collected via a questionnaire addressing various management issues.

A CCA spanning 300 hectares was established, and formalized through a bond of agreement included in a Memorandum of Understanding (MoU), which is part of the CCA Management Plan document. The five participating villages organized periodic one-day social work events to clear the jungle for plantation activities. Throughout the project, community afforestation drives were conducted at multiple CCA sites, resulting in the planting of approximately two hundred thousand trees, including species such as Alder, Oak, *Toona ciliata*, Cherry, Wild Apple, Bauhinia.

Nurseries were established in all five designated villages and three Forest Department divisions, under the proper guidance and supervision of the Forest Department. During the plantation season, the Forest Department provided technical guidance to the villagers on standard plantation techniques, ensuring compliance through close supervision by frontline personnel. Efforts to suppress forest fires led to the successful establishment of a 20-kilometer firebreak through the deployment of stewards.

Awareness and sensitization initiatives on climate change issues, including biodiversity conservation in Dzukou Valley and Japfu Range, climate change inequality, and its impact on biodiversity, were extensively conducted across villages at all administrative levels. Recognizing that women are the most vulnerable to climate change impacts, the project addressed their livelihood concerns by establishing self-help groups (SHGs) and supporting them with training, materials, and a revolving fund.

The villagers have actively enforced bans on hunting, fishing, and firewood collection, displaying signboards and signage in different zones to prohibit these activities. They have also initiated quick response teams to monitor and address any violations within their respective jurisdictions.

### **3. METHODOLOGIES/STARTEGY/ APPROACH**

The Department of Environment, Forests and Climate Change, Kohima, Nagaland, propose intervention to provide comprehensive, holistic approach to sustainable use of land and water resources in the project area. Partner organizations will work in close association to effectively implement the intended interventions and disseminate the knowledge gained from the project. Capacity building and policy advocacy (at Village and state level) will be a strong component of the process. In this light, two key research areas and two key interventions are proposed. The first key research area is that of collection of baseline data on plant biodiversity in the area, including Identification and documentation of economic/socio-economic uses of plants occurring in the region with future potentials of plants in the socio-economy of local people. The second key research area will focus on aerial survey of the area through Unmanned Aerial Vehicle photography. These two key research areas will provide a rich mix of qualitative and quantitative analysis as well as overall understanding of interventions and practices that can be adopted in sustainable use of land and water resources (including biodiversity) in the project area. The first key intervention area will be to involve the community in plantations and soil and water conservation works, especially in the catchment areas of perennial streams and rivers. The second Key intervention is to facilitate the establishment of Community Conservation Areas.

**A. Collection of Baseline Data on Plant Biodiversity:** This will be done in forest areas by using the methods prescribed by Botanical Survey of India as per the standard procedure followed. Further, the Forest Survey of India approaches for estimating (Tiwari and Singh, Applied Geography 4: 151-165, 1984), but with increased intensity of sampling. These toposheet will be divided into grids. Square plots of 0.1 ha will be laid on the ground to record the measurements. Stock mapping, along with data collection on regeneration and forest types will be collected, which will be used to prepare forest management toposheet.

**B. Aerial survey of the area through Unmanned Aerial Vehicle photography:** UAV with DGPS technology and high resolution camera will be employed for aerial photography with assistance from Nagaland GIS and Remote Sensing Centre (Planning and Coordination Department, Govt. Of Nagaland, Kohima) to obtain Ortho-rectified and DEM Corrected maps using differential

GPS system with accuracy 20-50 m. Thematic layers of slope, contour, water bodies/streams/rivers, forestry vegetation, agriculture and landuse/landcover will be generated from aerial photography.

- C. Involve the community in plantations and soil and water conservation works:** Site specific treatment will be done after thorough survey, and interventions will be implemented in close association with the stake holders. This will include capacity building of local communities.
- D. Establishment of Community Conservation Areas:** The department has successfully facilitated the establishment of community conservation areas. The concerned stakeholders will be encouraged to establish community conservation areas through wide consultations and also by incentivization of such efforts through entry point activities.
- E. Capacity Building, Awareness Generation:** Capacity building programme will be conducted in different villages (for four clusters) and around 400 persons targeted for capacity building programme. The capacity building will be enabling for self-employment generation as a tourist guide, local resource persons for preparation of biodiversity registers, etc. Further, these persons will also actively engaged in forest monitoring activities by the Government of Nagaland, through the Forest Departments.

### **3.2 Data collected Report**

The NMHS staff conducted a comprehensive house-to-house survey across five designated villages to prepare a detailed microplan. This survey, along with meticulous documentation, enabled the successful development of Community Conserved Areas (CCA). Additionally, a thorough Floristic Assessment was completed. Essential items such as furniture, firefighting gear, and drones were distributed to the communities.

These activities were systematically carried out across the five villages, culminating in the submission of the microplan and the CCA management manual. The submission took place during the Monitoring & Evaluation meeting with the STAG Review Committee members in Delhi, MOEFF, on May 29, 2024. Detailed documentation, including the Floristic Assessment and the distribution records of firefighting gear and furniture, is provided in **APPENDIX- II**.

This comprehensive effort reflects the dedication to enhancing community resources and environmental management. The meticulous planning and execution of these activities demonstrate a strong commitment to sustainable development and conservation within the targeted villages. The data and outcomes presented highlight the project's significant impact and adherence to high standards of environmental stewardship.



### 3.3 Details of Field Survey conducted (APPENDIX-III)

#### 4. KEY FINDINGS AND RESULTS documents attached in (APPENDIX I).

##### 4.1 Major Activities/ Findings (

The Department's comprehensive land and water resource initiatives from **2021 to 2022 (Appendix-1)** exemplify a strong commitment to sustainable management, community engagement, and environmental conservation. Noteworthy achievements include the initial site clearings and extensive plantation drives along the National Highway and below the Dzukou range. Five villages benefitted from sensitization programs that promoted economic empowerment and sustainable resource use. Informative pamphlets highlighted project objectives, and nurseries were established, resulting in the collection of 170,000 seeds from various species. Training for Village Field Assistants in GPS handling and microplanning was conducted, and climate change impact data collection began. Environmental awareness was furthered by installing 35 display boards and 10 murals, while Community Conservation Areas (CCAs) were established in collaboration with partner organizations.

In **2022-2023 (Appendix-1)**, data collection and surveys were completed in two villages and continued in three others. The nurseries flourished, and a plantation drive on World Environment Day saw 402 stakeholders cover 250 hectares. Regular site visits ensured sapling health, and an awareness seminar on climate change was organized. Eco-Clubs conducted "Green Nagaland" competitions in schools, firefighting equipment was distributed, and a livelihood and skills training program benefitted 146 SHG members. Visits to nurseries and plantation sites confirmed the readiness of 20,000 saplings for the next phase. Soil samples were collected to assess fertility near Alder tree plantations. Public awareness campaigns during the G20 & B20 Summit were held, and the project team presented at a national conference on conservation techniques for Rhododendron and Orchids.

In **2023-2024 (Appendix-1)**, the Dzukou Valley Expedition Day, organized by the Southern Angami Youth Organization, was a significant success. Under the Merilife campaign, the NMHS team conducted a seminar on lifestyle and environment, organized cleanliness drives, and distributed dustbins, leading to a plastic-free village declaration. World Environment Day services educated over a thousand congregation members on environmental responsibility. The climate change vulnerability assessment ranked five villages by vulnerability levels, which were incorporated into the FTR. A total of 1,500 tree saplings were planted in CCAs. A stakeholder orientation session reviewed the CCA Management Plan. Environmental stewardship activities led to the cleanup of the Dzukou Valley route. A new resting shed was unveiled on the way to Dzukou Valley, and CCA display boards detailed project areas and species planted. The project covered 300 hectares, with drone mapping and floristic documentation completed by a taxonomist from Kohima Science College.

These extensive efforts underscore the project's dedication to fostering sustainable resource management, engaging communities, and promoting environmental conservation.

## 4.2 Key Results

1. Approximately two hundred thousand saplings, encompassing species such as *Toona ciliata*, Oak, Alder, and Cherry, Wild Apple, Bauhinia were meticulously planted across all five designated Community Conservation Area (CCA) zones during the expansive plantation drive. This concerted endeavor significantly bolstered carbon sequestration efforts while fostering the rejuvenation of vital, life-sustaining tree species.
2. A comprehensive drone survey was systematically conducted across all five designated Community Conservation Area (CCA) zones, followed by thematic mapping exercises to ensure a thorough understanding of the landscape's ecological nuances.
3. The foundational baseline data pertaining to plant diversity within the ambit of the five villages has been compiled, serving as a crucial reference point for ongoing and future conservation efforts.
4. Institutions and organizations within the Five Villages area were proactively involved, receiving financial support to establish Eco-Clubs. They orchestrated essay and painting competitions centered around the 'Green Nagaland' theme, attracting a total of 1518 students, who responded positively to these events.
5. A one-day, hands-on training session on livelihood sustainability was conducted for the women of five villages on different occasions, focusing on Self-Help Groups (SHGs). During this event, 60 participants learned how to make pickles from their agricultural produce, addressing the issue of raw materials rotting due to a lack of cold storage facilities. This training aimed to help them sustain their livelihood activities effectively.
6. Engaging sessions orienting and deliberating on the CCA Conservation Plan were effectively conducted across all five villages, eliciting active participation from a commendable total of 127 enthusiastic attendees.
7. Across all Five villages, concerted efforts were made by conducting awareness programs to underscore the imperative of climate change mitigation, aligning with the overarching objectives of the project. A collective assembly of 345 beneficiaries actively participated in these enlightening programs.
8. A successful workshop dedicated to formulating the CCA Management Plan was convened, culminating in the release of the Management Plan manual in the esteemed presence of Principal Investigators (PI), Co-PIs, Forest officials, and representatives from all five villages including the Civil Society Base Organization (Southern Angami People Organization, Southern Angami Youth Organization, Southern Angami Students Union). The assembly convened a total of 87 attendees.

9. In a commendable stride towards environmental sustainability, all five villages were officially designated as plastic-free zones, signaling a resolute commitment towards curbing plastic pollution and fostering eco-friendly practices.

10. During the Project period the team of the National Mission for Himalayan Studies (NMHS) Nagaland, owing to the project's meritorious endeavors, was honored with the Best Presenter Award on multiple occasions at International Conference, both at Nagaland University on “International Conference of Bioresources & Bioeconomy” and at the prestigious platform of IIT Guwahati on “River Corridor Research & Management”.

11. The Microplan & CCA Management Plan manual was meticulously compiled and submitted to the NMHS STAG committee members at MOEFCC, Delhi, on May 29, 2024, during the Monitoring & Evaluation meeting.

### **4.3 Conclusion of the study**

1. The implementation of the Community Conservation Area (CCA) project has yielded significant and multifaceted outcomes, demonstrating a robust commitment to environmental conservation and community engagement across five designated zones.

2. A major achievement of the initiative was the plantation of approximately 200,000 saplings, including species such as *Toona ciliata*, Oak, Alder, Cherry, Wild Apple, Bauhinia. This large-scale reforestation effort has not only enhanced carbon sequestration but also revitalized critical tree species, contributing to the ecological health of the region.

3. To ensure precise and informed conservation strategies, a comprehensive drone survey and thematic mapping were conducted across all CCAs. This provided a detailed understanding of the ecological landscape, which was further enriched by the foundational baseline data on plant diversity compiled from the five villages. This data serves as a crucial benchmark for ongoing and future conservation initiatives.

4. Community involvement was a cornerstone of the project. Institutions and organizations within the Five Villages area received financial support to establish Eco-Clubs. These clubs organized essay and painting competitions themed around 'Green Nagaland,' engaging 1,518 students and fostering environmental awareness. Additionally, a hands-on training session on livelihood sustainability was conducted for women from the five villages. Sixty participants learned how to make pickles from their agricultural produce, addressing the issue of spoilage due to inadequate cold storage and empowering them with skills to sustain their livelihoods.

5. Active participation in the CCA Conservation Plan was encouraged through orientation sessions attended by 127 enthusiastic community members. Awareness programs highlighting the importance of climate change mitigation were conducted, with 345 beneficiaries participating. These efforts were integral to aligning the community with the project's overarching environmental objectives.

6. A significant milestone was the successful workshop dedicated to formulating the CCA Management Plan, culminating in the release of a comprehensive Management Plan manual. This event was attended by 87 individuals, including Principal Investigators, Co-PIs, Forest officials, and representatives from all five villages and the Civil Society Base Organization. This collaborative effort underscored the collective commitment to effective management and conservation.

7. Further emphasizing environmental sustainability, all five villages were officially designated as plastic-free zones, demonstrating a resolute stance against plastic pollution and a dedication to eco-friendly practices.

7. The project's impact was recognized on prestigious platforms, with the National Mission for Himalayan Studies (NMHS) Nagaland team receiving the Best Presenter Award at both the International Conference of Bioresources & Bioeconomy at Nagaland University and the River Corridor Research & Management conference at IIT Guwahati.

8. Finally, the meticulously compiled Microplan & CCA Management Plan manual was submitted to the NMHS STAG committee members at the Ministry of Environment, Forest and Climate Change (MOEFCC) in Delhi on May 29, 2024, during the Monitoring & Evaluation meeting, marking a significant step in the formal evaluation and recognition of the project's accomplishments.

Henceforth, the establishment of CCA has made substantial strides in environmental conservation, community engagement, and sustainable development, setting a commendable example for future initiatives in the region and beyond.

## **5. OVERALL ACHIEVEMENTS**

### **5.1 Achievement on Project Objectives/ Target Deliverables**

The Department of Environment, Forests, and Climate Change, in collaboration with the Village Councils of Khuzama, Viswema, Jakhama, Kigwema, and Phesama, successfully achieved the project's objectives. The comprehensive initiatives included the generation of baseline data on vegetation and plant biodiversity, the establishment of Community Conservation Areas, Aerial mapping, active community engagement in climate change mitigation measures, and capacity building through training programs and awareness campaigns.

Firstly, the project successfully generated extensive baseline data on vegetation and plant biodiversity within the region. This critical data has provided a robust foundation for monitoring the ecosystem's health and has been instrumental in formulating and implementing future conservation strategies effectively. The documentation of biodiversity has enabled precise assessments and facilitated informed decision-making processes.

Secondly, the establishment of Community Conservation Areas was accomplished, promoting in-situ conservation of biodiversity. These areas have been pivotal in ensuring the sustainable use of biodiversity

resources and enhancing the region's resilience to climate change stresses. The successful implementation of these conservation areas underscores the project's commitment to preserving the natural heritage and fostering ecological balance.

Thirdly, the project effectively engaged the community in climate change mitigation measures and the conservation of land and water resources. Through core forestry activities, such as plantation and soil water conservation, the community actively participated in initiatives that have significantly contributed to the region's environmental sustainability.

Lastly, the project excelled in building capacity through targeted training programs and awareness campaigns. These initiatives have equipped community members with the necessary knowledge and skills to actively participate in conservation efforts. The heightened awareness and enhanced capabilities have empowered the community to take proactive measures in safeguarding their environment and addressing climate change challenges.

## **5.2 Interventions**

The project, aimed at enhancing carbon sequestration and conserving declining life-supporting forest tree species, was initiated in Five villages under Kohima District of Nagaland with a focus on community participation. The intervention began with a comprehensive assessment of the existing forest cover and identification of critical areas where tree species were most at risk.

Key stakeholders, including local communities, forest department officials, and environmental experts, were engaged from the outset. Workshops and meetings were organized to raise awareness about the importance of carbon sequestration and forest conservation. These sessions highlighted the dual benefits of combating climate change and preserving biodiversity, emphasizing how local communities could play a pivotal role in these efforts.

A participatory approach was adopted to ensure community ownership and long-term sustainability. Local leaders and village councils were involved in decision-making processes, which helped in gaining trust and ensuring the alignment of project goals with community needs. Traditional knowledge and practices were integrated into the project design, respecting and leveraging indigenous expertise in forest management.

The project implementation phase saw the establishment of nurseries to grow native and endangered tree species. Training programs were conducted to equip community members with skills in nursery management, tree planting, and sustainable forest management practices. These activities were designed not only to enhance technical knowledge but also to encourage participants to take responsibility for caring and preserving.

Monitoring and evaluation mechanisms were put in place to track progress and ensure accountability. Regular field visits and community feedback sessions were conducted to identify challenges and adapt

strategies accordingly. This iterative process helped in fine-tuning the project interventions and achieving desired outcomes.

Incentives were provided to communities to encourage active participation. These included financial benefits through livelihood support through the promotion of non-timber forest products, and capacity-building initiatives aimed at creating alternative income sources. By addressing economic needs alongside environmental goals, the project created a win-win scenario for both conservation and community welfare.

The project also fostered partnerships with academic institutions, non-governmental organizations, and government agencies to bring in additional expertise and resources. These collaborations enhanced the project's credibility and facilitated the sharing of best practices and lessons learned.

### **5.3 Green Skills developed in State/ UT**

This project has significantly advanced the development of green skills among local women. In a region where agricultural produce often spoils before reaching the market due to insufficient cold storage facilities, a critical initiative was undertaken to empower women by training them in pickle making. This initiative not only addressed the issue of food wastage but also provided a sustainable means of livelihood.

#### **Training and Skill Development**

Women from Five village communities were provided comprehensive training in the art of pickle making. This training encompassed the entire process, from selecting the right produce, understanding preservation techniques, and mastering the use of spices and herbs to create a variety of pickles. The training also included essential business skills such as packaging, branding, and marketing to ensure that the women could effectively sell their products in both local and wider markets.

#### **Economic Empowerment**

By mastering pickle making, the women transformed perishable agricultural products into long-lasting, marketable goods. This not only reduced post-harvest losses but also created a new source of income. The skill development initiative enabled the women to become entrepreneurs, contributing to their household income and fostering economic independence. Additionally, the project facilitated the formation of cooperatives, which helped in collective marketing and distribution, thereby enhancing their reach and profitability.

#### **Environmental and Social Impact**

The project has had a multifaceted impact on the community. Environmentally, it promoted the conservation of local biodiversity by encouraging the use of indigenous plants and fruits for pickle making. This practice aligns with the broader goal of carbon sequestration and forest conservation. Socially, the

training sessions fostered a sense of community and collaboration among the women. By working together, they shared knowledge, supported each other, and strengthened community bonds.

### **Sustainable Livelihoods**

The introduction of pickle making as a livelihood strategy provided a sustainable solution to the issue of agricultural spoilage. This not only ensured food security but also offered a stable income source that could be maintained year-round, irrespective of agricultural cycles. The project's emphasis on sustainability extended to the use of eco-friendly packaging materials, further enhancing its environmental benefits.

### **Long-term Benefits**

The long-term benefits of the project are profound. By equipping women with valuable skills and knowledge, the project has laid the foundation for continuous economic growth and community development. The women trained through this initiative are now capable of training others, ensuring the perpetuation of these green skills across generations. The increased household income and economic stability also contribute to improved quality of life and reduced poverty in the region.

This project has successfully developed green skills among women by training them in pickle making. This initiative has provided a sustainable livelihood, reduced agricultural waste, promoted environmental conservation, and fostered community development. The project's comprehensive approach to skill development, economic empowerment, and sustainability has created a lasting positive impact on the lives of the women and their communities, demonstrating a model of success that can be replicated in similar regions.

### **5.4 Addressing Cross-cutting Issues**

The project addresses the cross-cutting themes of climate proofing, gender equality and communication which must necessitates a holistic and integrated approach. The core forestry activities of soil and water conservation, agro-forestry, establishment of Community Conservation Areas and plantation activities will go a long way in building resilience of the project to the effects of climate change, while also increasing the carbon-sink pool and conservation of biodiversity. Hence, the project is also in consonance with the “National Mission on Sustaining the Himalayan Ecosystem” under National Action Plan on Climate Change.

This initiative prioritize climate resilience, biodiversity conservation, and sustainable development. Engaging local communities was pivotal, as their participation ensures cultural relevance and long-term sustainability. Empowering these communities through education and capacity-building fosters stewardship and enhances local livelihoods. The project also incorporated gender inclusivity, ensuring equitable participation and benefits for all. By integrating modern scientific methods with indigenous knowledge, we could able to enhance conservation efforts and optimize carbon

sequestration. Continuous monitoring and adaptive management are essential to address emerging challenges and ensure the project's success. Strategic collaborations with governmental and non-governmental organizations will amplify impact and facilitate resource mobilization. Ultimately, this project aims to create a replicable model for balancing ecological preservation with socio-economic development, aligning with both local and global environmental goals.

## **6 PROJECT'S IMPACTS IN IHR –**

### **6.1 Socio-Economic impact**

This project has significantly elevated the socio-economic status of local stakeholders. Through concerted community engagement and sustainable forestry practices, the initiative has catalyzed profound transformations in livelihoods and environmental stewardship.

Economically, the project has fostered new avenues of income generation for participating communities. By promoting the conservation and sustainable management of critical forest tree species, it has unlocked economic opportunities previously untapped. Local residents now benefit from enhanced access to markets for sustainably harvested forest products, thereby diversifying their income streams and reducing dependency on traditional, often unstable, livelihoods.

Moreover, the socio-economic fabric of the region has been enriched through improved community cohesion and empowerment. The participatory nature of the project has empowered local stakeholders by involving them in decision-making processes and equipping them with skills in sustainable forestry practices. This empowerment has not only bolstered their confidence but has also reinforced their role as custodians of their natural environment, instilling a sense of pride and ownership.

Furthermore, the project has had a ripple effect on social indicators, including health and education. Improved economic conditions have enabled better access to healthcare services and education for community members, contributing to overall well-being and human development in the region. Additionally, the project's emphasis on environmental conservation has safeguarded biodiversity and ecosystem services, which are crucial for sustaining livelihoods in the long term.

Through this project, it has emerged as a beacon of socio-economic progress in all the Five villages, by integrating environmental conservation with community empowerment. Through strategic interventions and inclusive participation, it has not only enhanced the economic resilience of stakeholders but has also fostered a sustainable model of development rooted in environmental stewardship and social cohesion.

### **6.2 Impact on of Natural Resources/ Environment**

The proposed project aims to substantially enhance natural resources and environmental health across all five project areas, as well as the Kohima District of Nagaland. By prioritizing increased carbon



sequestration, the initiative will directly contribute to climate change mitigation. While the immediate impact may not be visible, but we are confident that the project will significantly reduce atmospheric carbon dioxide levels, improve air quality, and stabilize local climate patterns in the long term.

The promotion and conservation of declining forest tree species will foster biodiversity, ensuring the survival of endemic and threatened flora. This biodiversity boost will create a more resilient ecosystem, capable of supporting diverse wildlife and maintaining ecological balance.

Community participation is central to this initiative, ensuring sustainable and inclusive management of natural resources. Local involvement will encourage responsible management, leading to reduced deforestation and habitat destruction. As a result, soil quality and water resources in the region will see marked improvements, reducing erosion and enhancing groundwater recharge.

Though the immediate impact may not be evident, we are confident that the project will substantially engage the community in climate action, reduce atmospheric carbon dioxide levels, enhance air quality, and stabilize local climate patterns in the long term.

### **6.3 Conservation of Biodiversity/ Land Rehabilitation in IHR**

#### **Conservation of Biodiversity:**

1. **Protection of Endangered Species:** Through the establishment of community-driven conservation areas, the project successfully safeguarded numerous endangered and declining forest tree species. These areas acted as sanctuaries, providing a safe habitat for the regeneration and growth of these critical species.
2. **Community Involvement:** The project highlighted the crucial role of local communities in biodiversity conservation. A comprehensive CCA Management Plan was developed, and during its preparation, extensive training, capacity-building, and orientation programs were conducted. These initiatives equipped community members with the essential knowledge and skills to manage and protect their natural resources effectively.
3. **Biodiversity Monitoring:** Regular monitoring and documentation of flora and fauna were integral components of the project. Advanced techniques and tools were employed to track changes in biodiversity, ensuring timely interventions and adaptive management practices. This approach enhanced the overall health and resilience of the ecosystem.

#### **Land Rehabilitation:**

1. **Afforestation and Reforestation:** Large-scale afforestation and reforestation initiatives were undertaken to restore degraded lands. Native and ecologically significant tree species were planted, enhancing the structural and functional integrity of the forest ecosystems. These efforts not

only improved carbon sequestration but also provided vital ecosystem services such as soil stabilization and water retention.

2. **Soil and Water Conservation:** The project has successfully implemented soil and water conservation measures, including terracing at the cultivation site. These interventions have effectively controlled soil erosion, enhanced soil fertility, and increased water infiltration, thereby rejuvenating the degraded landscapes.
3. **Sustainable Land Management Practices:** Emphasis was placed on promoting sustainable land management practices among local communities. Agroforestry, mixed cropping, and organic farming techniques were introduced, integrating traditional knowledge with modern scientific approaches. These practices not only enhanced agricultural productivity but also contributed to the overall health of the ecosystem.

The project achieved significant milestones in the conservation of biodiversity and land rehabilitation in the IHR. By fostering community participation, protecting endangered species, promoting Eco-tourism and implementing sustainable land management practices, the project not only enhanced the ecological integrity of the region but also ensured the well-being and livelihoods of the local communities. The successful implementation of this project serves as a model for future conservation and rehabilitation efforts in similar ecologically sensitive regions.

***NB:** Biodiversity conservation and land rehabilitation of all the Five villages were comprehensively detailed in the CCA Management Plan Manual, which was submitted during the Monitoring & Evaluation meeting at the Ministry of Environment, Forest and Climate Change in Delhi on May 29, 2024.*

#### **6.4 Developing Mountain Infrastructures**

**Several key Mountain infrastructure developments were successfully implemented:**

1. **Waiting Shed in Dzukou Valley:** A waiting shed was established midway to Dzukou Valley, providing rest and shelter for trekkers and tourists. This initiative not only enhances visitor experience but also promotes sustainable tourism, reducing human impact on the environment **(Appendix-1)**.
2. **Distributed Dustbins for Clean Environment:** To maintain a clean and litter-free environment, dustbins were strategically distributed throughout the region. This measure encourages proper waste disposal, contributing to the preservation of the pristine mountain landscape **(Appendix-1)**.
3. **Nursery Infrastructure Development:** Basic necessities for nursery infrastructure were provided to support the growth and care of saplings. This included essential tools, equipment, and materials to ensure the successful cultivation of tree species crucial for carbon sequestration **(Appendix-1)**.

4. **Monitored Terracing:** Terracing practices were carefully monitored and implemented to prevent soil erosion and enhance water retention. This method not only protects the soil but also creates a conducive environment for tree growth **(Appendix-1)**.
5. **Fire Fighting Gears Distribution:** To combat forest fires effectively, fire fighting gear was distributed among community members. This proactive measure ensures that the community is well-equipped to handle fire emergencies, safeguarding the forest ecosystem.
6. **Office Setup Accessories Distribution:** Necessary office accessories were distributed to establish functional offices for project management and coordination. This facilitated efficient administration and communication, essential for the project's success **(Appendix-1)**.
7. **Sensitization Programs:** Regular sensitization programs were organized to educate and engage the community on the importance of forest conservation and carbon sequestration. These programs fostered a sense of responsibility and active participation among local residents**(Appendix-1)**.
8. **Sapling Distribution from Departmental Nursery:** Given the limited capacity of local nurseries, additional saplings were sourced from departmental nurseries and distributed to the community. This ensured an adequate supply of tree species for plantation activities, supporting the project's reforestation goals**(Appendix-1)**.

## **6.5 Strengthening Networking in State/ UT**

Under the project initiative, significant achievements have been made in strengthening networking across States and Union Territories. Success stories showcasing exemplary practices in various aspects of the project have been shared with the Division of Forest, Ecology, and Climate Change at ICFRE-RFRI, Jorhat. This dissemination aims to effectively engage stakeholders and serve as an inspirational guide for similar initiatives.

The Floristic Assessment, prepared by Kohima Science College, serves as a valuable reference for various plant biodiversity research projects, particularly those related to the titled project. This assessment aids in understanding the importance of the region's species and supports more effective conservation practices.

Moreover, the project's findings and progress have been published in the Annual Magazine of the State Forest Department. Abstracts were also presented at two prestigious international conferences: one at Nagaland University on "Bioresources & Bioeconomy" and the other at IIT Guwahati on "River Corridor Research & Management," where the project researcher received the Best Presenter Award.

## 7 EXIT STRATEGY AND SUSTAINABILITY

### 7.1 Utility of project findings

This project has yielded significant findings across various critical domains, demonstrating its profound impact on both environmental conservation and community engagement.

**Microplan Data Collection:** A significant milestone of the project is the successful compilation of microplan data. This comprehensive dataset serves as an intricate blueprint for targeted conservation efforts and resource management strategies. Concurrently, the microplan details site-specific strategies derived from extensive stakeholder consultations and ecological assessments. It identifies critical conservation targets, such as endemic species protection and habitat connectivity.

**Thematic Mapping Using Drones in Community Conserve Areas:** Employing advanced drone technology, the project has achieved precise thematic mapping of Community Conserve Areas. This innovative approach has enabled the accurate delineation of biodiversity hotspots, habitat fragmentation patterns, and ecological corridors. Such detailed spatial data empowers stakeholders with crucial insights for effective conservation planning and habitat restoration initiatives.

**Community Conserve Area Management Plan:** The formulation and documentation of the Community Conserve Area Management Plan stand as a cornerstone of the project's success. This comprehensive document integrates scientific findings with community aspirations, outlining actionable strategies for habitat preservation, biodiversity enhancement, and sustainable resource utilization. It has served as a guiding framework for collaborative conservation efforts, fostering local stewardship and resilience against environmental challenges.

**Floristic Assessment:** The meticulous floristic assessment conducted as part of the project has been diligently incorporated into the Final Technical Report (Annexure I). This taxonomical inventory not only catalogues Indigenous flora but also identifies rare and endangered species crucial for biodiversity conservation. The inclusion of such detailed data enriches the Final Technical Report, providing a scientific basis for conservation policies and land-use planning initiatives.

**Village Level Vulnerability Index on Climate Change:** The development of a Village Level Vulnerability Index on Climate Change (**APPENDIX IV**) represents a significant advancement in understanding local climate resilience. This index synthesizes environmental data, socio-economic factors, and community perspectives to assess vulnerability and adaptive capacity. It serves as a vital tool for prioritizing climate adaptation strategies and enhancing community resilience in the face of climate variability.

**NB:** *Significance of Project Outcomes in the CCA Management Plan Manual, Microplan data of all the Five villages was submitted during the Monitoring & Evaluation meeting at the Ministry of Environment, Forest and Climate Change in Delhi on May 29, 2024.*

## 7.2 Other Gap Areas

1. **Impact of Climate-Induced Vulnerability on Livelihood:** Research should also focus on assessing how climate change specifically affects the vulnerability of local livelihoods in other parts of the Kohima District, particularly those dependent on forest resources. This includes understanding changes in precipitation patterns, temperature fluctuations, and their direct impact on agriculture, forestry practices, and non-timber forest products crucial for community sustenance.
2. **Socio-Economic Dependency of Urban Economy, Particularly Kohima City, on the Japfu Range:** Investigating the socio-economic dynamics between Kohima city and the Japfu Range is crucial. This entails examining the extent to which urban economies rely on ecosystem services provided by the Japfu Range, such as water provisioning, timber, and recreational activities. Understanding these dependencies is essential for sustainable urban planning and forest conservation strategies.
3. **Study of Invasive Species and Its Impact on Biodiversity in the Dzukou Valley:** Conducting a comprehensive study on invasive species within the Dzukou Valley ecosystem is vital. This research should identify invasive plant species threatening native biodiversity, their spread mechanisms, and ecological impacts. Insights gained can inform invasive species management strategies aimed at preserving the unique biodiversity and ecosystem services of the Dzukou Valley.

## 7.3 Major Recommendations/ Way Forward

1. **Community Engagement and Empowerment:** Implement robust community engagement strategies to foster local participation in forest conservation efforts. Empower communities through education and training programs on sustainable forestry practices.
2. **Research and Development:** Prioritize research into effective carbon sequestration methods tailored to the specific forest ecosystem in other areas as well. Invest in R&D initiatives aimed at understanding and preserving declining life support tree species.
3. **Policy Advocacy and Implementation:** Advocate for supportive policies at local and regional levels to incentivize carbon sequestration efforts and protect endangered tree species. Collaborate with policymakers to integrate conservation measures into broader environmental agendas.
4. **Capacity Building:** Strengthen the capacity of local stakeholders, including forest officials and community leaders, through workshops and skill development programs. Enhance their ability to monitor, manage, and sustainably utilize forest resources.
5. **Monitoring and Evaluation:** Establish a comprehensive monitoring and evaluation framework to track the progress of carbon sequestration initiatives and the conservation status of target tree species. Use data-driven insights to adapt strategies and ensure accountability.

6. **Public Awareness and Education:** Launch extensive public awareness campaigns to highlight the ecological and economic benefits of forest conservation. Foster a sense of ownership and responsibility among the broader population towards preserving biodiversity.
7. **Collaborative Partnerships:** Forge strategic partnerships with academia, research institutions, NGOs, and private sectors to leverage expertise, resources, and funding for sustained project success.
8. **Scaling Up and Replication:** Explore opportunities for scaling up successful pilot initiatives across other districts in Nagaland and potentially replicate the model in similar ecological contexts nationwide.
9. **Financial Sustainability:** Develop innovative funding mechanisms and sustainable financing models to ensure the long-term viability of conservation efforts beyond initial project phases.
10. **Adaptive Management:** Embrace adaptive management practices that allow for flexibility and responsiveness to evolving environmental and socio-economic dynamic.

#### **7.4 Replication/ Upscaling/ Post-Project Sustainability of Interventions**

The project's success in enhancing carbon sequestration and conserving endangered forest tree species in Kohima District presents a robust framework for replication and upscaling. To ensure sustained impact beyond the project's duration, several strategic pathways have been identified:

1. **Replication:** Leveraging the community-centric model that underpins the project, replication efforts will focus on disseminating best practices to neighboring districts and communities facing similar ecological challenges. This includes establishing knowledge-sharing platforms, workshops, and training sessions tailored to local contexts, thereby catalyzing widespread adoption of sustainable forest management practices.
2. **Upscaling:** Building upon established partnerships with governmental and non-governmental stakeholders, the project aims to upscale its interventions by integrating them into regional and national biodiversity conservation frameworks. By advocating for policy integration and securing additional funding streams, scalability efforts will be bolstered, ensuring a broader geographical reach and deeper conservation impact.
3. **Post-Project Sustainability:** Key to the project's legacy is the establishment of self-sustaining mechanisms that endure beyond initial funding cycles. This involves empowering local communities through capacity-building initiatives in forest stewardship and enterprise development linked to sustainable resource use. Moreover, fostering a sense of ownership and responsibility among stakeholders will be pivotal in maintaining conservation gains and preserving biodiversity corridors in perpetuity.

## **8. ACKNOWLEDGEMENTS**

On behalf of our entire research team, I extend my deepest gratitude to the NMHS Ministry for their unwavering support and guidance in our project titled "Increasing Carbon Sequestration and Promoting Conservation of Declining Life-Supporting Forest Tree Species through Community Participation in Kohima District of Nagaland."

This endeavour has achieved remarkable success due to the Ministry's visionary leadership and commitment to environmental conservation. The project's accomplishments in enhancing carbon sequestration and preserving vital tree species are a testament to the collaborative efforts fostered by the Ministry's invaluable resources and expertise.

We are profoundly grateful for the opportunity to contribute to this significant environmental cause and look forward to continuing our partnership to further our shared goals of ecological sustainability and community-driven conservation.

**APPENDICES of the DPR (Attached in the gmail folder)**

Appendix I – Details of Technical Activities

Appendix II – Floristic Assessment

Appendix III – Survey Report

Appendix IV– Vulnerability Assessment