Ministry of Environment, Forest and Climate Change

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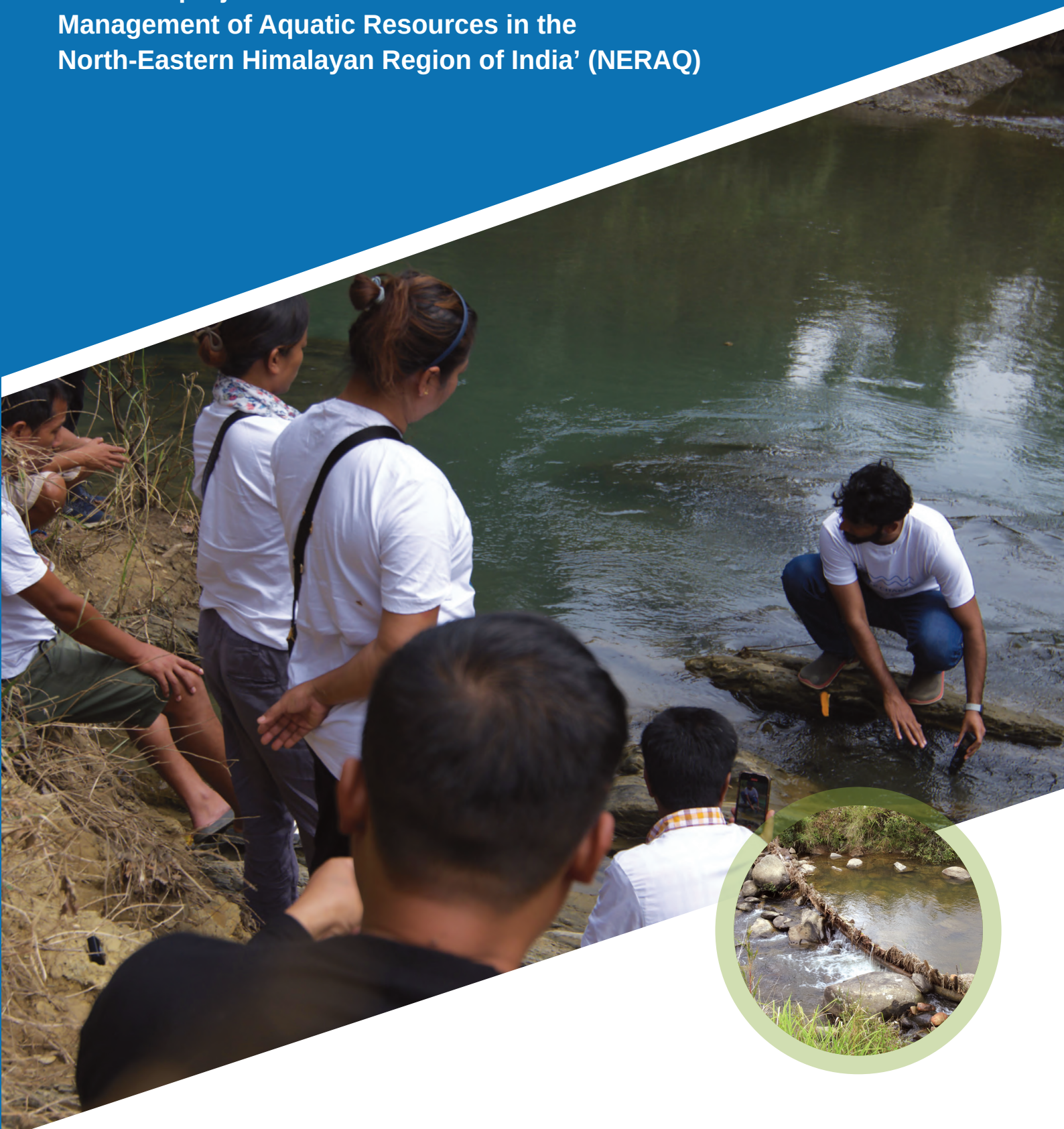
Supported by:
Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
based on a decision of the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE

GOOD PRACTICES

From the project 'Protection and Sustainable Management of Aquatic Resources in the North-Eastern Himalayan Region of India' (NERAQ)



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Published by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Registered offices:
Bonn and Eschborn
Protection and Sustainable Management of Aquatic Resources in the Northeastern Himalayan Region of India (NERAQ)

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Design and Layout
Mensa Design Pvt. Ltd

Photo credits
Cover photo: GIZ

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On behalf of the
German Federal Ministry for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection (BMUV) under the International Climate Initiative (IKI)
New Delhi, 2024

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About the Project

India's North Eastern Region (NER), stands out as a vital biodiversity hub, encompassing two of the world's thirty-four biodiversity hotspots: the Indo-Burma and the Himalayas. This region supports a rich array of aquatic biodiversity that is crucial for the food and income security of local riparian communities. However, threats from population growth, climate change, pollution, and unsustainable practices such as destructive fishing and logging are jeopardizing these aquatic ecosystems.

The Indo-German Bilateral Cooperation Project- Protection and Sustainable Management of Aquatic Resources in the North Eastern Himalayan Region of India'(NERAQ) is part of the International Climate Initiative (IKI), funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV). The project is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close partnership with the Indian Ministry of Environment, Forest and Climate Change (MoEFCC) at the union level. The overall objective of the project is the protection, sustainable and climate-resilient management of aquatic resources with focus on wild fish and invertebrates (such as snails, crabs, frogs). The project aims to strengthen the knowledge and management capacities of state, research and local stakeholders for aquatic resources in the Indian states of Assam, Manipur, Meghalaya and Nagaland.

Good Practices from the Pilot Implementation

The following pages attempt to document the learning experiences that could be categorised as good practices from the pilot projects in the four implementing states for replication. These good practices were identified through a meticulous process of evaluation of the pilots' work, their results, and the means and measures used for achieving those results. These practices were then screened across criteria such as effectiveness, efficiency, relevance, sustainability, ethical soundness, possibility of replication/scale up, partnerships/collaborations involved, community involvement and political commitment/support base around the practice.

The essence of identifying and sharing good practices is to learn from implementation on the ground and to encourage the application of knowledge and experience to new situations. These good practices should not be viewed as prescriptive, but can be adapted to meet new challenges, becoming better as improvements are discovered.

1

Sustainable Aqua-Tourism for conservation of fish species, their associated traditional knowledge and income generation: A convergence story from Khliehshnong, Meghalaya

SUMMARY

The pilot intervention in Khliehshnong, Meghalaya tells a unique story of the coming together of various stakeholders of how different aspects of conservation were brought together to present the interconnectedness between aquatic conservation and income generation for the locals through sustainable aqua-tourism. Nestled next to a three-hectare man-made water reservoir encircled by an eleven-hectare sacred forest, a Visitor Information Centre (VIC) has newly been established. The water body was once teeming with endemic fish species, including the ecologically and culturally significant snakehead fish 'Channa pardalis'. The VIC is strategically nestled enroute to the famous Dainthlen Falls in Sohra, East Khasi Hillis, also once renowned as the wettest place on Earth and celebrated for its myriad waterfalls. It showcases the unique aquatic biodiversity and displays traditional practices of the region to visitors from within the Northeast region and from outside alike. The income generated from the VIC will not only ensure its maintenance but also supports the identified unemployed youths (both male and female) who have been trained in managing the VIC including that in guiding nature walks, conducting environmental education programmes and conserving the water body via ranching or tree-planting. The pilot implementation is a collaborative and financial convergence of the local community via the traditional institution - the "Khliehshnong Village Dorbar", the Department of Fisheries of Meghalaya, and the NERAQ project.

Dr Evanoreen Khongwir
Scientist, Meghalaya State Biodiversity Board

In Khliehshnong, we are working closely with the BMC in the conservation of the snakehead species through convergence with the Fishery department. And also, we are documenting the traditional knowledge which are associated with aquatic biodiversity.

Main Implementing Partners: Khliehshnong Village Dorbar, Department of Fisheries, Meghalaya State Biodiversity Board, Martin Luther Christian University

Location: Khliehshnong, East Khasi Hills, Meghalaya

Challenges of Implementation:

- There was an initial lack of interest within the community. While the Village Dorbar was fully committed, a deeper involvement of the community at large was both a social and logistical imperative to ensure the commitment of the whole community towards the activities for conservation of aquatic resources. This was addressed by organising a series of community awareness and sensitisation programmes such as a "Community Snakehead Catch and Release competition" to raise the interest levels.
- Heavy monsoons delayed various field-based activities, and the construction of the VIC was impeded.
- Realignment of project milestones as each participating agency has their own mandate and timelines
- There was a time lag between the release of funds from various agencies and the field requirements. Also, mandatory documentation is not always readily available with the community-based institutions.
- Village meetings or sensitisation programmes needed to be organised in the evenings or at a time most convenient to the community to prevent them from leaving their daily jobs for project activities- be it farmers or school teachers.

Beneficiaries:

Community members, Dorbar members, Biodiversity Management Committee members, unemployed youths.

The Good Practice/Measure and Key Steps of the Process

- The project facilitated regular consultations among all relevant stakeholders to foster convergence and to share ideas and readjust timelines
- Sensitisation of community members at large that includes capacity building of various stakeholders such as the BMC members on their roles and functions, the unemployed youths on tourism ethics and aquatic monitoring techniques, the Khliehshnong Village Dorbar members on sustainable natural resources management and preparation of management plans.

- A habitat assessment by scientist from the Indian Institutes of Science and Research, Kolkata proved to be highly useful in identifying the current ecological status of the waterbody, the species and in suggesting concrete breeding measures and protocols

- To restore the catchment area of the water body for long-term water availability, 1.5 hectares of the already-degraded forest area was reforested with the help of local villagers while the saplings were provided by the Forest Department

- With the support of the State Biodiversity Board, the aquatic fauna and flora of the People's Biodiversity Register (PBR) were documented

- The traditional knowledge and practices of the villagers with relation to aquatic resources were documented in detail with the support of the Martin Luther Christian University and are displayed in the VIC.

Enabling Factors:

- The commitment and enthusiasm of the Khliehshnong Village Dorbar and their proactive efforts to engage the entire village resulted in widespread participation, fostering a sense of collective ownership.

- The readiness of the Khliehshnong Village Dorbar to channelise resources of approximately 11,000 Euros from the MGNREGA programme towards conservation measures like tree plantation activities and building a pathway surrounding the water body for the VIC.

- The commitment by the Department of Fisheries to utilise the national Aqua Park Scheme and offer to support all fishery management related trainings has resulted in building the capacities of the managers at the village level.

Lessons Learnt:

- Campaigns to invite participation of the entire community like the "Snakehead Community Catch and Release" fishing competition can instill the necessary awareness, interest and commitment of the community to conserve aquatic diversity and also facilitate identification of the various snakehead species

- It requires sensitivity to the work and time schedule of the villagers when planning activities to ensure maximum participation through which commitment and transparency grows.

- Facilitation of convergence requires regular meetings to ensure proper planning and flexibility in revising plans and timelines.

Impacts:

- Training programmes have empowered unemployed youth, equipping them with the skills to contribute to the management of the Visitor Information Centre (VIC) and serve confidently as nature guides.

- The involvement of the youths as a central pillar of the interventions further inspired the younger generation on the need for community participation and responsibilities in conservation initiatives.

- Previously inactive members of the Biodiversity Management Committee (BMC) are now actively leading major community activities.

- The afforestation efforts with the Forest Department have successfully expanded green cover around the water body.

- Under the Dorbar's guidance, a sustainable resource management plan has been prepared to guide conservation-friendly activities.

- Government agencies like the District Administration and Department of Tourism have appreciated the pilot as potential model for replication in other regions across the state.

2

Habitat assessment – building capacities of youths and fishery officers for continuous monitoring (Meghalaya)

SUMMARY

Freshwater ecosystems are pivotal for biodiversity and offer innumerable socio-economic opportunities including blue upskilling. Mapping the habitat including parameters of biodiversity, physical and chemical gradients are an integral component for freshwater ecosystems. Under the NERAQ project, this exercise was undertaken at Khliehshnong, a village located about 3.5 km away from Sohra in Meghalaya. Given the endemicity within the region and wider parts of Meghalaya, there is a need to integrate robust scientific approach for generating baseline information for existing habitat attributes with the reservoir through implementation of rapid habitat level assessment. This intervention intends to add value to the conservation of the endemic species of Snakehead fish in water bodies in the region that can ultimately contribute to blue economy through aquatic tourism and support livelihood of local communities. A rapid habitat assessment of the water reservoir to gauge the suitability for ranching was undertaken. This was followed by a series of capacity development exercises of frontline staff members of the Fisheries Department and youths from Khliehshnong aimed at equipping the participants with skills of monitoring the health of the aquatic ecosystems. A user manual that details the methodology was also developed and handed over to the community and the department for future use.

Alan West Kharkongor
Director, Meghalaya Tourism Development Corporation

> The topography of Cherrapunjee, if you go around, you will find small streams where we don't have big fishes. Right from the time that I was a small kid, I related myself to this particular species, snakehead. We are related to this snakehead. I was told that even the Maharaja of Sohra, till the day he died, he was fishing snakehead. So it's very important to our culture in Sohra. ”

Main Implementing Partners: Indian Institutes of Science Education and Research, Kolkata

Location: Khliehshnong, Sohra

Challenges of Implementation:

The habitat assessment is a technical exercise for which, intense field sampling activities are required to be undertaken at specified months of the year. This is essential to gain an understanding of the habitat and inter-connected physical, chemical as well as biological attributes. Intensive field sampling in a place like Sohra which receives heavy rains posed as a critical challenge. As such, involvement of the village youths in the assessment exercise is deemed as a step to ensure that the exercise can be repeated at a later stage. The youths were trained by the research students on how to conduct the habitat assessment, while also building their own confidence and capacity.

Beneficiaries:

Officers of the Fishery Department, Youths of Khliehshnong

The Good Practice/Measure and Key Steps of the Process

In habitat monitoring of fragile aquatic ecosystems with endemicity, capacity development constitutes an important pillar. The capacity development in this domain involves training of frontline staff, including research staff, and most importantly the indigenous and local communities residing near this habitat. As part of the rapid habitat assessment of Khliehshnong water reservoir, a series of two capacity development exercises on monitoring of water quality were undertaken. Five frontline staff members of the Fisheries Department, Government of Meghalaya were trained on the nuances of sampling strategies to be undertaken during the monitoring of aquatic habitats such as the Khliehshnong water reservoir. Each participant learnt the fundamentals including theory of pH, dissolved oxygen, total dissolved solids, electrical conductivity and water temperature measurements for aquatic ecosystems. Each participant was meticulously trained to calibrate the hand-held probes, use of proper standards and steps to be followed during in-situ measurements. The cost of the probes, limitations in terms of measurement accuracy and overall performance were discussed with all participants.

During the capacity development trainings, special emphasis was laid on best practices for sampling to be followed across diverse aquatic ecosystems. Based on focused trainings, 3 sets of instruments comprising of digital probes for measuring pH, TDS and EC were distributed among the 10 participants. In total, 9 instruments were distributed

among the participants. The distribution of the digital probes among the teams has led to self-instrumentation capabilities which will pave the way for monitoring of aquatic habitats including the Khliehshnong water reservoir.

Enabling Factors:

Engagement of a technical expert is paramount in facilitating a successful assessment. Such expertise not only provided essential guidance throughout the exercise but also ensured that participants received adequate support from a dedicated team. Moreover, the willingness of frontline staff and village youths to actively learn significantly enhanced the exercise's overall impact, fostering a more meaningful and productive experience.

Impacts:

The outputs of the assessment exercise are three folds- conducting a habitat assessment of the water in Khliehshnong that would result in recommendations for implementation; building the capacity of the frontline staff of the Fisheries Department and local youths and lastly, development of a use manual to be used in subsequent exercises.

The assessment provided concrete steps to be taken during ranching and post-ranching for enhancing targeted sustainable tourism in Khliehshnong water reservoir. Various parameters were studied, namely, Water Quality Index (WQI) values that suggest that the water reservoir is suitable for ranching of biological communities including endemic fish species. The overall health of the water body indicates the absence of contaminants, which makes it favorable for ranching and can support a rich aquatic diversity.

The key recommendation shared with the village authority will provides concrete steps for implementation and policies that need to be framed to preserve the water body. Recommendations such as the need to sensitise visitors and tourists to adhere to environmentally sustainable practices and promote complete ban on use of plastics are a few of which the authority are determined to take up.

The recommendations also suggested a need for regular monitoring to ensure that contaminants and wastewater from various sources do not find their way into the water body. This is required to ensure the long-term viability of sustainable tourism. The above recommendations will undoubtedly serve as a concrete direction for the village authority to act. The confidence of the frontline staff and the village youths is evident during the capacity building exercises.

3

Integrating traditional knowledge and wisdom of IPLCs into modern education via multi-disciplinary curricula (Nagaland)

SUMMARY

To ensure the incorporation of the traditional knowledge of the indigenous people and local community (IPLC) into the resources management discourse, it is an imperative that both research and government agencies acknowledge and integrate other forms of knowledge and management practices into their current teaching pedagogy and science-based management approach. As a step towards this objective, the NERAQ project facilitated the launching of a pioneering multidisciplinary course 'Traditional Knowledge System (TKS)' by Kohima Science College, Jotsoma (KSCJ), marking a significant milestone in the State's educational landscape. This innovative course, the first of its kind ever in Nagaland, aims to bridge the gap between modern education and the rich heritage of traditional wisdom of the Nagas.

Main Implementing Partners: Kohima Science College, Jotsoma

Location: Kohima District, Nagaland

Challenges of Implementation:

The main challenge for the course is the availability of relevant reading material on the course. This was addressed by the vast experience and knowledge of the lead trainer, Dr. Rajindra Puri, Director, Centre for Biocultural Diversity, University of Kent, UK, who helped in identifying relevant publications and the active participation of the faculty members of Kohima Science College, Jotsoma, in linking Traditional Knowledge to their existing curricula.

Beneficiaries:

Researchers, students and IPLCs

The Good Practice/Measure and Key Steps of the Process

With the vision of bridging the divide between traditional and scientific knowledge, a series of initiatives were taken. The key interventions included:

- A four-day training course on Documentation of TK of Aquatic Resources and their use organised at Poilwa Village under Peren district of Nagaland.. It was organised to capacitate relevant stakeholders with the tools and methods of documenting traditional practices related to aquatic resources in the region. There was active participation of the village community members, Nagaland State Biodiversity Board, researchers, lecturers, students representing different organisations and institutions such as ATREE, Martin Luther Christian University, Shillong, IORA Ecological Solutions, YARD (Youth Action for Rural Development) and Kohima Science College, Jotsoma along with staff of GIZ.

- This was followed by a course on Curricula Development on Traditional Knowledge titled "Traditional Knowledge: Cultural Heritage for the Future" in Kohima Science College, Jotsoma, aimed at facilitating curriculum development on traditional knowledge then proposed to be introduced as a new course and offered by the college in line with the National Education Policy (2020). The trainings were organised by NERAQ Project in collaboration with the Centre for Biocultural Diversity, University of Kent, UK, attended by for 16 researchers and faculty members of the College.

- The above-mentioned trainings culminated in the launching of a pioneering multidisciplinary course 'Traditional Knowledge System (TKS)' by Kohima Science College.

Enabling Factors:

The willingness of Kohima Science College, Jotsoma to experiment and adopt the concept went a long way in straightening the pathways of materialising it into a reality. Further, the ground was already ripe in the wake of the mandate of the National Education Policy that enabled the swift launching of the course.

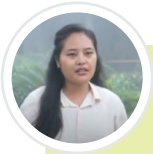
Ms. Kevilhuninuo Nagi
Department of Anthropology,
Kohima Science College

Being a new course, we were apprehensive at first. But what we found was that the students also, they seem to be very interested and enthusiastic.

The course has been designed to provide students with a comprehensive understanding of the diverse traditional knowledge systems that have been passed down through generations. By integrating subjects such as Anthropology, Botany and Zoology, the curriculum offers a holistic approach to learning, encouraging students to appreciate and value the depth and relevance of traditional practices in today's world.

Lessons Learnt:

It is observed that the process of conceiving the idea of this course to its actual launch as a curriculum took a significantly long time. This should be considered and accounted for in future initiatives of this kind that involve a multi-departmental collaboration. Calendars of departments of educational institutions are punctuated with activities, events and programmes that may not easily coincide with each other. This leaves little margin to introduce new subjects or initiatives---one that requires synergies between the multiple stakeholders with fixed calendars.



Vekhoshelu Chuzho
Student, Kohima Science College

The introduction of traditional knowledge in our college, it is a great opportunity. We're very happy that most of the traditional knowledge that we have, these are all already passed down. And we hope that with a new course that we have in our college, we will be able to properly document and give more data on the traditional knowledge system.

Impacts:

The launch of this pioneering multidisciplinary course elicited an enthusiastic response, attracting over 70 student enrollments. This initiative not only underscores the importance of Traditional Knowledge but also paves the way for a robust interdisciplinary approach that fosters collaboration across fields especially for strengthening traditional knowledge with current climate predictions and evolving transformative agriculture systems. With the anticipation of increasing enrollments, this endeavor sets a promising precedent for future educational initiatives aimed at integrating diverse knowledge systems.

4

Promotion of native species for both livelihood and species conservation (Nagaland)

SUMMARY

The villagers of Poilwa in the Peren District of Nagaland have adopted snail culture in their paddy fields, leveraging the area's abundant water sources. A recent field survey conducted by Kohima Science College revealed the presence of two edible snail varieties: the native Cepangopaludina chinensis and the exotic Filopaludina bengalensis, which were introduced by villagers who purchased these from nearby markets in Kohima and Dimapur. While snails are prolific breeders, their potential to become invasive necessitates careful management. Consequently, the community is being encouraged to eradicate the introduced species to conserve the indigenous variety, thereby ensuring the ecological balance and sustainability of their agricultural practices.

Main Implementing Partners: Kohima Science College, Jotsoma; Nagaland State Biodiversity Board

Location: Poilwa village, Peren district

Challenges of Implementation:

Invasive snail species pose significant challenges for agriculture, as their resilience and adaptability make them difficult to be eradicated from fields. Despite the diligent efforts of farmers to manage and control these populations, the invasive species often demonstrate a remarkable ability to thrive, jeopardizing crop yields and overall productivity. Consequently, the persistence of these snails highlights the need for more effective management strategies and comprehensive approaches to mitigate their impact on agricultural practices.

Beneficiaries:

Women Farmers

The Good Practice/Measure and Key Steps of the Process

Freshwater snail farming also known as heliculture, is the practice of breeding and raising snails for consumption. Heliculture has gained popularity in various parts of the world due to the increasing demand for snail meat, which is considered a delicacy and has nutritional as well as medicinal values.

The native snail species is smaller in size with softer shell and is considered a delicacy. The local variety is preferred over the other snail species sold in the markets in Kohima and has higher demand. Snails are a rich source of proteins, iron, calcium, Vitamin A, and other minerals. Snail meat also has very little fat.

Snail farming requires very little investment and is highly profitable. Therefore, to augment the snail production of the village womenfolk and improve their earning through snail culture, 50 women from all the 5 Khels of Poilwa village were selected for freshwater snail farming in the paddy fields. This was done as part of the livelihood improvement initiative of the pilot project implemented by Kohima Science College, Jotsoma, under the NERAQ Project. Encouraging the cultivation of the native species is a countermeasure to eradicate the invasive snail species. The key steps involved were

- Identification and management of alien invasive species
- Minimising genetic erosion and safeguarding the genetic diversity of native bioresources
- Livelihood improvement

Besides other Biodiversity Targets, the above-mentioned activities are both in line with the Nagaland Biodiversity Targets 4 and 7 of the NSBSAP which focus on managing alien invasive species and minimising genetic erosion and safeguarding the genetic diversity of native bioresources.

Enabling Factors:

The successful integration of conservation and livelihood initiatives hinges on the provision of proper guidance and consistent support from implementing partners, alongside active community participation. This collaborative approach not only fosters sustainable practices but also empowers beneficiaries to take ownership of their development. By aligning conservation efforts with economic viability, a conservation livelihood model has been cultivated, ensuring that environmental preservation and community welfare are mutually reinforcing objectives.

Dr. Limatemjen
Dean of Sciences, Kohima Science College

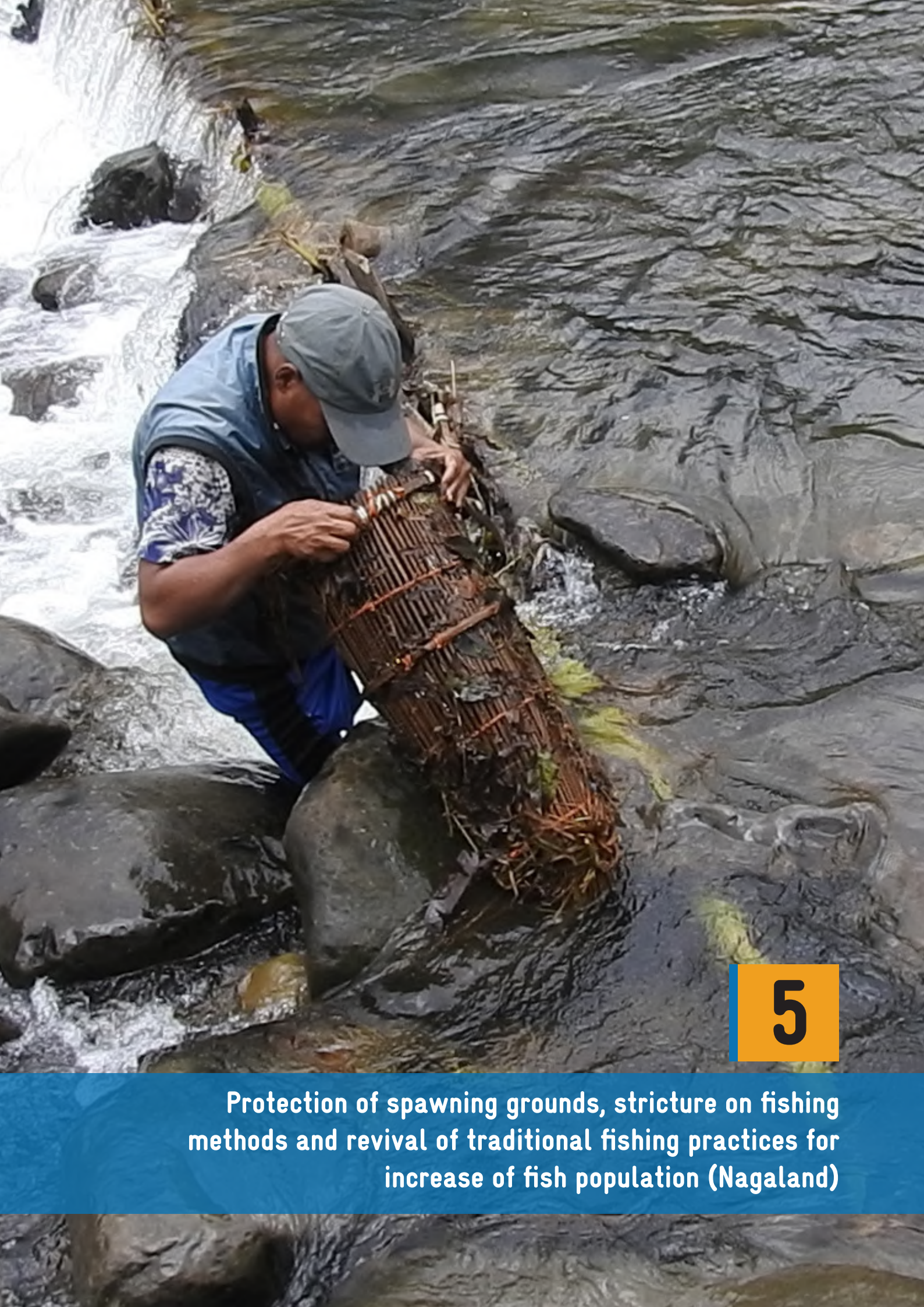
Through the NERAQ project, we intervened in order to remove the exotic species from the paddy field. When we started, it was initially with the idea of conservation and protection of the aquatic ecosystem. And then this branched out to another area, which is a very interesting area- the traditional knowledge.

Lessons Learnt:

To take up conservation of bioresources in remote areas, it is imperative to secure the livelihood of the communities through livelihood improvement activities. Food security is a major concern for many rural households. By securing the livelihoods and ensuring food stability of local communities, the pressure on bioresources be alleviated, thereby fostering a greater willingness to embrace conservation efforts. This synergistic approach not only supports community well-being but also enhances the effectiveness of conservation initiatives.

Impacts:

Over 100 households are actively participating in sustainable farming practices that not only bolster their livelihoods but also contribute to the preservation of the genetic diversity of local bioresources. This initiative highlights the crucial link between agricultural sustainability and biodiversity conservation, promoting environmentally responsible farming methods that protect indigenous species while ensuring economic stability for the community. By integrating traditional knowledge with modern practices, these households exemplify a commitment to ecological stewardship and the resilience of local ecosystems.



5

Protection of spawning grounds, stricture on fishing methods and revival of traditional fishing practices for increase of fish population (Nagaland)

SUMMARY

The NERAQ pilot project in Nagaland focused on the sustainable management and protection of aquatic resources along the Tepuiki River in Poilwa village, Peren District. With local livelihoods primarily reliant on agriculture, aquatic resources play a crucial role in the village's economy and culture. However, the pristine river faces threats from climate change and unsustainable fishing practices that jeopardise aquatic biodiversity. A key outcome of stakeholder engagement was the prohibition of harmful fishing methods, emphasising the value of traditional practices for conservation. Implemented by Kohima Science College (A), the project included detailed surveys and assessments of spawning grounds, particularly for the climate-sensitive *Snowtrout* and the state fish, *Chocolate Mahseer*. Eight spawning grounds were identified, with 4 designated as key conservation sites--one of the major spawning grounds being at the confluence of the Tepuiki River and the Duilumroi river (also known as *Dzülerüdi* or *Dzüleke* river which flows down from Dzüleke village). These initiatives not only aim to protect these vital habitats but also foster community awareness about the essential role of spawning areas in supporting and enhancing fish population growth.

Main Implementing Partners: Kohima Science College, Jotsoma

Location: Poilwa village, Peren district

Challenges of Implementation:

Time constraints and accessibility challenges due to difficult terrain significantly impacted the pilot implementation. The site became particularly inaccessible during the monsoon season, exacerbating these issues, as flash floods posed an additional risk. These factors necessitated careful planning and contingency measures to ensure the safety and effectiveness of the project.

Beneficiaries:

Local community of Poilwa and neighbouring villages

The Good Practice/Measure and Key Steps of the Process

The initiative implemented by Kohima Science College (A), Jotsoma, aimed to highlight the crucial role of community conservation in safeguarding a unique aquatic habitat, specifically focusing on the Snowtrout and Chocolate Mahseer species. The pilot project involved comprehensive surveys of spawning grounds along a 7-kilometer stretch of the Tepuiki River, resulting in the identification of 8 spawning sites, 4 of which were deemed critical for conservation as Key Biodiversity Areas. In addition to ecological assessments, the project also carried out awareness programmes and sustainable livelihood activities, such as integrated snail-cum-paddy and fish-cum-paddy cultivation, emphasising the importance of these spawning grounds for fish populations and engaging the local community in their protection. The key steps involved were:

- Awareness campaigns and meetings with key stakeholders in the village leading to the ban by the Village Council on unsustainable fishing methods such as electro-fishing, use of nets and chemicals.
- Use of traditional methods of fishing only
- Prohibition on fishing in selected spawning grounds
- Stricture on fishing methods and penalty on violators

Enabling Factors:

- Inclusion and equal participation of all stakeholders in decision making.
- Conservation livelihood approach of the activities wherein conservation and livelihood are integrated together.

Lessons Learnt:

The protection of fish spawning grounds is vital for ensuring sustainable fish populations and the health of aquatic ecosystems, which in turn supports economic and community well-being.

Rangsan Nlang
Chairman, Poilwa Village Council

As per the resolution of the Poilwa Village Council, we have totally banned the improvised and the modern techniques of fishing and we have resolved only to practise the traditional style of fishing in the village.

Impacts:

The villagers have observed a significant increase of fishes in the Tepuiki River. During the assessment of aquatic resources in the Tepuiki River, the Zoological Survey of India (ZSI) has discovered a few new fish species as well.

Protecting fish spawning grounds has significant and multifaceted impacts on the environment, local economy, and fish populations and in maintaining the overall health of the aquatic ecosystems, supporting food chains and conservation of biological diversity. It is also envisaged that for communities that rely on fishing for their livelihoods, protecting spawning grounds would enhance long-term sustainability as it helps maintain fish stocks, which can lead to more consistent and reliable fishing yields over time.

6

Documenting People's Biodiversity Registers on Aquatic Resources

SUMMARY

The Northeastern Himalayas are a freshwater biodiversity hotspot in Northeast India which is home to various endemic species, many of them, perhaps, still undiscovered. Biodiversity Management Committees (BMC) in India are mandated to document their valuable biological resources and traditional practices connected to each species through the People's Biodiversity Registers (PBR) under the Biological Diversity Act 2002. While this intensive exercise of PBRs has been very successful throughout the country, the documentation of aquatic species has mostly been ignored due to their tricky whereabouts in and around the streams and rivers, and the lack of technical know-how on documenting them. Especially, the state of Nagaland has been one of the most unexplored states in the Northeast region in this context. In what may be considered as a first-of-a-kind venture, the aquatic bio-resources and its associated traditional knowledge, good practices, key findings and recommendations were documented in PBRs in 12 villages, located at the foothills of the Japfü Range, in the Southern Angami Region, South of Kohima, the capital of Nagaland.

Main Implementing Partners: Nagaland State Biodiversity Board

Location: Chakhabama/Sakhabama, Jakhama, Kezo Basa, Kezoma, Khuzama, Kidima, Kigwema, Mima, Mitelephe, Pfüchama, Phesama and Viswema villages, Nagaland

Challenges of Implementation:

In addition to the community members' limited technical expertise in documenting aquatic resources, several challenges impeded effective assessment. These include difficult terrain, which complicates access to various sites, and the necessity for prolonged assessment periods. To obtain a comprehensive understanding of the aquatic ecosystem, it is essential to conduct year-round sampling at different seasonal intervals. This approach will ensure a more accurate representation of the resources and their fluctuations over time.

Beneficiaries:

Practitioners, Communities, State Biodiversity Boards, Biodiversity Management Committees

The Good Practice/Measure and Key Steps of the Process

In this significant documentation and study by the Nagaland State Biodiversity Board (NSBB), a total of 567 aquatic sites were recorded which includes rivers/streams, springs, ponds and man-made water storage structures, a total of 65 faunal species and 48 floral species. The Biological Diversity Act, 2002 promulgated by India, aims to achieve the objectives of the Conservation of Biological Diversity (CBD), and mandates the constitution of BMCs at the local level for the purpose of conservation of biodiversity. The BMCs are called upon to perform important functions such as preparation of their respective People's Biodiversity Registers, initiating and sustaining conservation activities in the future.

The study involved the preliminary quantitative assessment of freshwater aquatic resources available in the 12 villages viz., Chakhabama/Sakhabama, Jakhama, Kezo Basa, Kezoma, Khuzama, Kidima, Kigwema, Mima, Mitelephe, Pfüchama, Phesama and Viswema. With the assistance of teachers and research scholars from the Kohima Science College (A), Jotsoma, and the BMCs of the respective villages, the NSBB not only successfully documented aquatic bio-resources but also the associated traditional knowledge and good practices in these villages. The aquatic sites assessed are major contributors of water resources to Dzü-ü and Sidzü rivers. These two rivers are important tributaries of the Doyang River, the biggest freshwater river in Nagaland. According to the NSBB, the assessment will contribute to the preliminary assessment of the aquatic resources of the Doyang River. The key steps of the process were:

- Meetings with the BMC members and village elders for prior informed consent and garnering their ownership and active participation.
- Selection of good field data collectors for sample collection, handling and identification
- Social and resource mapping of the village

- Proper briefing of field guides on the activities to be undertaken
- Field surveys
- Marking GPS coordinates and site photographs
- Aquatic data collection and analysis
- Interviews with traditional knowledge holders
- Validation of each aquatic PBR by the respective village

Enabling Factors:

The mandate of the Biological Diversity Act was a key imperative that enabled smooth uptake of the activity within the documentation exercise of the PBRs.

Ms. Savinuo Kikhi
Forest Ranger, Department of Environment, Forests & Climate Change, Nagaland

Since the BMCs are representative of the village, they have full authority. The decision-making process has to come from the BMCs itself.

Lessons Learnt:

Documenting and listing natural resources in the form of a PBR helps create awareness about the biological wealth that local communities have. This instils a sense of ownership to conserve biodiversity.

Impacts:

The PBRs will serve as a baseline data for research related activities, incorporating as important reference materials for conservation planning and management of natural resources, Environmental Impact Assessments, strategising, designing and implementation of various projects. This initiative has paved the way for the NSBB to scale up the preparation of People's Biodiversity Registers by carrying out similar exercises in 70 villages of Nagaland with support from the Indo-German project, 'Forest and Biodiversity Management in the Himalaya (Nagaland)', funded by the KfW and 150 villages in Nagaland under the 'ELEMENT' funded by World Bank.

7

BMC as agent in conservation of cave diversity

SUMMARY

Meghalaya is renowned for its stunning caves, which are among the longest and deepest in the country. The state has more than 1,700 caves, making it the area with the most caves in the entire Indian sub-continent. Though more than half of the caves have been fully or partially explored for either scientific or recreational purposes, little is yet known about the very unique aquatic biodiversity that has evolved in these dark and wet habitats.

Caves in Meghalaya are managed by local villages, with the community serving as the primary custodians of biodiversity. These villagers possess extensive knowledge of local species and their traditional management practices, which are crucial for effective conservation efforts. Biodiversity Management Committees (BMCs) play a key role in this framework, functioning as statutory bodies dedicated to promoting and conserving biological diversity. They are instrumental in the sustainable use and documentation of both biodiversity and traditional knowledge through the preparation of People's Biodiversity Register (PBR), emphasising the importance of local governance in environmental stewardship. It is based on this premise that the project has taken the assistance of the BMCs in documentation of the diversity within the caves of Meghalaya. Trained under the project, BMC members are sensitising the communities of Lawbah in Mawsynram, East Khasi Hills on the need to conserve the diversity within the caves of Lawbah and nearby villages. The Lawbah BMC has successfully documented the diversity of caves within their jurisdiction with the assistance of the Meghalaya Biodiversity Board and the Meghalaya Adventures Association. Further, the BMC has formulated a Community Cave Management Plan that highlights conservation ethics in sustainable management of caves and devises policies that promote cave tourism.

Main Implementing Partners: Lawbah Biodiversity Management Committee, Meghalaya State Biodiversity Board, Meghalaya Adventures Association

Location: Lawbah, Mawsynram, East Khasi Hills, Meghalaya

Challenges of Implementation:

There has been limited research on the aquatic biodiversity within caves in Meghalaya. Assessment of diversity within caves require specialised knowledge and support. Also, to venture inside the deep caves requires specialised skills and techniques. Documentation can only happen during winter season when water level is low and caves are accessible. With the assistance of the Meghalaya Adventures Association (MAA), an organisation that has over 30 years of experience in cave expedition and the Zoological Survey of India, the project has initiated identification of species.

Preparation of a community managed management plan requires a deep knowledge and understanding of cave structures, conservation of flora and fauna diversity and factors to ensure that caves are preserved and continue to support the rich diversity. This knowledge was aptly provided by the MAA members.

Beneficiaries:

Members of the Lawbah BMC, village youths from Lawbah and neighbouring villages

The Good Practice/Measure and Key Steps of the Process

Documentation of aquatic diversity in PBRs in general, are often not as emphasised as that of the floral diversity. To fill this gap, special focus was given to documentation of aquatic diversity in the PBR of caves within Lawbah. In this exercise, the species collected were validated by experts, making it necessary to partner with agencies that can provide this support. This has brought to cognisance the huge untapped potential of cave tourism within Lawbah and in Meghalaya as a whole. The BMC of Lawbah have identified youths from villages in and around Lawbah and with assistance from the MAA, have undergone a practical onsite training on cave ethics, focusing on safety protocols and are now trained as cave guides. This is envisaged to promote sustainable cave tourism bringing in recognition of conservation of cave ecosystem and the biodiversity that the caves nurture.

Taina Dyckhoff
Head of Division (Environment and Climate)
German Embassy, New Delhi

It is fascinating to see here how people are doing the implementation on the ground which is the main part of the projects we are doing under the framework of the International Climate Initiative and this contributes to our very strong Indo-German green and sustainable development partnership.

Enabling Factors:

In a state like Meghalaya where control and management of natural resources is within the ambit of the community institution, the support and cooperation of the traditional institutions assume paramount importance.

Further. cooperation extended by the scientific institutions like Zoological Survey of India is a key enabling factor.

Lessons Learnt:

- It is essential to recognise the role of traditional institutions, as also the Biodiversity Management Committee (BMC), within the broader framework of local governance. Active collaboration with these institutions is crucial, as they oversee the management of natural resources in their respective villages. Establishing a common goal between traditional institutions and the BMC through consultative meetings can significantly enhance project outcomes.

- Engaging with specialised agencies that have expertise in cave exploration can provide valuable insights and improve project efficacy.

- Investing in approaches that link conservation efforts with income-generating opportunities, particularly in cave tourism, can yield sustainable benefits for both the environment and local communities.

Impacts:

The key impacts of inventorising (aquatic) biodiversity within the caves of Lawbah are significant. Firstly, the local community has acknowledged the intrinsic value of conservation and the potential for cave tourism, fostering greater ecological stewardship. Additionally, the BMC has enhanced its technical skills in documenting the flora and fauna within the cave ecosystem. This effort has garnered appreciation from traditional institutions, recognising the BMC's pivotal role in conserving biodiversity. Furthermore, local youth have been trained in cave ethics and safety protocols, promoting responsible cave tourism. The community has also proactively developed a comprehensive cave management plan, while neighbouring villages are expressing interest in joining this initiative, indicating a broader regional commitment to conservation efforts.

8

Engaging school students in documenting the traditional knowledge of their elders for a deeper understanding of local aquatic ecosystems

SUMMARY

Over generations, indigenous people and local communities living around the Chakpi River, Chandel District in Manipur, have cultivated a deep understanding of the river's ecology. Where the elders know the river like the back of their hand, a unique approach was tested to overcome the growing disconnect between the younger generation and their elders.: A total of 300 school children from 4 schools in riparian villages participated in documenting their traditional knowledge (TK) through interviews, photos, drawings, and video recordings. They created questionnaires covering topics like local aquatic species, fishing techniques, myths, and spiritual connections to the river.

Students were motivated to showcase their findings through exhibitions, competitions, and presentations both within and outside the village to inspire wider adoption. Children storybooks were created based on the students' narratives, preserving local myths and traditions. Engaging school students in documenting TK is a crucial strategy to revive community-based conservation efforts and enhance ecological awareness.

> The Chakpi river is the main sustenance of the locals. We drink water from it too. And from the riverbed, we get sand and stone too. Its usefulness is immense in Chandel area. There's no one who would say otherwise. From kids to adults, no one will refute its value. The river has been here long before our births. This river is very dear to us.
>
> **S.S. Bimong**
> Chief Mantripantha village

Main Implementing Partners: Teachers from Koinonia Training School in Chandel Christian, Wisecrabs, Chandel, Manipur

Location: Monsangpantha, Lambung, Mantripantha and Japhou village of Chandel District of Manipur India

Challenges of Implementation:

- Teaching students the correct methods for interviewing knowledge holders and documenting TK digitally can be difficult, as it involves both technical and cultural sensitivity.
- Gaining access to TK holders like village elders and ensuring that their knowledge is respected and accurately recorded.

Beneficiaries:

Koinonia Training School in Chandel Christian; St. Peters Higher Secondary School in Monsang Pantha, Anallon Christian Institute in Lambung, and Oak Hill Christian Academy in Panchai.

The Good Practice/Measure and Key Steps of the Process

- A local teacher was trained by the expert, Dr Rajindra Puri from the University of Kent to facilitate the transfer of the documentation methods to students.
- Four schools from the riverine villages of Chakpi River were selected. Necessary permissions were obtained from the school authorities, and collaboration was established with each institution.
- Around 300 students (aged 10–16 years) were trained on how to conduct interviews with elders, local fishermen, and community leaders. To capture the narratives, the students were encouraged to use a variety of documentation methods, including notepads, mobile phone photography, drawings, paper clippings, charts, recordings, and video documentaries.
- A set of questionnaires was created collaboratively by the students and their teacher. These focused on aquatic organisms in the local dialect, fishing methods and techniques, taboos, myths, folklore, legends, oral histories, spiritual and cultural connections as well as traditional management practices related to the Chakpi River.
- The teacher, with the support of local youth clubs, organised school exhibitions and competitions where students were asked to showcase and present their findings. These presentations included handwritten notes, stories, photographs, drawings, oral presentations, posters, documentary write-ups, and storytelling sessions.

- Students primarily documented the morphological features of the river, linking TK with contemporary environmental science. They noted critical areas such as fish overwintering and breeding grounds.
- Additionally, the students recorded haunting stories associated with the river, which serve as deterrents to destructive fishing practices and the overharvesting of the river.
- Recognising and celebrating the students' efforts through awards, certificates or prizes during school and community events inspired and motivated the students.
- Outstanding students were invited for the state level event celebrating the International Day for Biological Diversity on 22 May 2024. They presented their findings in front of 22 other indigenous communities and higher education authorities which may potentially inspire replication in other villages.
- Based on the student's narratives, children's storybooks have been written and designed, reflecting the river's taboos, myths, folklore, legends, and oral histories. This initiative not only celebrates the children's creativity but also safeguards oral traditions for future generations and instills a sense of environmental stewardship for the Chakpi River among the young kids.

Enabling Factors:

- The 11-steps Methods Manual on how to document traditional knowledge on aquatic resources provides a structured framework for assessing and documenting this knowledge, enabling teachers to effectively engage students with community elders.
- Teachers of all the 4 schools were supportive and interested in assessing and documenting traditional knowledge.
- Back-stopping of the documentation work via online consultations with experts and people who have already applied the methods manual helped to improve the documentation process.
- The members of local club (Wisecrabs) played a key role in facilitating identification of suitable elders for interviews and in improving the questionnaires.

Lessons Learnt:

- Local organisations specialised in digital storytelling can support the students on how to use digital tools for recording and transcription.
- Competitions and awards highlight the significance of the documentation and ensure that the findings are shared widely among the village communities and beyond.
- Grandchildren can help in establishing trust with their grandparents in the documentation and can encourage them to share their wisdom.
- Ensuring the initiative's long-term sustainability, capacity building of numerous teachers, resource allocation and collaboration among education authorities to integrate TK into school curricula would be required.

Impacts:

- Students became active agents of knowledge sharing with their families and communities and therefore became part of the inter-generational cycle of learning. They are advocates for sustainable environmental practices in their own communities.
- Empowered students developed a sense of ownership and responsibility for the river's conservation.
- Students learned about the value of endemic fish species in medicine, culture, and rituals, and the critical role these practices play in maintaining the health of the river. Some were even inspired to pursue aquatic studies in the future.
- Students now understand how both approaches - traditional knowledge united with science education can work hand in hand to strengthen the foundation for long-term conservation strategies.
- The documentation within the local language prevents the loss of the linguistic heritage.

9

Collaborative Efforts of Women Fishers in Community-Based River Monitoring Teams

SUMMARY

The riverine communities along the Chakpi River, particularly women fishers and youth, have been capacitated in monitoring and managing the river's health effectively. Training empowered the women fishers and local youth to collect and validate data, fostering ownership and accountability. Feedback mechanisms and accessible resources, such as illustrated handbooks, enhanced their monitoring capabilities. Data is being shared transparently through community notice boards, encouraging informed decision-making and collaboration with local authorities. The initiative strengthens community bonds by integrating scientific and indigenous practices, establishing rules like 'no-fishing' zones to protect vital habitats. This inclusive approach ensures sustainable river management while fostering a shared sense of responsibility among stakeholders.

Main Implementing Partners:

Monsangpantha Women Fisher Groups, ATREE, Monsang Pantha Youth Club, GIZ Intern,

Location: Monsangpantha, Lambung, Mantripantha and Japhou village of Chandel District of Manipur India

Challenges of Implementation:

- Engaging community members with diverse levels of literacy and knowledge in river monitoring, particularly those unfamiliar with formal scientific methods, struggled with tasks such as fish collection, population monitoring, and the identification of aquatic species.
- Ensuring that women fishers, who are often left-out in decision-making, were fully included in the monitoring process.
- Proper collection, documentation, and application of monitoring data.
- Sustaining long-term community commitment beyond initial training and resource distribution.

Beneficiaries:

Community members, village authorities and women fishers' group of Chakpi River, Chandel District

The Good Practice/Measure and Key Steps of the Process

- The project mobilised local youth and women fishers to establish a Chakpi River Protection and Monitoring Team fostering inclusive, community-based environmental stewardship..
- A dedicated handbook for monitoring the Chakpi River was developed, combining scientific insights with traditional knowledge in a visually engaging format. The inclusion of photographs, information, and morphological diagrams contributed by local youth of scientific background and indigenous women fishers is an apt way to ensure the handbook is blended in local knowledge and scientific experiences.
- The women and youth were regularly trained on identifying changes in riverbed structures, tracking the appearance and disappearance of local aquatic insects, observations on changes in fish spawning grounds, monitoring seasonal variations in fish availability, and assessing pollution levels through water quality testing.
- The monitoring data is displayed on a notice board, specifically designed and placed at the community information centre at Chakpi..
- Local authorities now have access to comprehensive data and can take informed decisions.

Enabling Factors:

- Visual aids and simplified materials made the process accessible to participants with varying literacy levels.
- A user-friendly monitoring handbook incorporated culturally-relevant visuals.
- Publicly displayed monitoring data promoted transparency and informed decision-making, involving the entire community and local authorities.
- Continuous feedback during training empowered participants and laid the groundwork for ongoing collaboration and sustainable river management.

Lessons Learnt:

Integrating traditional ecological knowledge with modern scientific practices fostered trust among community members but also empowered them in taking an active role in ecosystem conservation. By prioritising diverse perspectives and equitable participation, the initiative exemplifies how merging local knowledge with scientific expertise can yield transformative environmental outcomes and promote ecological resilience.

Vincent Monsang
Village Chief, Monsang pantha village.

This is just the beginning. We need to expand our efforts to conserve a larger area of our aquatic ecosystem till Bolidam region, ensuring its preservation for future generations. We, the communities of these four villages, must take inspiration and lead the way from the valuable lessons learned during this pilot initiative.

Impacts:

- Overfishing and pollution are likely to reduce as they are regularly tracked by the community itself.
- Ecological changes like the increase or decrease in the diversity of aquatic species
- Monitoring fish and aquatic insect populations tracks ecological changes, identifying areas that need protection, such as spawning grounds, and promoting better management practices like no-fishing zones.
- Sharing monitoring data encourages communities to adapt practices based on changes in the river ecosystem.

10

Process of preparation of Integrated Wetland Management Plan (IWMP) for the Doloni Wetland

SUMMARY

The National Plan for Conservation of Aquatic Ecosystems (NPCA), developed by the Ministry of Environment, Forest and Climate Change (MoEFCC) in 2019, emphasises the importance of Integrated Wetland Management Plans (IWMP). The guideline mandates the State Wetland Authority to develop the IWMP in coordination with other line departments for promoting an integrated effort towards protecting and sustainably managing wetlands as per the "wise-use" principle carefully balancing the different objectives of all involved stakeholders through assessments and consultations. Though Assam is a state famous for its wetlands, no IWMPs have so far been developed. Therefore, in close cooperation with the Assam Forest Department's State Wetland Authority, the NERAQ project has facilitated in developing the first IWMP for Assam at the NERAQ pilot area, Doloni Beel, aimed at restoring ecological balance and promoting sustainable resource use for the benefit of all stakeholders.

The Doloni Beel ('beel' in Assamese is wetland), a crucial freshwater wetland in Bongaigaon District, Assam, provides a vital habitat for diverse aquatic species and supports local livelihoods through fishing and agriculture. However, like many other wetlands in Assam, it faces significant threats, including habitat degradation from farmland conversion, industrial activities, siltation, and unregulated fishing practices. Current management, largely based on a lease system, further complicates these issues, negatively impacting both the ecosystem and local communities.

Location: Doloni wetland, Boitamari block, Bongaigaon district, Assam

Challenges of Implementation:

Mrs Bamuni Rabha
Village Volunteer, Doloni Beel

There is a stark contrast between the Doloni lake of the past and the present. When my older son was born, we used to take bath and wash our clothes in the lake.
However, contact with this wetland water nowadays leads to severe skin infections, itching and rashes that disrupt night sleep

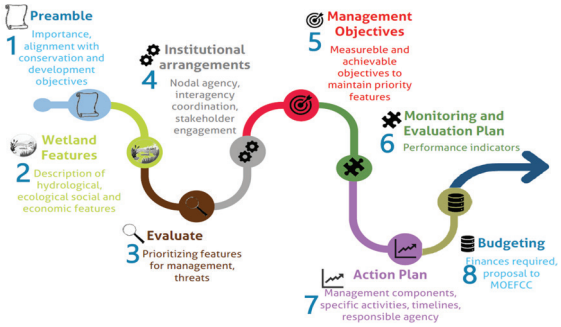
The Doloni Beel environment is characterised by a complex interplay of stakeholders, each with distinct and often conflicting objectives. Government departments exhibit varied priorities; the Fisheries Department advocates for increased fish production through wetland leasing, while the Forest Department and State Wetland Authority prioritise conservation initiatives. Additionally, the Agricultural Department promotes hybrid rice varieties that entail intensive fertilizer use. On the community side, the presence of 12 villages introduces further complexity, as differing ethnic and religious backgrounds contribute to conflicting livelihoods and interests. The convergence of these diverse agendas necessitates a nuanced approach to resource management to promote sustainable development in the region.

Beneficiaries:

Government departments and agencies, NGOs, CBOs, communities

The Good Practice/Measure and Key Steps of the Process

Integrated Wetland Management Plans are based on assessments and stakeholder consultations. As directed in the NPCA guidelines, the steps followed in preparation of the IWMP for Doloni entailed the following measures:



- Mapping the wetland basin and cataloguing its biodiversity—including flora, fauna, and water quality, hydrological, ecological, social and economic features—leveraging RS-GIS techniques.
- Following this, an evaluation of local livelihoods was conducted, highlighting their strengths, challenges, and sustainability while emphasising women's roles. An understanding of community dependence on wetland

resources was also established, identifying both sustainable and unsustainable practices. Threat assessment covered both natural and anthropogenic influences, including climate vulnerabilities and policy gaps.

- Afterwards, an evaluation of these assessments helped nail down what is important to the community, the ecosystem, different key stakeholders, their interests, dependencies and how they interacted with each other and all that would play out in settling for a common, mutually agreed management regime that is sustainable.
- Through intensive consultations with the line departments, and all other stakeholders, engagement on the initiative was established and management priorities, and monitoring and evaluation plan agreed upon.
- Subsequently, consultations on requisite capacity-building initiatives for promoting alternative livelihoods that are ecologically viable, with a focus on empowering women were taken up.
- A meeting was convened by the District Collector's office wherein concerned departments were invited to discuss on schemes and plans that had a potential for convergence.
- Finally, an Integrated Wetland Management Plan (IWMP) is being developed, incorporating insights gained throughout the study and engaging all stakeholders for validation, with action plan, specific activities, responsible agencies and timelines, culminating in a formal submission to the Assam Forest Department.
- Consultations with relevant stakeholders, as an imperative to the IWMP process, were being undertaken all through the plan preparation process.

Enabling Factors:

- GIZ India's extensive experience in developing Integrated Wetland Management Plans (IWMPs) for various wetlands across the country has positioned it advantageously in this endeavour.
- District authorities were immensely supportive and actively encouraged the participation of all line departments to identify potential opportunities for strategic and financial convergence. By facilitating an inclusive dialogue, the authorities played a crucial role in enhancing the effectiveness of the IWMP and ensuring a coordinated effort in addressing the wetland management challenges.

Lessons Learnt:

- The most important step is bringing the diverse stakeholders for open discussions onto a single platform – a first step towards building trust and openness to discuss conflicting issues and identifying ways forward.
- Experience facilitators and moderators can successfully navigate the dialogue by identifying middle grounds and mutual points of interest.
- Due to the Lok Sabha elections, activities were halted for several months. Consultations and meetings are best planned with complete knowledge of the official calendars of major events and holidays of the year.

Impacts:

- The first generation and documentation of information pertaining to the Doloni wetland, encompassing checklists, technical reports, photographs, and videos that collectively underscore its ecological importance.
- Heightened community awareness regarding sustainable management practices, fostering an environment conducive to adopting alternative livelihoods.
- Enhanced communication and cooperation between government departments and local communities have strengthened collaborative efforts in not only drafting the plan, but lay the groundwork for further implementation of the same.
- The IWMP helps the State Government apply for funds via the NPCA under the MoEFCC for implementing the IWMP.
- To make this initiative sustainable and replicable, officials of the Assam Forest Department have been capacitated on how to develop and manage the IWMP.
- This initiative presents a replicable model for wetland management across and beyond the state, with the potential to significantly enhance the resilience and sustainability of vital wetland ecosystems.

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