

Indigenous fishing techniques and fish aggregating practices among the Monsang community in Chandel district of Manipur, India

Maitarambum Wartung Monsang^a, Maibam Malemngamba Meitei^b, Shongsir Joy Monsang^a, Soibam Ngasotter^{c,*}, Suari Debbarma^a & Sahid Ahmad Tampakmayum^a

^aCollege of Fisheries, Central Agricultural University (Imphal), Lembucherra, Tripura 799 210, India

^bICAR-Central Institute of Fisheries Education, Mumbai, Maharashtra 400 061, India

^cLSPN College of Fisheries, Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Kawardha, Chhattisgarh 491 995, India

*E-mail: ngasotter@gmail.com

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Traditional knowledge (TK) plays a vital role in sustaining the livelihoods of indigenous communities and conserving local aquatic resources. In biodiversity rich regions such as Northeast India, there is an urgent need to document traditional fishing practices that are rapidly declining due to modernization and ecological change. The Monsang community of Chandel district, Manipur, has practiced various indigenous fishing techniques since time immemorial, drawing on deep ecological understanding of hill-stream ecosystems. The present study documents three traditional fishing methods: (i) *Thingnarhuvuw*, (ii) *Peh-ethur*, and (iii) *Chiipin/Chiiping*, practiced in Japhou and Monsang Pantha villages based on field surveys conducted using snowball sampling and semi-structured interviews. *Thingnarhuvuw* functions as a fish aggregating device using leafy branches, *Peh-ethur* involves group-based net dragging in shallow river stretches, while *Chiipin/Chiiping* employs bamboo barriers and traps to guide fish movement. These techniques reflect community-based, seasonally regulated, and low-cost fishing practices adapted to local ecological conditions. Documentation of such indigenous techniques is essential for preserving cultural heritage and informing sustainable fisheries management at the local level.

Keywords: *Chiipin/Chiiping*, Community-based fisheries management, Fish-aggregating device, Indigenous technical knowledge, *Peh-ethur*, *Thingnarhuvuw*

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Fishing has been one of humanity's oldest subsistence and cultural activities¹, shaping food systems, economies and local knowledge since prehistoric times². Across the world, small-scale fishers have developed a wide variety of Indigenous Technical Knowledge (ITK) locally evolved fishing gears and practices grounded in intimate ecological understanding³. Such methods often use renewable materials such as bamboo, cane, or wood, designed to exploit the natural behaviour of aquatic organisms while maintaining low environmental impact⁴. Globally, similar systems are reported among riverine and coastal communities of Southeast Asia, Africa and the Pacific Islands, where locally fabricated fish-aggregating devices (FADs), bamboo traps and fence-net systems enhance catch efficiency without intensive mechanization⁵. These traditional practices demonstrate a fine balance between

livelihood sustenance and ecological stewardship, making them relevant to present-day sustainable fisheries management⁶.

In India, inland fishing communities exhibit rich diversity in traditional gears and techniques, reflecting varied ecological and cultural contexts. The Ao and Sumi tribes of Nagaland employ specialized gears tailored to river hydrology and fish behavior⁷. In Mizoram, more than a dozen traditional methods, some incorporating ichthyotoxic plants have been documented for seasonal capture⁸. In eastern Uttar Pradesh, devices such as *Taap*, *Gaanj* and *Parha* remain integral to community fisheries⁹, while in Maharashtra's Western Ghats, the Katkari community combines ecological knowledge with species migration cycles¹⁰. Collectively, these examples show that ITKs form a critical part of India's aquatic resource heritage, representing centuries of adaptation to local hydrology, biodiversity and social organization¹¹.

*Corresponding author

Northeast India, known for its high aquatic biodiversity and strong ethnic diversity, still maintains a living tradition of indigenous fishing¹². In Manipur, inland fisheries are an essential livelihood source, contributing over 30,000 t of annual fish production¹³. Manipur is known for its rich aquatic biodiversity, with 325 recorded fish species, 142 of which are food fish and 183 ornamental¹⁴. Among its hill districts, Chandel is unique because of its hilly terrain, dependence on the Chakpi River¹⁵ and prevalence of Naga sub-tribes in which the Monsang community is one of them. The Chandel district has rich diverse fish species¹⁶. The community continues to practice a suite of distinctive fishing techniques that use natural materials and collective effort.

However, scientific documentation of such indigenous fishing methods in the community is scarce. Most available studies focus on species diversity or production statistics rather than on the traditional management systems that govern fishing

practices¹⁷. The lack of formal recording and recognition of these practices threatens their continuity, especially as modern synthetic gears and changing river ecology disrupt transmission of local knowledge¹⁸. Thus, this study aims to provide the first systematic ethnographic documentation and preliminary quantitative profile of the Monsang indigenous fishing techniques, linking practice-level detail in hill-stream fisheries of Manipur.

Materials and Methods

Study area

The study was conducted in Chandel District of Manipur, Northeastern India (Fig. 1a), a hill district inhabited predominantly by Naga sub-tribes, including the Monsang community. Chandel is characterized by narrow valleys, steep river channels and high dependence on inland water bodies, particularly the Chakpi River (Fig. 1b), for fishing,

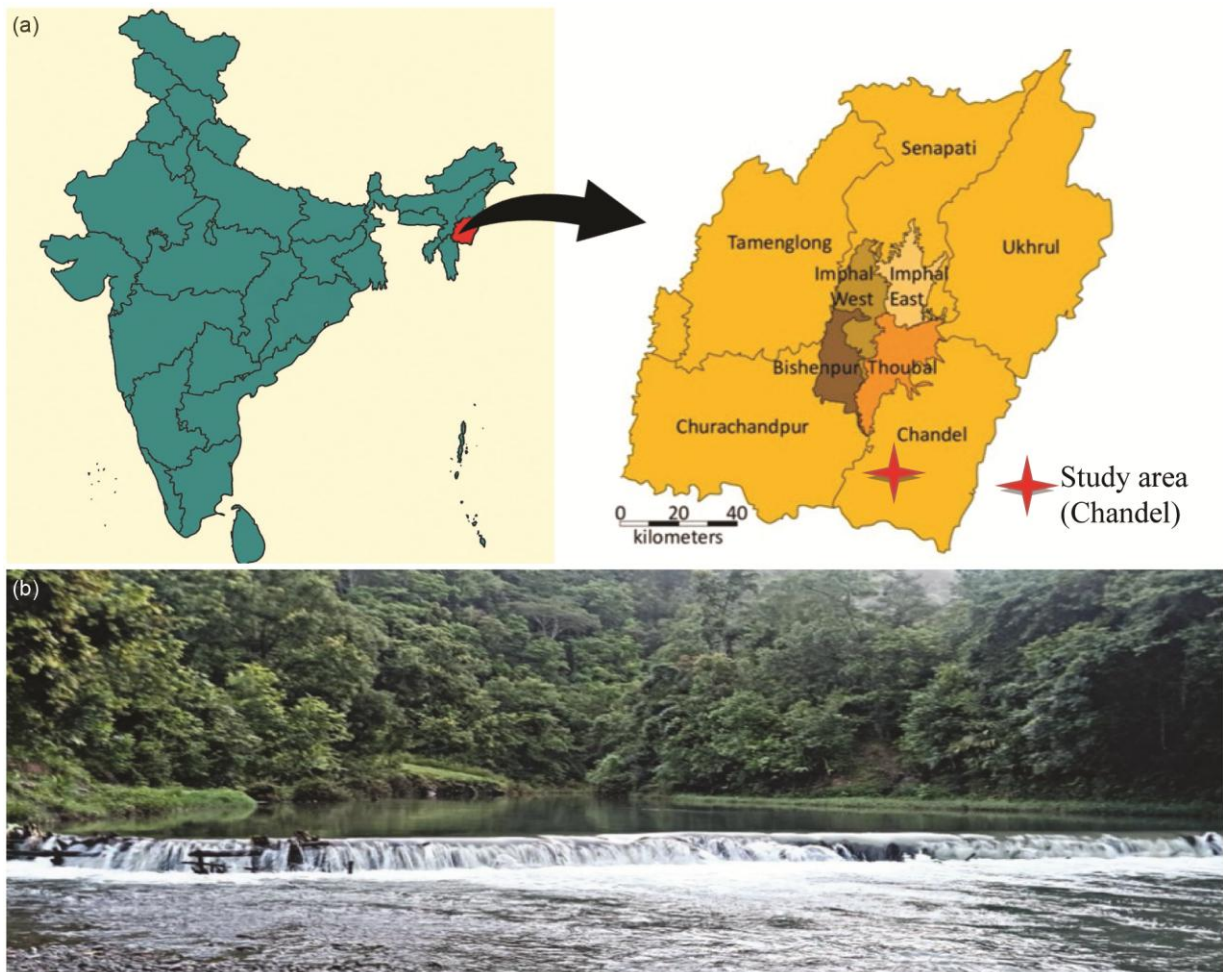


Fig. 1 — Map of India showing (a) Chandel district, (b) Chakpi river

domestic needs and agriculture. The district receives an average annual rainfall of ~1245 mm, with pronounced hydrological seasonality that influences fishing opportunities¹⁴. Two villages: (i) Japhou village and (ii) Monsang Pantha village were purposively selected for the study based on the prevalence and continued practice of traditional fishing methods among the Monsang community. The data were collected through personal interviews with local ITK holders (local fishermen and fisherwomen, elders, traditional knowledge holders, and village leaders) which were selected using a snowball sampling method, wherein initial participants recommended other knowledgeable individuals involved in indigenous fishing activities. This method was particularly effective in locating key informants with in-depth ecological and cultural knowledge of traditional fishing techniques and fish aggregating practices. A semi-structured questionnaire was employed to gather detailed information about fishing gears, techniques, fish aggregating behaviours, seasonal practices, and material usage.

Result and Discussion

Every community has their own fishing technique. In this article, some of the traditional fishing techniques of Monsang community of Chandel district, Manipur has been illustrated. The recognition of indigenous knowledge and practices has grown in the context of conservation and sustainable resource management, as their promotion can enhance the effectiveness, sustainability, and legitimacy of ecosystem management¹⁹. Additionally, there are also potentials of discovering new fish species from this district particularly Chakpi, Lokchao, and Maha²⁰. Traditional fishing practices have changed or forgotten now-a-days due to modernization and development; however, some traditional practices are being still followed by the people as they were not replaced by any modern craft and gears²¹. This can also be an opportunity to conserve the indigenous traditional knowledge. Moreover, this has been practiced as a livelihood of the local communities. They are community, local and rural origin that depend entirely on locally available resources and thus this knowledge of such indigenous practices provides valuable inputs to make efficient use of natural resources²².

Thingnharhuvuw

Thingnharhuvuw is a traditional fishing practice widely adopted by the Monsang community,

particularly in Japhou village of Chandel district, Manipur. The term “*Thingnharhuvuw*” originates from the Monsang dialect, where “*Thing*” means tree, “*nha*” refers to leaves and “*rhuvuw*” denotes a nest or trap. Its popularity stems from its dual role as a Fish Aggregating Device (FAD) and a shelter creator, mimicking natural leaf accumulations where periphyton develops and detritivorous fish congregate (Fig. 2). Thus, it can increase catch per unit effort²³. The technique is generally implemented in calm water bodies with depths ranging from 2 to 4 meters, where the current is slow. It is suitable for use in all seasons, except during periods of heavy rainfall and flooding, when water flow becomes excessively swift. Similar fishing devices, such as Kao in the Thoubal district, have been reported by Devi *et al.*²³. This kind of fishing enhances fishing effectiveness, efficiency and regularity of fishing activities. However, proper management, research, consultation and planning are required for sustainable fisheries.

Preparation of *Thingnharhuvuw*

The selection of appropriate plant species is a key component in preparing the trap. Respondents emphasized that branch species with durable foliage, e.g., *Quercus serrata* (konara oak)- locally known as Uyung and *Eucalyptus camaldulensis* (river red gum), known as Nasik in Manipuri, retain their structural integrity underwater for up to 10 days, allowing sufficient time for periphyton development.

To enhance the trap's efficiency, paddy straw or mustard straw is interwoven among the leaves to fill void spaces and create a nutrient-rich environment. This attracts fish species that feed on decomposing organic matter. Additionally, ripe guava may be added as a natural bait to increase fish attraction.



Fig. 2 — A traditional model of *Thingnharhuvuw* prepared using leafy tree branches, used as a fish aggregating device (FAD) by the Monsang community of Chandel district

Medium-sized stones are inserted to act as sinkers, ensuring the system remains submerged and the entire assembly is secured tightly with rope to withstand mild water currents.

Empirical studies of traditional brush-pile²⁴ or branch-based FADs²⁰ in northeast India and related work on substrate-enhanced periphyton indicate that deployed woody or bamboo substrates quickly develop biofilms and invertebrate communities that enhance food availability and fish congregation, supporting the ethno-ecological rationale given by fishers. These observations are consistent with broader FAD literature showing that small, biodegradable substrates function as effective aggregation aids in freshwater systems and can elevate catch efficiency when used judiciously.

Operation of *Thingnarhuvuw*

Site selection is paramount to the success of this method. Typically, deeper pools or depressions within the riverbed are chosen as these zones harbor a greater abundance of fish, especially bottom-dwelling species and shellfish, due to their reduced water velocity and enhanced shelter conditions. The trap is positioned such that the base of the branch faces upstream, while the tips point downstream. This orientation minimizes leaf dispersion and ensures the structure remains intact during submersion.

Once placed, the device is left fully submerged for a period of 7 to 8 days. During this time, periphyton (a layer of algae and microorganisms) forms on the leaves and stems, providing a nutritional surface for herbivorous fish, especially those with fringe-like lips. Additionally, the decomposing straw emits organic compounds that attract detritivorous fish and shellfish, including prawns and crabs. The structure offers not only a source of food but also shelter, making it an effective and ecologically grounded fish aggregating device.

Harvesting procedure

Harvesting is a delicate and crucial process that requires precision to prevent fish from escaping. To extract the trap, one must grasp the base of the branch and slowly drag it against the direction of water flow (Fig. 3). This movement causes the leaves to fold inwards, creating a natural barrier that prevents fish from fleeing. This technique significantly increases the chances of retaining the maximum number of fish and shellfish that have taken refuge in the device.

Fish species collected

The *Thingnarhuvuw* method is particularly effective for capturing a diverse range of native fish and shellfish species (Fig. 4), owing to the dense leafy microhabitats created by the submerged branches. Common species harvested include *Barilius barila* (Baril fish), *Channa striata* (Striped snakehead), *Lepidocephalichthys guntea* (Guntea loach), *Mastacembelus armatus* (spiny eel), *Puntius jayarami* (Heikak nga), *Pethia atra* (Black ruby barb), *Puntius khugae* (Khuga barb), *Trichogaster labiosa* (Thick-lipped gourami), *Raiamas guttatus* (Trout barb), freshwater crabs (*Badistemon fulvum*) and prawns (*Macrobrachium dayanum*). These species commonly occupy shaded, structured habitats, which explain their aggregation within the leafy architecture of the *Thingnarhuvuw* device.

Several of these species, such as *Bangana devdevi* (Deopani labeo), *Devario acuticephalus* (Gaint danio) and *Trichogaster labiosa* (Thick-lipped gourami), are also recognized for their ornamental value, making this fishing practice significant not just for subsistence but also for local livelihoods. Some of the species collected (e.g. *Barilius barila*, *Channa striata*, *Garra*



Fig. 3 — Harvesting of *Thingnarhuvuw* in a slow-moving river segment in Chandel district, Manipur. The branches are dragged carefully against the current to prevent fish from escaping



Fig. 4 — Fishes harvested using the *Thingnarhuvuw* method

spp.) were also widely reported from traditional fishing of Naga hill-stream communities⁷; although direct documentation of FAD-based gear use among tribes such as Zeliang or Liangmai is lacking, the overlap in species composition suggests that similar habitat-preferences and stream ecology may underlie traditional fishing across the region.

Peh-ethur

“*Peh-ethur*” is a traditional fishing method practiced by the Monsang community of Chandel district, Manipur, India. The term originates from the local Monsang dialect, where “*Peh*” refers to a wide, open or flat area and “*Ethur*” denotes hunting. As such, “*Peh-ethur*” implies the act of hunting fish in flat, shallow river stretches. According to oral histories and community narratives, the practice has been passed down through generations and continues to serve as an essential fishing tradition for subsistence and cultural identity. Unlike *Thingnarhuvuw*, *Peh-ethur* is labour-intensive and operates as a coordinated group activity, resembling the communal and cooperative fishing traditions documented among several Naga communities⁶, where collective effort and shared knowledge are central to the harvesting process¹⁹.

Operational method

The *Peh-ethur* method is a collaborative fishing activity that requires the participation of a group of skilled individuals. The primary gear used is locally known as “*Eentha*”, a type of fishing net made from natural fibers, which is fastened to two long bamboo poles (Fig. 5a,b). Each end of the *Eentha* is held by one or two individuals, allowing it to be dragged

across the riverbed at an angle of approximately 45 degrees. In general, a group of four to five people is needed to operate a single *Eentha* effectively.

One member of the group is responsible for carrying a “*Ruhpeer*”, a traditional fish-carrying bag or container, used to collect the harvested fish during the operation (Fig. 5c). Meanwhile, the remaining group members position themselves opposite the net, agitating the water to direct or drive the fish toward the netted area. The technique demands a high level of coordination and knowledge of fish movement, often acquired through experience.

Fishing typically begins between 10:00 and 11:00 AM, when sunlight penetrates the water surface, encouraging schools of fish to rise to the upper layers to bask. This natural behaviour is strategically utilized by the fishers. The activity continues until around 4:00 PM, just before sunset.

Fish species harvested

Group interviews indicated that a single *Peh-ethur* operation typically yields between 1.5 and 3.5 kg of mixed fish, although catches vary depending on stream width, substrate type and local fish density. Respondents emphasized that harvest success depends largely on high water transparency and on selecting the optimal time of day, particularly when sunlight penetrates the water column and fish become more visible in shallow stretches. Equally important is the coordinated disturbance of the water by the participating fishers, who work together to drive fish toward the *Eentha* net. These accounts are consistent with ecological observations that shallow-water seine or drive-net operations are most effective when synchronized with diel movement patterns and



Fig. 5 — (a, b) *Eentha* - A traditional Monsang fishing net operated with bamboo poles, (c) *Ruhpeer* - Traditional bamboo container used for collecting and carrying fish

periods of enhanced visibility, enabling fishers to exploit natural behavioural responses associated with sunlit hours.

Peh-ethur commonly yielded species characteristic of hill-stream habitats, including *Barilius barila* (Baril baril fish), *Channa striata* (Striped snakehead), *Mastacembelus armatus* (Zig-zag eel), *Lepidocephalichthys manipurensis* (Guntea loach), *Puntius jayarami* (Heikak nga), *Pethia atra* (Black ruby barb), *Puntius khugae* (Khuga barb), *Garra* spp.-*Garra chakpiensis* and *Devario acuticephalus* (Manipur danio) (Fig. 6). Traditional fishing among tribal communities in Nagaland⁷ and surrounding hill-stream regions²¹ continues to rely on simple, locally made gear used in rivers and streams, suggesting that communal and subsistence-oriented fishing remains ecologically and culturally important in comparable hill-stream environments of Northeast India.

Chiipin/Chiiping

Chiipin or *Chiiping* is a traditional fishing practice uniquely associated with the Monsang community of Chandel district in Manipur, India. This method is typically conducted in shallow water bodies with a depth ranging between 1 to 2 feet. The technique involves the construction of temporary fences or barriers within the stream or river to slow down the natural flow of water. This redirected flow is then channeled toward fishing traps, locally known as “*Eruh*”.

The *Eruh* traps used in *Chiipin/Chiiping* align structurally with traps classified under the ISSCFG framework as ‘trap’ type gears. However, in this study we treat *Chiipin/Chiiping* as part of ITK because the community-specific construction materials (bamboo, leaf-woven valves), placement

rules, communal governance and ritual norms distinguish it from standardized commercial trap gear. Thus, while *Chiipin/Chiiping* fits the ISSCFG trap category functionally, it is described here within an ITK lens to emphasise its cultural embedding and customary management arrangements.

The method involves constructing V-shaped bamboo and stone barriers that divert streamflow into specialized traps (*Luhchao*, *Luthang*, and *Kapuruh*). Comparable trap-based and flow-manipulation systems have been documented among other hill-stream communities in Northeast India, where temporary barriers and funneling traps are used to concentrate fish for communal or household harvests; such practices have been described for tribal fisheries in Manipur^{15,23} and Nagaland²¹ and are recognized as socially embedded, low-input strategies for small-scale subsistence fisheries.

Types of *Eruh* traps and operational design

The *Eruh* traps used in *Chiipin/Chiiping* are traditionally categorized into three distinct types based on their functional orientation: *Luhchao*, *Luthang/Luhsha* and *Kapuruh* (Fig. 7).

Luhchao and *Luthang/Luhsha* are placed in the central portion of the constructed barrier. These two traps are connected at their edges and work in succession. *Luhchao* serves as the primary trap, larger in size with a wider mouth opening, designed to capture a larger volume of water and fish that flow along with the current. The end of the *Luhchao* trap feeds directly into the *Luthang/Luhsha*, a smaller secondary trap that accumulates and holds the captured fish, preventing escape. This tandem configuration ensures efficient fish collection by utilizing the natural flow of water.

In contrast, the *Kapuruh* trap is strategically placed near the edges of the river, adjacent to land. Unlike *Luhchao* and *Luthang/Luhsha*, the *Kapuruh* features an opening in the belly region, which is positioned downward, facing the waterbed. This specific design allows it to effectively trap fish and prawns that move against the water current, enhancing the system’s ability to target diverse species with differing swimming behaviors. These fishing traps and the mode of utilization are almost similar to the *Kabo-lu* and *Sora-lu* (conical traps) in Manipuri (Meitei) dialects, which are commonly used in the valley part of Manipur²³.

The main principle behind *Chiipin/Chiiping* lies in the strategic manipulation of the water current. By

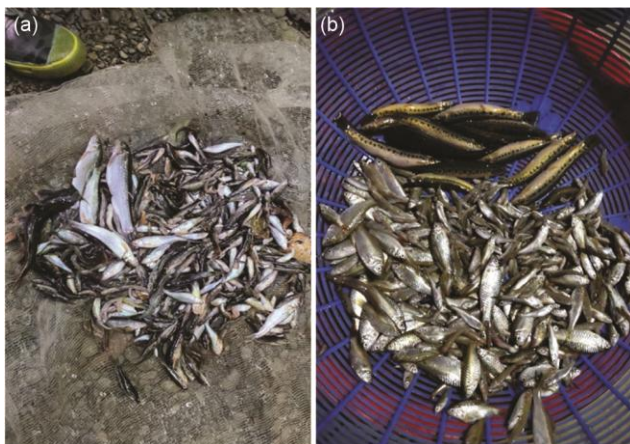


Fig. 6 — Variety of fish species harvested through the traditional Eentha fishing technique

building semi-permeable fences using natural materials such as bamboo, wood and leaves (Fig. 8), the flow of water is directed into traps placed at targeted locations. These “*Eruh*” traps are classified based on their function and the direction of fish movement. The *Luhchao* and *Luthang/Luhsha* types are generally linked at their edges and positioned to intercept fish moving with the water current. In contrast, *Kapuruh* is specifically designed to capture fish that move against the current, capitalizing on the migratory or reflexive behavior of certain species.

While the *Chiipin/Chiiping* method is labour-intensive and time-consuming, requiring significant effort in both the construction of fences and the monitoring of water flow, it remains a crucial subsistence strategy for the Monsang community. The technique is especially valuable during dry seasons when water levels are low and fish become concentrated in shallow stretches, making them more accessible.

Fish species collected

The *Chiipin/Chiiping* method yielded a notably diverse assemblage of benthic fish species. Respondents reported frequent catches of *Barilius barila* (Baril baril fish), *Channa striata* (Striped snakehead), *Mastacembelus armatus* (spiny eel), *Lepidocephalichthys manipurensis* (Guntea loach), *Puntius jayarami* (Heikak nga), *Pethia atra* (Black ruby barb), *Puntius khugae* (Khuga barb), *Garra* spp.-*Garra chakpiensis*, *Raiamas guttatus* (Burmese Trout), *Schistura phamhringi* (Stone loach), *Schistura reticulata* (Reticulata reticulated stone loach) and *Glyptothorax burmanicus* (sisorid catfish or hillstream

catfish) reflecting the species’ preference for shaded, turbulence-reduced microhabitats. The leaf litter and bamboo structures used in barrier formation further contribute to habitat complexity, supporting periphyton and invertebrate buildup that attracts hill-stream fishes. The observed species composition aligns with patterns documented in similar substrate-manipulation fisheries practiced in other hill districts of Northeast India^{15,21}.

Study limitations and future prospects

While this study provides valuable ethnographic and ecological insights, it is limited by its geographical scope focusing only on two villages within Chandel district and by the qualitative nature of data collection. Quantitative assessments such as catch per unit effort (CPUE), species abundance, or habitat mapping were beyond the scope of this study but would strengthen future analyses. Future work should incorporate standardized ecological metrics including size-frequency distributions of catches, CPUE measurements, juvenile-to-adult ratios, benthic invertebrate surveys and fine-scale habitat mapping to quantify ecological impact thresholds and support evidence-based management.

Future research should explore the integration of ITK into formal fisheries management and conservation frameworks. Documentation of traditional ecological knowledge through participatory approaches can support community-led conservation, biodiversity monitoring and the sustainable co-management of aquatic resources^{4,7}. Strengthening collaboration between fishers, researchers and policymakers can



Fig. 7 — Different types of *Eruh* trap: (a) *Luhchao* and *Luthang/Luhsha*, (b) *Kapuruh* and (c) *Luhchao*



Fig. 8 — V-shaped bamboo and stone barriers used in Savang-*Chiipin* (g) and Elung-*Chiipin/Chiiping* indigenous fishing practices

ensure that ITKs continue to inform adaptive strategies in the face of environmental and socio-economic changes.

Conclusion

There is an urgent need to document indigenous fishing techniques, as this rich ethno-cultural heritage is diminishing with the increasing use of modern fishing methods, despite the sustainability and cost-effectiveness of locally available materials employed in traditional practices. Thus, the present study highlights the enduring relevance and ecological sophistication of traditional fishing practices among the Monsang community in Chandel district, Manipur. The techniques of *Thingnarhuvuw*, *Peh-ethur* and *Chiipin/Chiiping* exemplify a deep-rooted indigenous knowledge system that has evolved in harmony with local environmental conditions and aquatic biodiversity. These methods demonstrate not only technical ingenuity such as the use of leafy branches as FADs or the construction of bamboo fencing for fish channeling, but also a profound understanding of fish behavior, seasonal cycles and sustainable harvesting.

Importantly, these traditional systems rely primarily on locally sourced, biodegradable materials, ensuring minimal ecological disruption. They also

foster communal cooperation and cultural continuity, particularly evident in group-based techniques like *Peh-ethur*. The diverse array of fish and shellfish species captured including both food and ornamental varieties further underscores the ecological value of these practices and their potential contribution to both nutrition and livelihood. Although fishing serves as a primary livelihood for many communities, regular awareness programs and effective fisheries management measures, such as mesh size regulation, control of trap density, and seasonal fishing bans are essential to ensure sustainability. Based on field-derived evidence, this study emphasizes community-monitored seasonal closures and the formal integration of ITK into district-level fisheries planning, supported through participatory governance, to maintain ecological integrity while safeguarding the livelihood security of hill-stream fishing communities in Manipur. From a policy and conservation perspective, this study supports:

- a) Formal recognition of validated indigenous fishing techniques within district-level fisheries planning;
- b) Community-led regulation of mesh size, trap density and seasonal closures based on local ecological indicators;
- c) Inclusion of indigenous fishers and elders in participatory monitoring programs; and
- d) Use of ITK documentation as a baseline for adaptive co-management in hill-stream fisheries of Northeast India.

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Author Contributions

MWM: Conceptualization, Data collection, Writing-original draft; MMM: Conceptualization, Writing-review and editing; SJM: Data collection, supervision, writing-review and editing, SN: Supervision, Writing-review and editing; SD: Data collection, literature search; SAT: Data collection, literature search

Conflict of interest

The authors declare no conflict of interest.

Informed Consent

Prior informed consent was obtained from all informants before their participation in the study. Informed consent was also obtained from all individuals appearing in the photographs.

Data availability

The data are available on request.

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