Original Research Article
ISSN: **3041-5357**
Journal homepage: https://diversity.researchfloor.org/

Journal of Diversity Studies

Traditional Ao fishing techniques use in hill streams of Mokokchung District, Nagaland, India

Ramita Sougrakpam[1], Bitu Rai[1], Lipokrenba[2], Zajanbeny K Odyuo[1], Bendangsangla[2], and Pukhrambam Rajesh Singh*[1]

[1]*Department of Zoology, Nagaland University, Lumami Hqrs: Zunheboto-798627, Nagaland, India*
[2]*Joseph's College (Autonomous), Jakhama. P.B. No. 39, Kohima-797001, Nagaland, India*

ABSTRACT

The Indigenous Ao tribe of Mokokchung have traditional methods for catching fish for subsistence and food security. They are practical and less time-consuming. Dikhu/Tsüla, Milak, Tsurong, Tsumok, Tsuo Tzuyim, Tzuvi, Tzüt and Menung are the important streams and river for the Ao tribes for carrying out fishing activities of which Dikhu river is the longest river in Mokokchung. All these streams and rivers are the tributaries of Brahmaputra. Various eco-friendly materials such as bamboo and easily available jute fibers from the forest are used in making these fishing gears along with the piscicidal plants for fishing. They are sustainable and can be easily decomposed in the environment after its use. Study was carried out at Aliba, Changki, Chantongya, Mametong and Yaongyimsen village of Mokokchung, Nagaland, India. It is found that 5 types of gears, 7 piscicidal plant and 2 different types of fishing accessories are used by the indigenous community. When compared to the villages it is found out there is almost similar way of operation of these fishing practices which shows a beautiful fusion of tradition, skill and innovative ideas passed down through generations and generations for centuries. Even with the introduction of modern techniques of fishing Ao people stick to traditions worth documenting prioritizing local gears and plants fosters eco-friendly fishing. This paper aims to prioritize sustainable practices and cultural education that integrate traditional knowledge with contemporary conservative strategies.

Keywords: *Ao tribe, Traditional Fishing techniques, Fishing gear, Piscicidal.*

Citation: Ramita Sougrakpam, Bitu Rai, Lipokrenba, Zajanbeny K Odyuo, Bendangsangla, and Pukhrambam Rajesh Singh [2026]. Traditional Ao fishing techniques use in hill streams of Mokokchung District, Nagaland, India. *Journal of Diversity Studies.*
DOI: https://doi.org/10.51470/JOD.2026.5.2.334

Corresponding Author: *Pukhrambam Rajesh Singh*

E-mail Address: *prajesh@nagalanduniversity.ac.in*

Article History: *Received 16 June 2026 | Revised 14 July 2026 | Accepted 17 August 2026 | Available Online September 19, 2026*

Copyright: *© 2026 by the author. The license of Journal of Diversity Studies. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license* ***(https://creativecommons.org/licenses/by/4.0/).***

Introduction

Hunting and fishing for their livelihood and nutritional security, the native tribal people in Nagaland continue to use a variety of distinctive fishing techniques based on their own indigenous traditional knowledge. For the people of Nagaland, fishing is one of the modes of operation and are some of the variables that affect the traditional fishing methods. The distinct approach taken is the outcome of years of experience and is connected to the fish's ecology morphology and behavior as well as the terrain of the fishing area. Nagaland's traditional fishing techniques represent a rich cultural legacy that is deeply intertwined with the local customs and natural resources. With their vast fisheries diversity, the state's aquatic resources display a variety of traits. In areas with low levels of institutional development and infrastructure, traditional fishing is frequently practiced [1].

Nagaland is home for many indigenous tribes, with Ao as one of the major indigenous tribes of Mokokchung district in Nagaland [2]. The rivers of Nagaland serve as an important source of water for the state of Nagaland. Numerous rivers both perennial and non-perineurial flowing in Mokokchung include Dikhu/Tsüla, Milak, Tsurong, Tsumok, Tsuo Tzuyim, Tzuvi, Tzüt and Menung [3].

In Mokokchung many small streams confluence with the Milak and Dikhu/Tsüla river which are the tributaries of Brahmaputra [4]. The Ao tribes refer themselves as Aoer which means "those who came" across the Dikhu river and were also the first tribe who adopted christianity in Nagaland [5]. The river flows close to fields located in Mokokchung district. These rivers serve as a significant source of livelihood for the people due to different geographical entities.

Traditional fishing technique is being passed on through generations and is important indigenous value for future generations [6]. Ao traditional fishing gears are non-mechanized and rudimentary due to local limitations. Different plant parts, such as leaves, roots, or the entire plant, are used in indigenous knowledge of piscicidal plants. There are 307 species of plants identified as Indian piscicidal plants [7] out which few are used by the Ao Nagas as piscicidal plants.

Methodology

The information on traditional fishing methods and their operations was collected by going to the field. During data collection, Secondary data were also used where conversation with different elderly experts was made to collect all available traditional fishing knowledge in the study area as far as possible.

Thus, data regarding traditional fishing gears, piscicidal plants and their mode of operation was obtained from both primary and secondary source.
This data provided more detailed knowledge about traditional fishing and how they work. Certain techniques such as traditional fishing gears, innovative modern fishing methods, piscicidal plants, etc., that are available in the study area are described under various groups as per the interview.

Study sites:
The study is carried out in five selected villages of Mokokchung viz. Aliba, Changki, Chantongya, Mametong and Yaongyimsen village (fig 1). Mokokchung district of Nagaland comprises of six different mountain ranges - Ongpangkong, Langpangkong, Asetkong, Tzürangkong, Jangpetkong and Japukong which holds mountainous villages [8]. Minor cultural differences can also be observed in the settlements' spoken languages. Chungli, Mongsen, and Changki are the three primary dialects [9]. The Mongsen dialect, which is a member of the Tibeto-Burman language family [10], is spoken by the residents of Aliba, Mangmetong, and Yaongyimsen village. Changtongya villagers now exclusively speak *Chungli*. Changki villagers speak *Changki*.

Aliba village –The village is positioned at 26.3810^0 North and 94.4381^0 East in Ongpangkong mountain range. The average elevation is 969.93 m. There are about 252 houses and total population of 1045 people. The river Tzuvi, Tzüt are the important cannels and river where the fishing is carried out.

Changki village - Changki is located roughly 26.4187^0 North and 94.3857^0 East. The average elevation of Changki is 1100 mts. It is one of the biggest villages. There are about 690 houses and total population of 3,132peoples. The river Tzüt, Tsurang are the important river for fishing.

Changtongya village - It is positioned at 26.57^0 North and 94.70^0 East. The local people of the town call it "Menemtsu". There are about 496 houses and a total population of 2,248 people. The river Dikhu is popular for its special characteristic which has a spot from where the crude oil arises and is the main river where the villagers carried out fishing.

Mangmetong village - The village is positioned at 26.2924^0 North and 94.39937 East in Ongpangkong mountain range. The average elevation is 154 m. There are about 775 houses and total population of 4159 people. Villagers carry out fishing at Tsuvi river.

Yaongyimsen village - The village is positioned at 26.56237^0 North and 94.7012^0 East. This place is on the border of the Mokokchung district and Longleng district. The Dikhu river is the main river for fishing by the villagers.

Result

The traditional fishing gears which are used by the indigenous Ao people in all the villages were primitive. They were mostly made of various types of materials including bamboo, nylon netting, twine, plastic structural and fasteners, polyester, polyethylene, nylon wood etc according to the local availability of raw material for the fabrication of the fishing gear [11]. Compared to contemporary technical equipments, the materials utilized are less expensive, need less skill, and are simpler to operate.

Tools like Spades or Shovels and Dao (machetes) are used to make spears, which are then used to dig and remove the roots of the piscicidal plant and chop the branches to remove the leaves, bark, and nuts. Based on their structure and mode of operation, three distinct kinds of traditional fishing gear along with two cutting-edge modern fishing techniques, eight piscicidal plants and two accessories used during fishing are employed in traditional fishing methods.
The fishing gears and techniques along with its operation are described as under:

Description of Traditional fishing gears and photographs (Table 1 and Fig2):

1. Angotatatsü (Scoop net)
The shapes of scoop nets range from round to triangular to rectangular [12]. A net with a smaller mesh size, such as nylon, cotton, or mosquito net, is attached to the frame, which is constructed from a metal ring or locally accessible materials like bamboo or jute [13]. Next, a metal or wood handle of the appropriate length is fastened to the frame [14]. Typically, this kind of equipment is used in shallow water [15].

2. Tsüngkenkang/Changpangkang (Hapa: Cylindrical trap)
These traps are made up of bamboo strips. Kotila means fish, kang means basket and Changpang is crab. The gear is operated by individuals alone [16]. The gear is made from bamboo and may take maximum three days to make one of these (Table 1). There is a small bamboo known as Tsülapongdang (Tsüla here means earthworm) which has a hole. Different types of bait are used such as earthworm and intestinal waste of animals [17]. The bait is placed inside the bamboo, and the opening is closed either by a small stone orleaves [18]. They are placed in waters with a depth of 2-3 feet and are surrounded by rocks to weigh down the basket so that it doesn't float away. The fish are attracted by the smell of the bait. Many types of fish and even crabs enter the basket are trapped and are unable to escape. The fish trapped are collected in the morning or after a period, the space between the strips helps the juveniles and eggs to escape.

3. Chadang (Conventional fish traps made of bamboo)
The trap is a temporary fish barrier that is frequently made wholly or partially vertically out of interlaced bamboo. According to reports from Mizoram as well, they are situated at the end of the designated river segment [19]. Fish are confined by the barrier, even though water can easily travel through the interwoven bamboo [20] while eggs of fishes and various aquatic animals escape with the water. When fishing within or between communities, this kind of barrier is employed [20].
Innovative modern fishing methods implemented with the traditional fishing methods (fig 2).

1. Zütsük (Cast net)
The materials used in zütsük were natural materials such as cotton or hemp, while modern versions utilize synthetic fibers for increased durability and performance [21]. Zütsük consists of a circular mesh with weights distributed around its perimeter and a central handgrip [22]. The net differs in size and weight distribution according to the specific fishing conditions and target species, with larger nets used for capturing baitfish and smaller ones for delicate applications [23]. Cast net fishing is a sustainable practice when conducted responsibly; however, improper use can lead to overfishing and habitat destruction [24].

2. Porki (Hooks and lines)

Fish are captured with hooks and lines, which are devices that use natural or synthetic bait attached to a hook that is fastened to the end of a line or snood. This equipment can be used for both conventional and contemporary fishing methods [25].

This is one of the most traditional and widely used fishing gear. It is composed of bamboo, hook, and nylon thread. The equipment is comprised of a long stick with nylon or another fiber thread attached to one side of the pole and a metallic hook of different sizes that is fastened with a tight grip on the end of the twine. The pole's length can vary between 1.5 and 3.0 meters, depending on convenience, and the hook is typically made of iron with sharp edges and curves bent for better entanglement [26]. Floats and weights are occasionally added to ensure proper stability in flowing water and to act as an indicator [27].

Table 1: Gear specification and target fishes

Local name	Materials	Length (cm)	Mouth opening (cm)	Longevity in years	Area of operation	Targeted species
Angotatatsü (Scoop net)	Nylon, cotton, mosquito net, frame: metal ring or bamboo or jute; a metal or wooden handle	65–73	35–38 diameter	2–3 years	Shallow river	Prawns, Channa spp., Danio spp., fingerling-size species, etc.
Tsüngkenkang/Changpang. (Hapa: Cylindrical trap)	Bamboo	40–45	18–20	3–5 years	Shallow river banks and fast-flowing rivers	Heteropneustus, catfishes, Channa spp. and Crab spp.
Chadang (Conventional fish traps)	Bamboo	120 – width of the river	–	One use	Downstream	Heteropneustus, catfishes, Channa spp. and hill stream fishes
Zütsük (Cast net)	Cotton or hemp, nylon	75–150	150–300	3–5 years	River	Chocolate Mahasheer, Channa spp., Heteropneustus, Mastacembelidae spp., Danio spp., etc.
Porki (Hooks and lines)	Bamboo, hook and nylon thread	30 (handle to sinker); 915 (sinker to hook); 100–120 (handle)	–	2–6 years	River	Catfishes, Channa spp., Chocolate Mahasheer, etc.

1. Traditional fishing gear



Angotatatsü (Scoop net)



Tsüngkenkang/Changpangkan g (Hapa: Cylindrical trap)



Chadang (Conventional fish traps made of bamboo)

2. Innovative modern fishing gear implemented with the traditional fishing methods



Porki (Hooks and lines)



Zütsük (Cast net)

3. Piscicidal plants



Tosu/ Topitong (Millettia pachycarpa)



Zu/Süli/Piyanglungmem (Derris elliptica)



Akhojang/Akajang (Juglans regia Linn)



Akhowa/Akawa (Juglans regia Linn)



Mokoktu (Albizia chinensis)



Nukboktsusang/ Jakremtsü (Pteridium aquilinum)



Jakamtsü (Polygonum hydropiper)

4. Accessories used during fishing:



Shape 1: Angü Makang/ Angakang (Traditional basket)



Shape 2: Angü Makang/ Angakang (Traditional basket)



Shape 3: Angü Makang/ Angakang (Traditional basket)



Ao Milen (Traditional split torch)

Fig 2: Photographs of Traditional fishing gears, Piscicidal Plants and Accessories.

Description of piscicidal/ ichthyotoxic plants (Table 2 and Fig 2):

1. Tosu/ Topitong (*Millettia pachycarpa* Bentham)

The raw root extract is used. The plant has a shallow climbing root system and is easy to uproot. On the day of fishing, the roots are often gathered and then roughly cut into equal lengths. To separate the fibers and extract the piscicidal substance for fishing, it is transported to the site and hammered with a piece of wood (pole) against a stone or log or stepped on foot. Additionally, the roots are struck against the stones in the riverbank [6]. Following the initial pounding, the root extracts take on a reddish hue [20]. To increase the poison's effectiveness, the crushed roots are subsequently dumped into the water body's current.

A bamboo barricade is made at the end of the stream so that the fish will not escape and the fishes are collected and put in the basket which is woven with bamboo [20].

2. Zu/Süli/Piyanglungmem (*Derris elliptica)*It uses the unprocessed root extract. Harvesting this plant is more difficult due to its deeply rooted systems [28]. Both labor and equipment are needed for extraction. Using a piece of wood or log, the roots are hammered above the stone or log. When pounded, the roots take on a pale hue and have a strong odour. Every root that has been gathered is pounded until the plant's fibers are separated.

3. Akhojang/Akajang: nuts, Akhowa/Akawa: leaf (*Juglans regia* Linn)

The nut cover and the un-matured tender leaves are used [29]. The fruits are placed in a conical basket in the river and four to five men pound to extract the juice out of the nut cover, which is normally mixed with the mud [28, 30].

4. Aar Jang/ Rüja (*Diospyros lanceiefolia*)

The plant's bark is employed. The barks are gathered and mashed with the use of a pestle. Setting up the piscicidal effect takes a whole day. Because of this, fishing is only done at night using traditional torches constructed from split bamboo. One of the extract's properties is that it deoxygenates the water. It either kills or paralyzes fish after it is thrown into the water [31].

5. Mokoktu (*Albizia chinensis*)

The bark of the plant is used [32, 33]. It is mainly used in community fishing. The bark is hammered with wood batch by batch for at least an hour. The juice is then washed into the river. The juice produced by this plant is reddish to brownish in colour and forms bubbles. During this process people swim in the water, it is believed that it has profound result for stupefying the fish. A bamboo barricade is used for catching.

6. Nukboktsusang/ Jakremtsü (*Pteridium aquilinum*)

Eagle fern, meadows brake, bracken, and brake are some of its common names [34]. The herb is readily available in the jungle in abundance. The Ao tribe use this herb as piscicidal plant relatively frequently [8]. The entire plant is ground into a paste to the water source to stupefy the fish. Several tribes in the northeast also employ this plant in their traditional fishing methods [20].

7. Jakamtsü *(Polygonum hydropiper)*

It is also accepted under the scientific name *Persicaria hydropiper* and goes by the common names water pepper or marshpepper knotweed. Native American Tribe, Cherokee people are documented to have used this plant as piscicidal plant [35]. Leaves are the primary toxic part, however the whole shoot plant is grounded and used due to small leaf size [36] (Table 2).

Table 2: Description of piscicidal plants, habits, parts used and its active components.

Sl. No.	Scientific Name	Local Name	Common Name	Habit	Parts Used	Active Components
1	Millettia pachycarpa (Bentham)	Tosu/Topitong	Thick-fruited Millettia	Large woody climber	Roots and seeds	Rotenone/other Rotenoids
2	Derris elliptica	Zu/Süli/Pivanglungmem	Derris, Poison Vine, Bitter-bark etc.	Large woody climber	Roots, leaves and bark	Rotenone
3	Juglans regia (Linn.)	Akhoiang/Akajang: nuts, Akhowa/Akawa: leaf	Wild walnut	Deciduous tree	Fruit husks, young leaves	Juglone
4	Diospyros lanceifolia	Aar Jang/Rüia	Lance-leave Ebony	Tree	Bark	Biplumbagin, Citranone in fruits
5	Albizia chinensis	Mokoktu	Chinese albizia	Tree	Bark	Unidentified
6	Pteridium aquilinum	Nukboktsusang/Jakremtsü	Eagle fern, meadowsbrake, bracken, and brake	Herb (Ferns)	Whole plant	Norsesquiterpene glycosides and Phytoecdysone
7	Polygonum hydropiper	Jakamtsü	Water pepper or marsh pepper, knotweed	Herb	Leaves and seeds	1,4-Naphthoquinone

Table 3: Taxonomic classification of piscicidal plants

Sl. No.	Scientific name	Kingdom	Division	Class	Order	Family
1	Millettia pachycarpa (Bentham)	Plantae	Tracheophyta	Magnoliopsida	Fabales	Fabaceae
2	Derris elliptica	Plantae	Tracheophyta	Magnoliopsida	Fabales	Fabaceae
3	Juglans regia (Linn.)	Plantae	Tracheophyta	Magnoliopsida	Fagales	Juglandaceae
4	Diospyros lanceifolia	Plantae	Tracheophyta	Magnoliopsida	Ericales	Ebenaceae
5	Albizia chinensis	Plantae	Tracheophyta	Magnoliopsida	Fabales	Fabaceae
6	Pteridium aquilinum	Plantae	Tracheophyta	Polypodiopsida	Polypodiales	Dennstaedtiaceae
7	Polygonum hydropiper	Plantae	Tracheophyta	Magnoliopsida	Caryophyllales	Polygonaceae

Accessories used during fishing (fig 2):

1. Angü Makang/ Angakang (Traditional basket)

Typically constructed from locally available materials like bamboo, cane, etc., these traditional bamboo baskets are available in a range of sizes and shapes. Smaller baskets are used to store the collected fish and are attached around the waist using rope or twine during fishing. Ao Nagas fishing baskets serve as a symbol of sustainable life and a tool for transporting fish [20].

2. Ao Milen (Traditional split torch)

Traditional split torch is made by splitting bamboo. When fishing at night, especially with piscicidal plants, traditional bamboo split torches help with visibility [20]. Modern battery-powered torches with a longer range are also used, even if these traditional torches make evening fishing easier [8].

Discussion

Fishing supports food security, boosts economies, preserves cultural traditions, promotes environmental balance, offers recreation, and drives scientific study. Fishing gear makes it easier for fishers to haul in plenty of fish with minimal effort. Experts classify these tools by how they capture fish, their design, and how they're used, since fish varieties differ widely. Techniques span simple hand-grabbing to local nets, and many time-tested methods endure today. Even though traditional methods seem basic, they're spot-on for targeting specific fish.

In Nagaland, though use of modern gear is rising, the Ao people stick to traditions worth documenting prioritizing local gears and plants fosters eco-friendly fishing. Fishermen use plants found nearby to stun hill stream fish, drawing on generations of know-how. This plant-based fishing happens worldwide [37,38].

Unlike harsh chemicals with long-lasting damage, plant extracts wear off in hours, sparing the ecosystem. Extracts from leaves, fruits, roots, or bark effectively daze fish, though results depend on the plant and fish species. This paper further opens the future research for studying the mode of action for the active compounds on molecular as well as on biochemical basis.

Indigenous practices aim for community thriving and harmony. Learning from fishers' sustainable habits over time helps protect aquatic life. Preserving indigenous wisdom is key for resource management [39, 40, 41], boosting ecosystem care's credibility and longevity [42].

Conclusions

The traditional fishing methods celebrate the unique cultural identity of tribes of Nagaland. As we navigate an increasingly interconnected world, nurturing and protecting these traditions becomes not only a responsibility but a tribute to the rich tapestry of human diversity and ecological harmony. Efforts to preserve Nagaland's traditional fishing methods are crucial to safeguarding both cultural heritage and ecological balance. Collaborative initiatives involving local communities, government support, and conservation organizations are imperative. These efforts should prioritize sustainable practices, cultural education, and policy frameworks that integrate traditional knowledge with contemporary conservative strategies.

Using a sample village in Mokokchung, the home of the Ao indigenous people of Nagaland, the study's primary goal is to record and document the traditional fishing methods and other accessories utilized by the fishermen. This study also aims to improve and promote simple and traditional fishing methods. The result obtained from this study will help in understanding the traditional fishing method and use of piscicidal plants for catching fish.

As the literature and records are scanty this paper will ensure the people practice and use the traditional gears while promoting sustainable fishing and also conserving the fish seed for the future fish stock.

Acknowledgement: Authors are extremely grateful to the village chairmen and elderly villagers of Aliba, Changki, Changtongya, Mangmetong and Yaongyimsen of Mokokchung district, Nagaland, India.

Conflict of Interest: There is no conflict of interest.

Author Contributions: PRS and RS- Conceptualization, research design and writing original draft; BR, L, B and ZKO- Data collection and interview.

References

1. Johnson, D. S. (2006). Category, narrative, and value in the governance of small-scale fisheries. Marine policy, 30(6); p.747-756.
2. Mills, J.P. (1926). Ao Nagas. Macmillan and Co.
3. Pukhrambam, R.S., and Bendang, A. (2024). Physico-Chemical Properties, Diversity and Adaptive structural modification of hill-stream fish of the Dikhu River, Mokokchung, Nagaland, India. Bioscene, vol 21(4), ISSN:1539-2422(P) 2055-1583(O), p 708-735.
4. Pukhrambam, R.S., and Bendang, A. (2026). Adaptive structural modification and diversity of hill-stream fish of Milak River, Mokokchung, Nagaland, Northeast, India, Journal of Diversity Studies, vol 5(1), p19-24; ISSN3044-5357; DOI: 10.51470/JOD.2026.5.1.19
5. Vulli D. (2019). "Cultural history of beliefs and rituals: A case study of Ao- Naga tribe of Nagaland, India. History Research Journal. 5.
6. Ovung, E.Y., Kithan, L.M., Brearley, F.Q., and Tripathi, S.K. (2022). Indigenous Community Fishing Practices in Nagland, Eastern Indian Himalayas. Sustainability. 14(12); 7049
7. Jawale, C. (2018). Piscicidal plants of India. Trends in Fisheries Research.Vol 7, Issue; p.33-45
8. Imchen, A., and Joglekar, P.P. (2017). Traditional fishing practices among the Ao Nagas: A case study of Mangmetong village, Nagaland. Herit. J. Multidiscip. Stud. Archaeol. 5; p.380–390.
9. Ghosh, B.B. (1979). Mokokchung District Gazetteers, Nagaland, Gazetteers of India. Kohima: Government of Nagaland.
10. Coupe, A.R. (2008). A Grammar of Mongsen Ao. De Gruyter Mouton.
11. Sebastian, R., Rao, J.C.S., Rao, K.G., and Simhachalam, G. (2016). Fishing Methods, Use of Indigenous Knowledge and Traditional Practices in Fisheries Management of Lake Kolleru,Journal of Entomology and Zoology Studies, 4(45); p.37-38.
12. FAO. (2021). Fishing gear types: Scoop nets. Fisheries and Aquaculture Technical Paper. Food and Agriculture Organization of the United Nations.
13. Thomas, S.N., and Hridayanathan, C. (2006). Design and operational characteristics of scoop nets in Kerala coast. Fishery Technology, 43(1); p.27-32.
14. Gabr, M., Fujimori, Y., and Shimizu, S. (2015). Handling characteristics of scoop nets for small-scale fisheries. Fisheries Engineering, 52(2); p.115-123.
15. Manoharan, J., Gopalakrishnan, A., and Pillai, S.L. (2021). Indigenous fishing gears of India and their operations. ICAR-Central Marine Fisheries Research Institute Bulletin, 189; p.45-52.
16. Gurumayum, S.D., Choudhury, M., and Bhagabati, S.K. (2020). Indigenous fishing devices of Northeast India: A review. Indian Journal of Traditional Knowledge, 19(3); p.529-549.
17. Bhattacharjya, B.K., Choudhury, M., and Puzari, A.M. (2017). Traditional fishing methods in Central Brahmaputra Valley zone of Assam. Journal of Inland Fisheries Society of India, 49(2); p.45-52.
18. Solanki, P., Singh, R., and Kumar, R. (2021). Indigenous bait and trap fishing practices in Eastern Uttar Pradesh. Journal of Fisheries and Aquaculture, 12(1); p.33-39.
19. Lalthanzara, H., and Lalthanpuii, P.B. (2009) Traditional fishing methods in rivers and streams of Mizoram, North-east India. Sci. Vis.,9; p.188-194.
20. Ovung, E.Y., Murry, B., and Kumar, S. (2022). Indigenous fishing techniques and their socio-economic implications in Nagaland. Journal of Traditional and Folk Practices, 10(1); p.55-64.
21. NSU Works. (2023). Third Place: Anthropogenic Impacts/Conservation. NSUWorks.
22. Wachter, H. (2022). Are some fishing methods more sustainable than others? Experience Life.
23. Nabbongo, H. (2005). Impacts of beach seines and castnets on the environment at Kigungu Fishing Ground on Lake Victoria in Wakiso District, Uganda. Kampala International University.
24. Okwakol, M. (2021). Cast-net fishery on northern portion of Lake Victoria and upper Victoria Nile. AquaDocs.
25. FISHBIO. (2023). Basic to advanced and back again: Hook-and-line history and current trends. FISHBIO.
26. Nissa, A., Lekshmi, N.M., Manoj Kumar, B., Das, S.K., Goud, A., (2021). Structural and Operational Aspects of Fishing, Traps of Meghalaya, North East India, Fishery Technology, 58: p-147-154.
27. New Zealand Legislation. (2018). Fisheries (Seabird Mitigation Measures—Bottom Longlines) Circular. New Zealand Legislation.
28. Campbell, J. A. (1916). An experimental investigation concerning the effects of & quot;Tuba" (Derris elliptica) fish-poison. Journal of the Straits Branch of the Royal Asiatic Society, (73); p.179-181.
29. Duke, J. A. (1983). Juglans regia L. In Handbook of Energy Crops. Unpublished. Purdue University. https://hort.purdue.edu/newcrop/duke_energy/Juglans_regia.html
30. University of Illinois Extension. (2018,). Black walnut. The Garden Scoop. https://extension.illinois.edu/blogs/garden-scoop/2018-08-23-black-walnut
31. North Eastern Hill University. (2012). Median lethal concentration (LC50) of piscicidal plants and their utilization in aquaculture. Journal of Aquatic Animal Health, 24(4).
32. Fern, K. (2022). Albizia chinensis. Useful Tropical Plants Database. https://tropical.theferns.info/viewtropical.php?id Albizia chinensis
33. Wikipedia contributors. (2012). Albizia chinensis. In Wikipedia. https://en.wikipedia.org/wiki/Albizia_chinensis
34. Fern, K. (2022). Pteridium aquilinum. Useful Tropical Plants Database. https://tropical.theferns.info/viewtropical.php?id Pteridium aquilinum
35. Hamel, Paul, B., and Chiltoskey, M.U. (1975). Cherokee Plants and Their Uses -- A 400 Year History, Sylva, N.C. Herald Publishing Co., p. 55.
36. Kulakkattolickal., and Thevasia, A. 1989. Piscicidal plants of Nepal: Ripe fruit of Catunaregam spinosa (Thunb.) (Rubiaceae) and leaves of Polygonum hydropiper L. (Polygonaceae) as fish poisons, Aquaculture, Volume 78, Issue 3, p. 293-301.
37. Kulakkattolickal, A.T. (1987). Piscicidal plants of Nepal preliminary toxicity screening using grass carp (Ctenopharyngodon idella) fingerlings. Journal of Ethnopharmacology. 21:1-9.
38. Van Andel T. (2000). The diverse uses of fish-poison plants in Northwest Guyana. Economic Botany 54(4); p.500-512

39. Polfus, J.L., Manseau, M., Simmons, D., Neyelle, M., Bayha, W., Andrew, F., Andrew, L., Klütsch, C.F.C., Rice, K., and Wilson, P. (2016). Łeghágots'enet̨e learning together the importance of indigenous perspectives in the identification of biological variation. Ecol.Soc. 21; p.18.
40. Ban, N.C., Frid, A., Reid, M., Edgar, B., Shaw, D., and Siwallace, P. (2018). Incorporate Indigenous perspectives for impactful research and effective management. Nat. Ecol. Evol. 2;p.1680–1683.
41. Artelle, K.A., Zurba, M., Bhattacharrya, J., Chan, D.E., Brown, K., Housty, J., and Moola, F. (2019). Supporting resurgent Indigenous-led governance: A nascent mechanism for just and effective conservation. Biol. Conserv. 240; p.108284.
42. Bjorkvik, E., Boonstra, W.J., and Telemo, V. (2021). Going on and off the map: Lessons about fishers' knowledge from identifying spawning areas together with Swedish Baltic fishers. Ocean Coast. Manag. 211; p.105762.