

## Traditional fishing methods in Central valley region of Manipur, India

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Central valley region of Manipur harbours great ichthyofaunal diversity; diverse fisheries resources, thus uses wide array of fishing methods which are evolved traditionally and being practiced extensively throughout the central valley. Some of the practices are unique to certain area such as the Loktak lake. The different traditional fishing methods presently being practiced by the fishermen are broadly categorized into major and minor fishing gears. In present paper an attempt has been made to collect and document the Indigenous technical knowledge (ITKs) related to fishing methods in central valley of Manipur, India. In addition to the documentation of different fishing methods, the rationales behind their use, as perceived and mentioned by the respondents, were also concurrently discussed to facilitate comprehension.

**Keywords:** Fishing methods, Central valley, Traditional fishermen, Livelihood

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Manipur lies in the North-easternmost corner of India within latitude 25.83°N and 93.93°E longitude. The state has an area of 22,327 sq km of which the valley (plain area) has only 1920 sq km. and the rest belongs the hills, characterised by dense forest and inaccessible terrains. The valley area is about 10% of the total but inhabited by 65% population. Further, 95% of population is non-vegetarian, and fish forms a substantial of their daily diet. Because of different geographical entity, the aquatic resources in the state exhibit diverse characteristics with immense Ichthyofaunal diversity. The state has vast potential of fisheries resources comprising ponds, tanks, natural lakes, marshy areas, swampy areas, rivers, reservoirs, submerged cropped land, low lying paddy fields, etc. which total accounts 56,461.05 ha<sup>1</sup>. In addition to this, the Loktak lake has been remain as major resource for capture fisheries and serve as means of livelihood for the traditional fishermen.

Worth of studying indigenous knowledge is well emphasized by Mundy and Compton<sup>2</sup>. The traditional fishing methods in the different water bodies of Northeast India have been described by various authors<sup>3</sup>. Dutta and Bhattachariya, reported about the

Community fishing practices by *Wancho* tribe in Tirap district of Arunachal Pradesh<sup>4</sup>. The authors also describe the traditional fishing of catfishes using duck meat as an attractant in Assam<sup>6</sup>. However, fish harvesting practices by *War khashi* community, Meghalaya<sup>5</sup>, and traditional fishing methods of Assam<sup>6,7</sup>, has also been documented<sup>5,6,7</sup>. Further, traditional fish based beliefs and customs in central valley of Manipur have been reported<sup>8</sup>.

The state has rich diverse fish fauna, concentrated in major rivers, reservoirs, natural lakes, etc. the detailed study of traditional fishing methods with respect to their operation and rationale behind their use is lacking, therefore, an endeavour has made to furnish the details about traditional fishing knowledge of study area.

### Methodology

The study was carried out in the Central valley region of Manipur which comprises of four districts, Imphal west, Imphal east, Bishnupur and Thoubal. Seeing the availability of the resources, two fishing villages from each selected district were chosen randomly for the purpose of collecting data for the study. The information on fishing methods and their operation was collected by personal interview with

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the fishermen, direct field observations and focus group discussions with about 10-12 fishermen and fisherwomen selected randomly from each of the 8 selected villages. During the course of data collection, conversations with different experts and fisheries officers of the department of fisheries were also made to collect all available ITKs in the study area as far as possible. In addition to this, secondary data from different sources such as fisheries department, FFDA (Fish Farmer Development Agency) and NGOs were also collected to get complete picture of fishing practices.

## Results and discussion

The fishing methods of Manipur can be broadly classified into three groups based on the operation and catch of fish, *viz.* major fishing methods, minor fishing methods and trap fishing (Fig. 1-13).

### Major fishing methods

#### *Nupi-il* / Lift Net

“*Nupi*” means woman and “*il*” means net in *Manipuri*. It is mainly operated by women. The net is mainly made up of nylon, however, in some areas cotton is also being used.

**Construction and operation:** The net is supported by two bamboo frames each of about 3 - 3.5m length (Fig. 2). These two bamboo frames join together in the middle using cane strips, so that it gives out four tips. Each tips of the bamboo is made a round cut mark for proper fastening of the net. The four tips of the net are fasten into the tips of bamboo. A bamboo pole locally known as “*poura*” supports the whole structured by means of fulcrum in the middle of the bamboo frames. It helps to haul the whole net especially with help of hauling rope of about 7m length. It is operated either from the bank of lakes, rivers and ponds or from the deck of a boat.

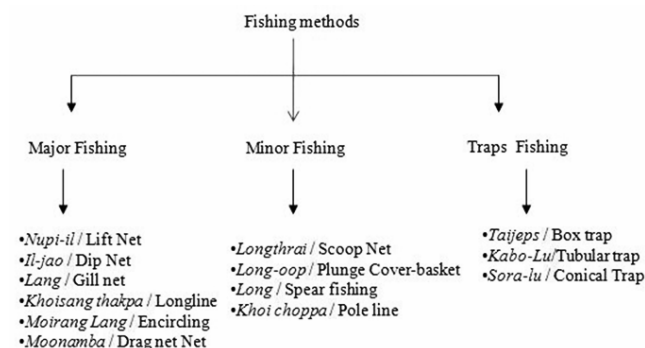


Fig. 1—Classification of fishing methods

The fishermen haul the net by inserting the “*poura*” (bamboo pole) in the dyke tightly (or with support of thighs when it is operated from boat) and pressing it down. The net thus lifts up from water and then collect the catches by hand. It is practiced throughout the year. Species caught are Indian Major Carps, *Puntius sp.*, *Chanda ranga*, *Chanda nama*, *Esomus dendricus*, Air breathing fishes.

#### *Il-jao* / Dip Net

Bigger dip net is known as “*il-jao*”. In *Manipuri* the word “*il*” means net and “*jao*” means big. The gear is operated in the month of May-September in the Loktak lake. The gear is made by stitching about 9-12 numbers of small dip nets in a rectangular form. The four corners of the net are tightened to four bamboo poles and again these bamboo poles are supported by another pole to secure them in position (Fig. 3).

**Operation:** The huge gear is mainly operated in loktak lake where the traditional fishermen take the advantage of *phoomdis* (floating mass of aquatic weeds in lake) for fixing the bamboo poles. Fishing operations are done by fixing the net to the bamboo poles and the remaining portion of the net is keep immersed underwater for 4-5 hrs or even one day of setting. In order to increase catch efficiency, dough of rice bran is spread over the net so as to attract the fishes. While hauling the net, two fishermen from two boats start lifting the net towards the *Phoomdis*. The net is lifted up by untying the lower two ropes and pulling them gradually above water surface. Fishes caught are collected by means of smooth bamboo pole “*pou*” beating the net one after another by two persons to the collection side.

#### *Lang* / Gill net

*Lang* is one of the most widely used gear by fishermen. It is a single wall nets with required mesh size for the desired fishes which are entangled by the gills themselves in the netting. It is made of monofilament, and maintain the mesh size for the desired fishes. Fishes are not able to escape once it is entangled.

**Operation:** The gear is set mainly at the surface of the pond or lake for few hours and they haul it either from the dyke or from the boat (Fig. 4). Further, species specific gill nets are prevalent in study area and depending on the catch of fish; it is mainly classified into five types. namely *Ngapai Lang* (*Chitala chitala* gillnet); *Ngarang Lang* (*Nangra*

*viridescens* gillnet); *Phabou Lang* (*Puntius* gillnet); *Ukabi lang* (*Anabas testudineus* gillnet); and *Lang jao* (Big gillnet).

#### **Khoisang thakpa / Longline**

“*Khoisang thakpa*” means setting of the longline on the water surface. It is one of the major gear which is operated mainly during the summer season (June- August). It is made of nylon or cotton twine of about 50-100 m long, fixed with series of baited hooks of about 30-50 numbers at an interval of 2-3m on the main line which is stretched on the surface of the water.

**Operation:** The operation of the gear is easy, here one end of the mainline is tied firmly to a fixed pole and setting is continued with successive ties of the mainline to the available weeds until the tail end is again tied to another fixed pole (Fig. 5). The long line is set early in the morning and hauled after 8-10 hrs and reset it again on the desired region. Species caught by the gear has been mentioned in Table.1. However, the most common live bait used for fishing purpose are *Puntius sp.*, insects, earthworms, *Esomus dendricus*, *Amblypharyngodon mola*, prawn and sometime small size *Channa sp.*

#### **Moirang Lang / Encircling Net**

This fishing method is same to that of purse seine and setting of gill net. It is suitable for the huge water bodies for catching the shoals of fishes. About 5-10 numbers of gill nets are joined together which forms a encircling net for catching the fish shoals (Fig. 6).

**Operation:** The gear is operated mainly when the water level reduces to its minimum, i.e. November to June. During the operation, fishermen identify the shoals of fishes by seeing the colour of water and also get indication by observing the movement of the aquatic weeds, then net are made encircled around the fish shoals. Furthermore, fishermen drive out the fishes from the boats on-board by striking the edge of the boat or by using spear from inside the centre of the encircling area so that the fishes then entangled in the encircled net. Catches of the fishing gear are depends on the mesh size of the nets. Species caught by the gear has been mentioned in Table 1.

#### **Moonamba / Drag net**

This fishing method is mainly practiced during dry season in beels, ponds and lakes. Fishes from the shallow water areas or almost dried area

are dragged out by this net and different kinds of fishes varying from small to large size fishes are caught. Two fishermen are required for the operation of this gear

**Operation:** This gear is operated by dipping the net completely inside the water and turning the net mouth along with the current. As soon as the fishermen feel the entanglement of the fish, they clip the net mouth, lift it up and take out the fishes. Varieties of species are caught such as *Puntius sp.*, *Anabas testudineus*, *Heteronoptis fossilis*, *Channa sp.*, *Amblypharyngodon mola*, *Esomus dendricus*, Air Breathing Fishes, etc.

### **Minor Fishing Methods**

#### **Longthrai fishing / Scoop Net**

Scoop net is locally known as “*Longthrai*”. It is of various shapes such as cup shaped, triangle shaped, circular or trapezoidal, etc. This gear has a netting of nylon or mosquito net mounted on the bamboo frame or jute frame with long handle attached to the frame (Fig. 7). It is operated both from the dyke as well as from the boat in the deeper water or from the margin near to dyke of the pond or lake especially in the weed infested area. It is practiced throughout in all seasons both by the men, women and also children. It is regarded as most easy means for catching fish. Species caught in this method are Minnows, prawn, *Channa sp.*, *Anabas testudineus*, *Clarias batrachus*, etc.

#### **Long-ooop fishing / Plunge Cover-basket**

It is bell-shaped basket made of seasoned bamboo strips/ *lee* having a height of about 50-55cm with foot diameter of 40-50cm and top opening diameter of about 13-15cm (Fig. 8). It is operated during the dry season, when the water reduces to its minimum level. The gear is operated by one man. It serves as compulsory gear for all the fishermen as it is available in all fishermen houses. Species caught are Indian major carps, exotic carps, *Notopterus sp.*, *Channa striatus*, etc.

#### **Long fishing / Spear**

This fishing method is practiced throughout the state. It is mainly operated by the expert fishermen only. It has 5-9 prongs of steels or bamboo with iron point at the tips attached to a long bamboo pole of 3-4m (Fig. 9). After locating the fish in water by seeing the bubbles or the movement of fish, the spear is thrown from the boat or from the dykes. *Channa striatus*, *Labeo rohita*, common carp, exotic carps, *Wallago attu*, etc.

Table 1—Particulars about the finishing methods in central valley region of Manipur India

| 1. Major fishing methods |   |   |  |   |   |  |
|--------------------------|---|---|--|---|---|--|
| Particulars              | <i>Nupi-il</i> / Lift Net   | <i>Il-Jao</i>   | <i>Lang</i> /Gill net  | <i>Khoisang Thakpa</i> /<br>Longline  | <i>Moirang lang</i> /<br>encircling net   | <i>Moonamba</i> /<br>Drag net  |
| Area of operation        | Lake/River/ponds  | Lake  | Lake   | Lake/Ponds  | Lake  | Pond/Lake  |
| Material used            | Cotton/nylon/<br>Bamboo   | Cotton/<br>bamboo   | Mono<br>filament   | Nylon thread,<br>iron hook  | cotton  | Cotton/nylon   |
| Dimensions               | 15m×10m   | 3-3.5m ×<br>2-2.5m  | -  | 50-100 m long<br>30-50 baited hooks<br>At interval of 2-3m  | Available in<br>various sizes   | Available in various<br>sizes depending on<br>the fish with mesh<br>size ranges between<br>1.5cm to 3.5cm  |
| Manpower                 | 1 or 2  | 2   | 1-2  | 1 or 2  | 2-5   | 2-3  |
| Longevity                | 5-6yrs  | 4-10yrs   | 2-5yrs   | >10yrs  | 4-6yrs  | 4-6yrs   |
| Fishing season           | Throughout the year   | May-September   | Nov-March  | June- August  | Nov- June   | Dry season   |
| Main Species caught      | Indian major carps,<br><i>Puntius sp.</i> , <i>Chanda<br/>ranga</i> , <i>Chanda<br/>nama</i> , <i>Esomus<br/>Dendricus</i> , Air<br>breathing fishes. | Indian major<br>carps, <i>Wallago<br/>attu</i> , <i>Esomus<br/>dendricus</i> ,<br><i>Amblypharyngo<br/>don mola</i> ,<br><i>Notopterus sp.</i> ,<br>Catfishes | <i>Chitala chitala</i> ,<br><i>Nangra<br/>viridecens</i> ,<br><i>Puntius</i> , <i>Anabas<br/>testudineus</i> and<br>Indian major<br>carps. | <i>Channa sp.</i> , <i>Clarias<br/>batrachus</i> , <i>H. fossilis</i> ,<br><i>Anabas testudineus</i> ,<br><i>N. notopterus</i> , <i>Wallago<br/>attu</i> , <i>Glossogobius<br/>giuris</i> , <i>Osteobrama sp.</i> ,<br><i>Macronagthus aculeatus</i> ,<br><i>Ompok sp.</i> , <i>Mystus<br/>bleekeri</i> , <i>Tilapia sp.</i> , etc. | Indian major carps,<br><i>Rohtee alfridina</i> ,<br><i>Wallago attu</i> ,<br>catfishes and air<br>breathing fishes,<br>etc. | <i>Anabas testudineus</i> ,<br><i>Heteronoptis<br/>fossilis</i> , <i>Channa sp.</i> ,<br><i>Amblypharyngodon<br/>mola</i> , <i>Esomus<br/>dendricus</i> , Air<br>breathing fishes,<br>etc. |
| 2. Minor fishing methods |   |   |  |   |   |  |
| Particulars              | <i>Longthrai</i> / scoop net  | <i>Long-ooop</i> / Plunge cover basket  | <i>Long</i> / Spear fishing  | <i>Khoi Choppa</i> / Pole line  |   |  |
| Area of operation        | Pond and lake   | Pond/ wetlands  | Ponds/ lakes/river   | ponds   |   |  |
| Material used            | Nylon   | Bamboo strips<br>Height- 50-55cm, bottom opening<br>diameter 40-50cm; top opening<br>diameter -13-15cm  | 5-9 prongs of steel<br>and bamboo pole of<br>3-4 meter; rope.  | Nylon or cotton twine,<br>and iron hook   |   |  |
| Manpower required        | 1 no.   | 1 no.   | 1no.   | 1no.  |   |  |
| Longevity                | 1-2 yrs   | >5yrs   | 3-5yrs   | 2yrs  |   |  |
| Peak season              | Throughout the year   | Dry season(November-April)  | Throughout the year  | Summer  |   |  |
| Bait used                | No bait   | No bait   | No bait  | Earthworm, maida paste,<br><i>hentak</i> , paste of boiled rice.  |   |  |
| Species caught           | Minnnows, prawn, <i>Channa<br/>sp.</i> , <i>Anabas testudineus</i> ,<br><i>Clarias batrachus</i> , etc.   | IMC, Exotic carp, <i>Notopterus<br/>notopterus</i> and <i>Channa<br/>striatus</i> , etc.  | <i>Channa striatus</i> ,<br><i>Labeo rohita</i> ,<br>Common carp, Exotic<br>carps, <i>Wallago attu</i> , etc.                              | <i>Clarius batrachus</i> , <i>Channa<br/>striatus</i> , <i>Labeo rohita</i> ,<br><i>Monopterusuchia</i> , etc   |   |  |
| 3. Traps Fishing         |   |   |  |   |   |  |
| Particulars              | <i>Taijeps</i> / Box trap   | <i>Kabo-Lu</i>  | <i>Sora-lu</i> /<br>Conical Trap   |   |   |  |
| Area of operation        | Lakes/Ponds   | lakes and ponds   | river ,lake and paddy field  |   |   |  |
| Material used            | Bamboo splits of 3-4mm diameter   | Bamboo splits   | Season bamboo splits and cane strips   |   |   |  |
| Dimensions               | L×B×H(16× 15-20×40-50)<br>Width of valve: 4-5 cm.<br>Gap between splits: 0.5-0.7cm  | L×B×H(4× 50-56×45-50)<br>Width of valve: 4cm.<br>Gap between splits:2-3mm   | Length : 30- 36 cm<br>Width of valve: 100-120cm  |   |   |  |
| Manpower required        | 1no.  | 1no.  | 2no.s  |   |   |  |
| Longevity                | 2 yrs   | 2 yrs   | 3yrs   |   |   |  |
| Peak fishing season      | Throughout the years  | Rainy season  | Rainy season   |   |   |  |
| Bait used                | Earthworm, kitchen waste  | No bait   | May or may not used  |   |   |  |
| Species caught           | Air breathing fishes  | catfishes   | Small air breathing fishes and<br>weed fishes  |   |   |  |





Figs. 2-13—Operation of *Nupi-il*; 3—Operation of *il-Jao* in lake; 4—Setting of *Lang*; 5—Setting of *Lang*; 6—Moirang lang /Encircling net; 7—Operation of *longtharai*; 8—Plunge cover basket and its operation; 9—Long/spear fishing; 10—*Khoi*-Hook used for pole line; 11—Setting of bamboo basket trap; 12—*Kaba-lu*/tubular trap; 13—*Sora-l*—Table 1-Particulars about the fishing methods in central valley region of Manipur India

**Khoi choppa / Pole line**

This type of fishing method is operated starting from children to old aged fishermen. It consists bamboo pool or splits with a length of about 1.5-2 m or even more as per the convenience of the fishing ground (Fig. 10). A nylon or cotton twine of about 2-3 m length with a baited hook at one end is tied at the tip of the pole. A small float or stick of around 3-4 cm length is attached in the middle of the twine which acts as an indicator for entanglement of fish. This float will move when fishes are hooked. For using this gear in running water a lead weight is attached to the line at about 10-15 cm above the hook in order to avoid the line to be drifted away and to maintain proper hanging inside the water. Baits used in the hooks are earthworm, maida paste, *hentak*, paste of boiled rice, etc. Species caught are *Clarius batrachus*, *Channa striatus*, *Labeo rohita*, *Monopterus albus*, etc.

**Fishing Traps****Tajeps / Bamboo basket/ Box trap**

It is a rectangular traps made from seasoned bamboo splits fastened by polythene straps (Fig. 11). The trap is operated in the lakes and ponds by setting among the weeds in rows. They have longitudinally open mouth at one side with non-returnable longitudinal valves fixed in the mouth pointing the valve stick inwardly. Three-fourth of the box are kept set in a row facing different directions or as desired by the fishermen.

According to Bira Singh, some of the commonly accepted norms and procedures by the traditional fishermen while setting of traps in lake are as follows<sup>9</sup>.

1. No fisherman should set gillnet in front of box traps.
2. No surrounding nets or gillnets can surround any other fishing gear set by other fishermen.
3. Fishes which are already hooked, but trapped in the box cannot be taken by other fishermen who are fishing nearby with same gear.
4. Identification mark, locally called "looyek", on the trap should be there.

**Kabo-Lu / Tubular trap**

This trap has valves at both ends and there is opening in the middle of the trap which is relatively larger in size and tapering towards both the top ends (Fig. 12). It is made of bamboo splits and the openings are made in such a way that fishes once

entered are not able to come out again. It is fastened by cane / polythene straps. This is set among the thick aquatic weeds or in the water channel / outlet from the ponds. The catfishes are the main species which are caught in this tubular trap.

**Sora-lu / Conical Trap**

"Sora-lu" is the biggest trap among all the traps operated in Manipur. This trap is mainly used for catching small fishes like air breathing fishes and weed fishes. The trap is mainly sets near the mouth of river and in lakes where the water currents are mild. Further, the trap is also used in the paddy field during rainy seasons during the month of June to August. It consists of two parts, bigger one is of conical shaped tapering with circular end in which two detachable ropes are tied at opposite directions and the smaller one is given a tubular shape with tapering towards the end (Fig. 13). The former part serves for congregation/aggregation and the later act as fish collecting cod end. The two parts are joined together by a detachable rope which is tied at the mouth of the smaller one.

During operation, the trap is placed in a pre-selected area. The placement of the trap has to be done by fixing two poles at opposite directions where two ropes of the trap are to be tied. In the mouth of the second part, the tapering circular end of the first part is inserted and made it continuous one. The rope attached to the trap is again tied to the pole in order to protect it from being drag by water current. Operation is carried out during evening, the trap is kept for whole night and in the early morning fishes are harvested by detaching the smaller part of the trap. In this way the operation of the trap can be continued for whole day.

**Conclusion**

Fishermen of the central valley use wide array of fishing methods to catch fishes, for their livelihood and nutritional security. The present fishing practice doesn't pose any destruction to natural biodiversity. The indigenous knowledge could serve as entry points into the sustainable utilization and management of natural resources. This could be achieved through the exploration of the indigenous technical knowledge of the local people and integrating useful aspects into the modern technologies. And also, welcoming the indigenous experts to collective problem-solving endeavours will be a good step towards successful sustainability planning.

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