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Fishing Techniques Used by the Fisherwomen of Loktak Lake Manipur

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Abstract: ***The objective of the study is to study the fishing equipments used by fisherwomen in 3 villages and 1 island located in and around Loktak Lake, Manipur. This study utilizes both primary and secondary sources of data, with a sample size of 400 respondents. The study was conducted with a 95% confidence level and a margin of error of 3%. Semi - structured interviews were carried out over the academic year 2019–2020. The fisherwomen in the surveyed region utilized 54 percent of lift nets (Nupi El) and dip nets (El Jao), 40 percent of gill nets (Lang), 1.75 percent of plunging cover baskets (Longthrai), 0.75 percent of spears (Long), and several other methods. However, in modern methods, the utilization of gill nets, commonly referred to as 'Lang', is the most efficient fishing technique, with a 100 percent adoption rate among women, resulting in high productivity. Consequently, women have made substantial contributions to the development of Manipur's fishing sector.***

Keywords: Women contribution, livelihood, Loktak Lake, Tools and Techniques

1. Introduction

The women of Manipur play a large role in fishing activities, yet their engagement has not been recognised in government statistics data or academic endeavours. Nevertheless, their involvement in fishing activity considerably contributes to the economic progress of the state. Kumar, et. al. (2003) state that women possess extraordinary strength, which is currently inactive. If the women of Asia become awake and conscious, they can impress and astonish the entire globe. Mahatma Gandhi, on the 18th of July in 1947. Furthermore, India ranks as the second largest fish producer globally, following China. India's fishing productivity in the year 2023 is 9, 045, 892 metric tonnes, with over 50 million people (90 percent in marine and 70 percent in aquaculture) relying on fishing as their major source of income. The fishing sector plays a key role in producing jobs, generating foreign exchange revenues, and contributing to India's economic growth (FAO, 2022; Bhargavi, et al., 2020).

Due to its freshwater nature, Loktak Lake in Manipur supports a huge population with fishery resources. Tools maximise fish capture for commercial use, guaranteeing a living. Manipur's plains rarely have huge fish, especially in lakes and reservoirs. Many freshwater fish species live in Manipur's lakes, ponds, rivers, streams, and marshy swamps. Knowing how fishing gear helps catch fish from their native habitats is essential. Our fishing strategies and devices are based on our ancestors' experience and expertise. To capture fish in their native environment, fishermen create and build their fishing gear from local materials. Because they use cheap local materials, these fishing gears are cheap. Fishing gear is adapted to their size, species, and environment. Traditional fishing equipment has been updated with modern materials. To prolong life, woolen nets have been replaced by nylon nets and bamboo or wooden handles with fibre, plastic, or iron handles. Fishermen expertly use numerous fishing equipment and methods for fish cultivation and management. Thus, this lake is considered a 'lifeline' (Census of India, 2011).

1.1 Objectives

The study aims to document the fishing equipment's used by fisherwomen in Loktak Lake, Manipur.

1.2 Data Base and Methodology

The study used primary data. Data was collected in 2019 - 20. The study's goals were met through structured face - to - face interviews using questionnaires.400 fisherwomen from 3 lakeside villages (Thanga, Phubala, and Ithing) and 1 island (Karang) of Loktak Lake in Bishnupur, Manipur, were sampled using simple random sampling. These respondents were selected based on theutility of different fishing equipment at a certain time and their descriptions of the fish they caught.

1.3 Study Area

The Central Valley of Manipur, India, contains Loktak Lake in Bishunpur shown in figure no.1. Longitudes 93º46' to 93º55' east and latitudes 24º25' to 24º42' north are its coordinates. The North East Region's largest freshwater lake is this one. The 287 sq. km. lake is elliptical, 26 km long and 13 km wide. A 1, 040 sq. km natural catchment surrounds the lake. The indirect catchment is 7, 157 sq. km. This lake also has 63 lesser lakes, two major rivers, Nambol and Nambul, and several smaller rivers and canals that converge into it. Around this lake are 8 towns and 52 villages with around 220, 017 people, 9 percent of Manipur's total population (Devi, S. S. and Moirangleima, Kh., 2022 - 2023).

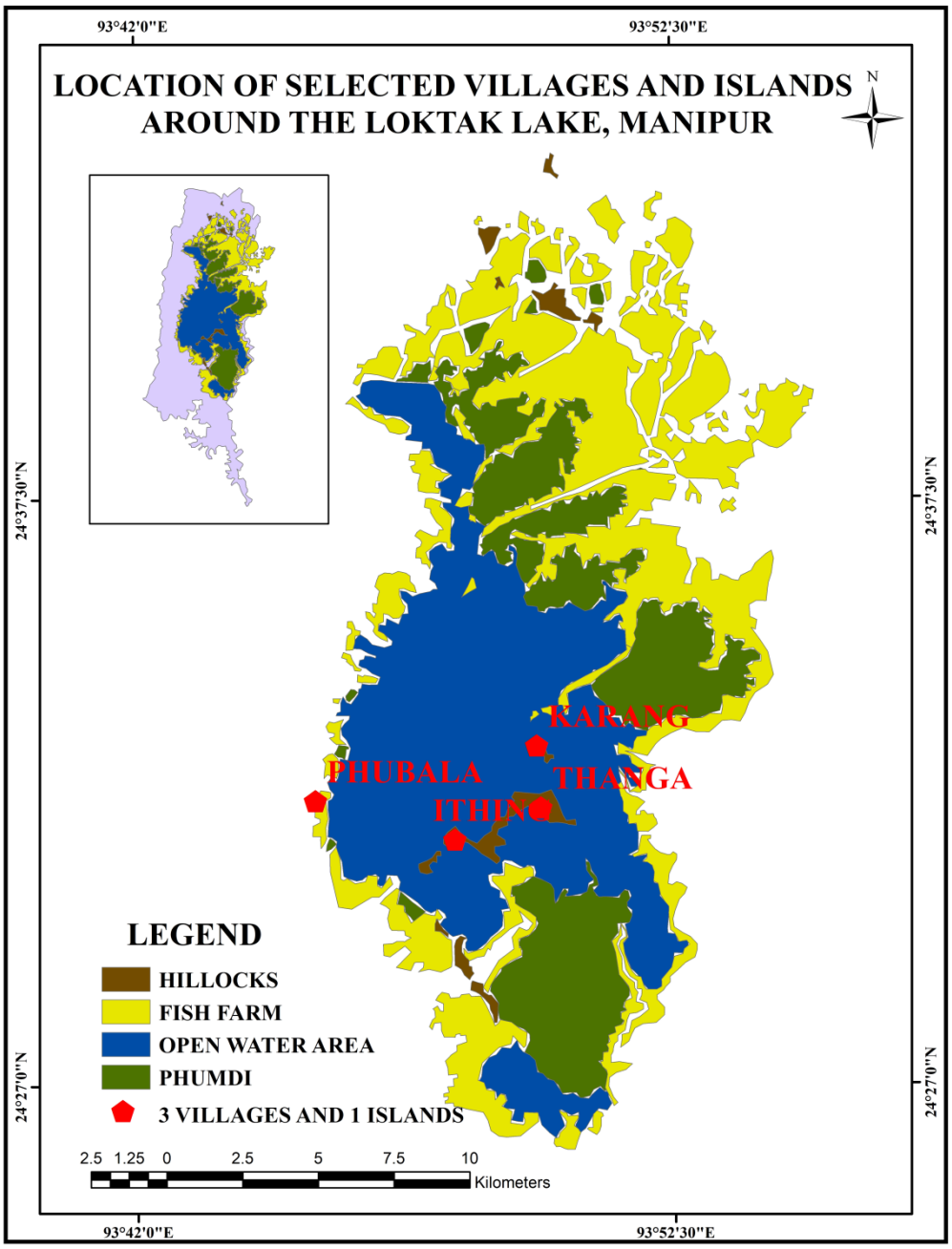


Figure 1

Source 1: CENSUS OF INDIA, 2011; 2. GOOGLE EARTH, 2019; 3. GOOGLE MAP, 2019; 4. SENTINATAL 2A MSSLIC, ESA 2018

2. Result and Discussion

Gill nets were the most efficient fishing gear used by fisherwomen in Loktak Lake, of Manipur (Figure no.2). Subsistence fisherwomen used traditional fishing vessels and equipment and a limited set of contemporary techniques.

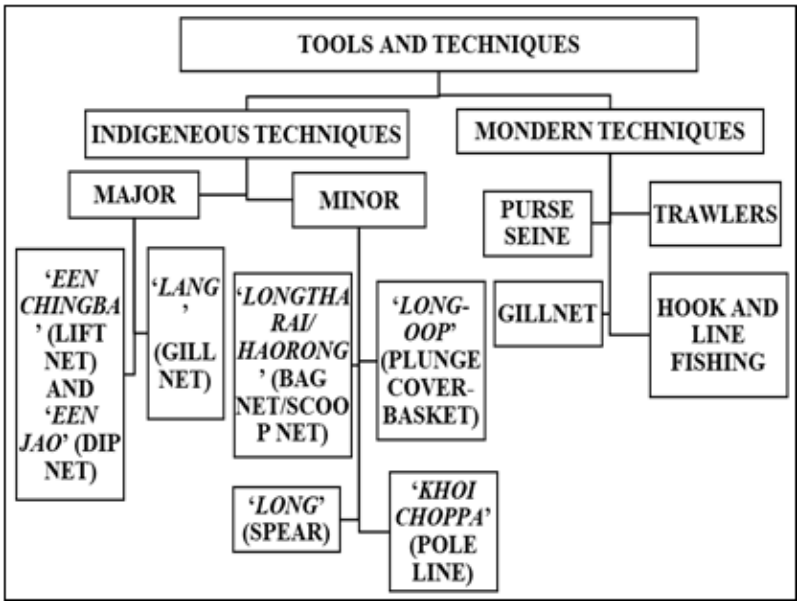


Figure 2
Source: Devi, B. N. et. al, 2013; Ngasepam, R. S. et. al., 2015

Indigenous Techniques
The indigenous techniques employed by these fishers can be categorised into major and minor techniques based on their specific applications, which will be thoroughly examined.

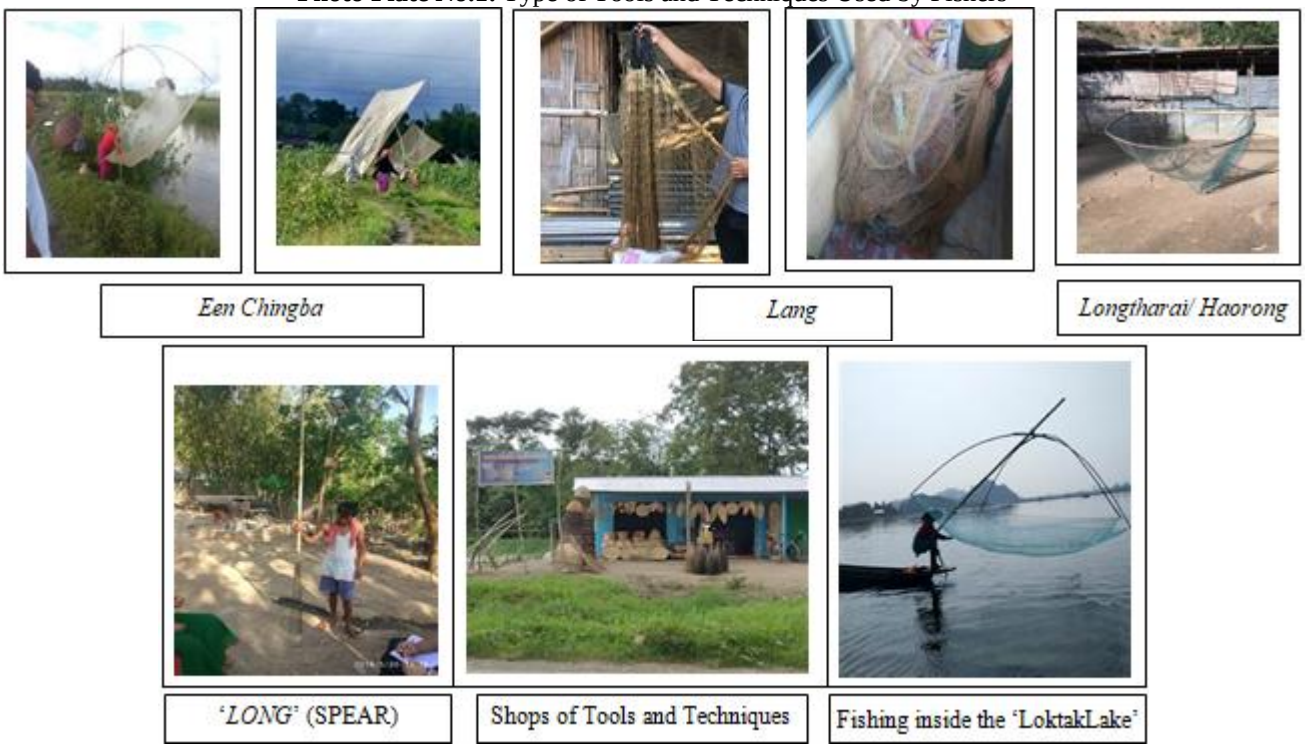
2.1 Major Techniques

2.1.1 '*El Chingba*' (Lift Net) and '*El Jao*' (Dip Net)
The '*El Chingba*' ('*El*' means net and '*Chingba*' means pulling) is a type of rectangular dip - net that is held up by X - shaped bamboo joints known as '*Hangen*' (photo plate 1).

Joint sizes depend on dip net size. Net is held underwater using a hauling rope (Eenching '*thouri*') and bamboo pole ('*poura*'). After submerging the net with bamboo poles excavated on the lake shore or the '*phumdi*' floating on Loktak Lake, the net can be quickly hauled out of the water to catch the fish.

Another one is '*El Jao'* (*El* means net and *Jao* means large), a 15 - foot - long, 30 - foot - wide net. The net's four corners are lifted out of the water and supported by bamboo poles after being lowered. Fish were lured into the net with roasted rice brand, rice brand and oil cake, or local wine remnants. After a few hours or a day, four to six fishermen aboard a floating '*phumdi*' pull up the net and collect the fish shown in photo plate no.2. Of the sampled respondents only 54 percent used this tool shown in table no.1.

Photo Plate No.1: Type of Tools and Techniques Used by Fishers



Source: Based on Field Survey, 2019 - 2020.

2.1.2 '*Lang*' (Gill Net)

The *lang* is a popular fishing tool. Mesh sizes for rectangular gill nets range from 10 mm to 3 mm and 35 mm to 4 mm. They measure 1 m by 4 m to 2.5 m by 6 m. Earthen clay or lead 'Long leek' sinkers are attached to the rope flowing through the net at the bottom to sustain the floating. A rope going through the net is attached at intervals with a *'Long - gom'* rubber sponge or Sing - nang (Erianthus procerus) stems to sustain the floating. The lake is fished with various - sized gill nets. Smaller nets are utilised in shallower lake depths (1–2 metres), whereas larger nets are used in deeper lake depths (2–4 metres). This contraption catches fish, so it cannot escape shown in photo plate no.2. And 40 percent used this tool according to respondents shown in table no.1.

2.2 Minor Techniques

2.2.1 '*Longtharai / Haorong*' (Bag Net/Scoop Net)

This region's indigenous people call scoop nets *'longthrai'*. Many shapes exist, including circles, triangles, and trapezoids. This net is usually composed of cotton or nylon with a mesh size of 2 to 3 mm, a 3 - foot depth, a circular bamboo frame, and a long handle. With this gear, the net is lowered into the water below floating weeds or weed - infested areas from the beach or dugout canoes shown in photo plate no.1. with 2.50 percent of using this tool the sampled respondents shown in table no.1.

2.2.2 '*Long - oop*' (Plunge Cover - Basket)

The bell - shaped basket is made of seasoned bamboo strips called *'Lee'* and has a height of 50 to 55 cm, a foot diameter of 40 to 50 cm, and an entrance diameter of 13 to 15 cm. The dry season is better when the water table is lowest, hence it is mostly used. Only one person needs to use this tool.1.75 percent used this tool according to sampled respondents shown in table no.1.

2.2.3 '*Long*' (Spear)

Thin bamboo splits should be used to make a bowl or saucer fishing device by skilled craftsmen. Net depth is 1.8 to 2 feet, and width is 2 to 3.5 feet. The net has 3–4 mm mesh. To lure fish to the net, the fisherman might throw the spear from the boat or dykes if they see bubbles or movement. This net is commonly excavated in shallow lake areas in autumn and rainy months (photo plate no.1). And of the sampled respondents, 0.75 percent used this tool shown in table no.1.

2.2.4 '*Khoi Choppa*' (Pole line)

To attract fish, metal hooks with strong threads and bamboo branches of various sizes are dipped in water with baits like small fish or Earthworm, maida (flour) paste, hentak, and boiling rice paste. Fish are caught by pulling on hook threads after swallowing bait. This 'Khoi Choppa' is made of 1.5 - 2 m bamboo splits or pools. A nylon or cotton thread and hook are attached to the pole for baited fishing of 2 - 3 m. A small float or stick (3–4 cm) is attached to the twine centre to indicate fish entanglement. Young and old fish this way (Devi, B. N. et. al., 2013; Ngasepam, R. S. et. al., 2015; Ngasepam, R. S. et. al., 2013). And to the respondents, only 1 percent used this tool shown in table no.1.

2.3 Modern Techniques

Gill nets, bay nets, cast nets, drift nets, and circular netting are examples. High - tech tools are also used. For instance, commercial fishing uses motorised gear. Shorter fishing expeditions of 2–3 days make diesel marine engine ships and trawlers appropriate for transporting and storing catches. Some points are discussed below,

2.3.1 Purse Seine

The most common method, purse seine fishing, involves identifying a group of fish and encircling them with a net. Using a crane or smaller watercraft, the net is returned to the fishing vessel. Catches are intentionally placed to encircle fish. The net's ends are then tied with a drawstring. The purse seining method targets a specific school of fish immediately after identification, resulting in a very low catch rate.

2.3.2 Trawlers

Dragging a large net with an open mouth along the ocean floor is called trawling. Small businesses are unlikely to own trawlers, which are the most expensive fishing vessels. Typical trawler fish holds are large enough to hold much of the catch. Tilapia, catfish, and other large fish can be transported by these ships many miles from their mooring.

2.3.3 Gillnet

Gillnets have holes drilled into them to simulate walls. It draws many fish that swim into it unaware and are hooked. Less developed places have more gillnets because they can be operated by smaller vessels or by hand.

Gillnets still account for most accidental catches, notwithstanding their decline. Gillnets can be handled sustainably when salmon cluster at choke points that can be walled off without harming other species. Gillnets are called drift nets because they flow with the stream. Similarly, by catch is a major issue. Till now according to the sampled respondents regarding the modern techniques, 100 percent of respondents used this type of tool because these fisherwomen can only afford one and other modern tools are unavailable in Manipur shown in table no.1.

2.3.4 Hook and line fishing

Line fishing called 'longline' uses hooks periodically throughout the line. They can exceed 10 km. The type of longline fishery can dramatically affect by catch. Longlining concerns usually occur in surface fisheries because seabirds, sharks, and turtles can get entangled while eating baited hooks. Fisheries management in nations with higher fishing capacity requires larger, more specialised hooks to avoid unintended bycatch, allowing stronger rules. Fishermen use a 'pole and line' to catch fish individually. Therefore, bycatch is acceptable. (SF, 2022; MSC, 2022).

Table 1: Tools and Techniques Used by Fisherwomen

INDIGENOUS TECHNIQUES		
Tools	Local	**Average (%)**
Lift Net and Dip Net	*'El Chingba' and 'El Jao'*	54.00
Gill Net	*'Lang'*	40.00
Bag Net/Scoop Net	*'Longtharai/Haorong'*	2.50
Plunge Cover - Basket	*'Long - oop'*	1.75
Spear	*'Long'*	0.75
Pole line	*'Khoi Choppa'*	1.00
Total		**100.00**
MODERN TECHNIQUE		
Tools	**Average (%)**	
Purse Seine	0.00	
Trawlers	0.00	
Gillnet	100.00	
Hook And Line Fishing	0.00	
Total	**100.00**	

Source: Based on Field Survey, 2019 - 2020.

3. Conclusion

Fisherwomen in the 4 selected respondents use a variety of fishing methods to make a living. Fisheries are tied to Traditional Knowledge circulation across generations. Women cannot use most contemporary tools, yet conventional ways may eventually disappear. However, combining traditional learning with modern science may boost the local community's economic status in the state. Whereas, involving indigenous experts in teamwork to solve tasks would also improve long - term planning. Thus, fisherwomen of the sampled area used lift nets (*Nupi el*), dip nets (*El Jao*), gill nets (*Lang*), drag nets (*Moonamda*), plunging cover baskets (*Longthrai*), spears (*Long*), and others. But gill nets, locally known as '*Lang*', are the most productive fishing tool, as all women utilise them.

Hence, women have contributed significantly to Manipur's fishing industry's growth.

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