The Pharma Innovation Journal 2023; SP-12(10): 191-195

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(10): 191-195

www.thepharmajournal.com
Received: 09-08-2023
Accepted: 12-09-2023

Tandel Mitul
College of Fisheries Science, Kamdhenu University, Navsari, Gujarat, India

Tandel Bhavika
College of Fisheries Science, Kamdhenu University, Veraval, Gujarat, India

Tandel Mayur
Senior Technician, CPF India Private Ltd., Surat, Gujarat, India

Parmar Jeet
Senior Research Fellow, College Fisheries Science, Kamdhenu University, Navsari, Gujarat, India

Tandel Lata
ICAR-Central Institute of Fisheries Education, Versova, Mumbai, Maharashtra, India

Tandel Bhavyata
College of Fisheries Science, Kamdhenu University, Veraval, Gujarat, India

Timbadia Shriyas
Department of Biological Science, California State University

Corresponding Author:
Tandel Bhavika
College of Fisheries Science, Kamdhenu University, Veraval, Gujarat, India

Exploring traditional fishing gears and methods in selected villages of Navsari district, Gujarat

Tandel Mitul, Tandel Bhavika, Tandel Mayur, Parmar Jeet, Tandel Lata, Tandel Bhavyata and Timbadia Shriyas

Abstract
Small-scale commercial or subsistence fishing is an example of traditional fishing practices. The local community uses traditional fishing techniques. A wide variety of gears were observed and surveyed, including gill nets (under various names), cast nets, fixed bag nets, encircling gear, crab traps, dol nets, and stick-trap techniques (for mudskippers) and their operation methods were recorded from the selected villages (Krushnapur, Kaniyet, Ranabhatha, and Dholai) of Navsari district. Fishermen in these villages possess important knowledge about the greatest fishing spots, the ideal times to capture a variety of species and the best methods for doing so. The Navsari District in Gujarat is home to several indigenous fishing communities that have relied on fishing as a means of sustenance for generations. However, with changing times and modern fishing techniques, traditional practices have faced challenges. This paper aims to shed light on these indigenous fishing practices, highlighting their cultural significance, sustainable nature, and potential for preservation and promotion.

Keywords: Traditional fishing, fishing gears, fishermen, Navsari district

1. Introduction
A prominent type of fishing is artisanal fishing, which is described as small-scale fishing in which the fisherman's wealth lies in his fishing gear (boats, motors, nets, and lines), which are prone to rapid depreciation and loss. Many of these fishermen employ traditional methods and gear (Quinn, 2011) [8]. Techniques range from the extremely simple, such as manually collecting or gleaning beach invertebrates, to sophisticated and costly techniques, like purse seining for tuna. Both commercial and artisanal fishermen employ a wide variety of fishing equipment (King, 1995) [5].

Coastal communities in India engage in a variety of fishing and non-fishing activities, and the majority of their income is derived from open-access/common-property resources (Bhatta, 2003) [3]. Efficient fisheries development requires research on traditional fishing rights and the consideration of strategies to promote the more efficient use of currently available fishing equipment and techniques. The relevance of subsistence fisheries has long been recognized (Bhilave, 2018) [4].

According to Data published by CMFRI, there are about 3,332 fishing villages in India. The production from the marine sector has progressively increased by nearly six times during the past 50 years. Much of the fishing efforts are concentrated on the shelf and fall within 2-200 m depth. Analysis of the sectoral trend indicates that the mechanized sector accounted for 68%, motorized 25%, and only 7% was artisanal by yield. Only 7% of the contribution from the artisanal sector yet the total number of non-motorized fishing crafts employed in the sector is nearly 100,000 (Sathiadhas *et al.*, 2014) [7].

Traditional fishing techniques have not been thoroughly studied in terms of their functionality and the rationale behind their use. The indigenous fishing techniques and equipment used to catch squid and cuttlefish along India's southwest coast are widely documented (Mohan, 1983), but there have been no recent attempts by scholars to describe the fishing gear used in the Gujarat region. Therefore, an effort has been made to provide information about the local traditional fishing expertise in the study area.

2. Materials and Methods
The research took place in four distinct villages within the Navsari district, namely Krushnapur, Kaniyet, Ranabhatha, and Dholai. The purpose of the study was to document the traditional knowledge pertaining to indigenous fishing equipment and techniques in these aforementioned villages.

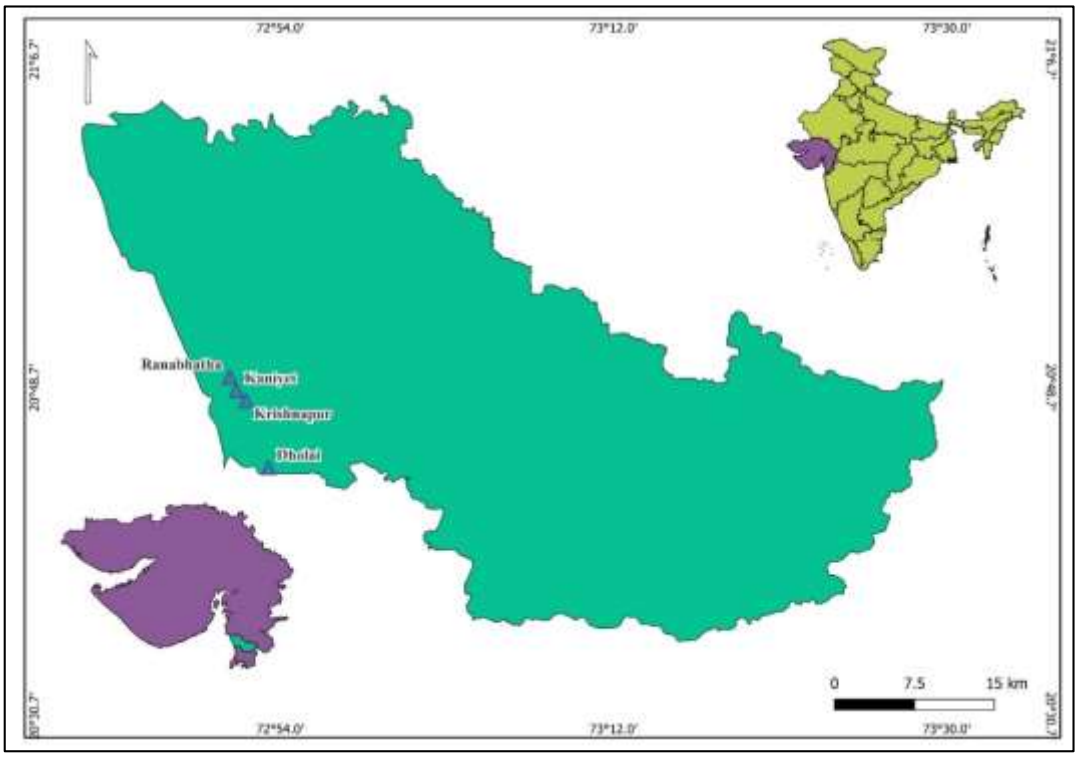

Fig 1: Study areas (selected villages) of Navsari district, Gujarat

The data regarding various traditional fishing techniques and their implementation were gathered through direct interactions with fishermen and fisherwomen at their locations, supplemented by field observations. The fishermen were interviewed with specific inquiries regarding fishing methods, such as the local names and prices of nets, the types of species caught, the labour involved, and the process of operating the nets.

3. Results and Discussion

In the current survey, a total of 8 different traditional fishing gear were observed. The primary fishing gears and techniques utilized by the fishermen in the creeks and other water bodies of their villages included gill nets (known by various names), cast nets, fixed bag nets, encircling gear, crab traps, dol nets, and the stick-trap method (specifically designed for catching mudskippers). Table 1 provides a comprehensive list of these gears, along with the species caught, local names, and the fishermen involved in fishing activities.

3.1 Kadar net (Encircling gear)

It is a fishing technique that involves the use of a gill net to capture fish. The Kadar net typically measures 25-30 meters in length and requires the participation of two to three individuals. It is primarily employed in near-shore waters.

Operation: In the fishing process, a circular net is employed, with one fisherman grasping one end while another fisherman holds the opposite end. This configuration allows the net to be encircled, creating a closed area. The circular shape of the net, combined with the coordinated effort of the fishermen, facilitates the effective capture of fish in a controlled and targeted manner.

3.2 Zaliyu (Crab trap)

It is a specific type of indigenous trap primarily designed for catching crabs. It is constructed by attaching a nylon net to a round-shaped metal wire, with the net typically having a diameter of approximately 50-60 cm.

Operation: The operation of the Zaliyu trap revolves around its strategic placement in areas known to be inhabited by crabs. To attract the crabs, a bait consisting of small prawns and trace fishes is strategically positioned at the center of the net. As the crabs venture closer to the bait, they inadvertently navigate into the lower part of the net, which acts as a confining chamber.

The well-designed structure and mesh size of the net prevents the captured crabs from escaping. Once entrapped, the crabs are unable to extricate themselves from the net, facilitating their secure capture. The trapped crabs transfer into a specialized crab collection basket known as the "Todiyu." This basket is specifically designed to safely contain the captured crabs during transportation and storage.

3.3 Chhogiyo (Cast net)

Cast net is traditionally handwoven using cotton thread or nylon thread with a diameter of one millimeter or more. The net takes on a circular shape and typically has a diameter of two meters when intended for use by a single fisherman.

Operation: To operate the Chhogiyo, the fisherman secures the free end of the throwing rope to his left wrist (assuming the fisherman is right-handed). Next, the fisherman gathers half of the net over the left forearm, allowing the open end with the attached weights to hang freely. By grasping the open end in the right hand and aided by a quick body turn from left to right, the fisherman flings the spread net over the water. Once the net settles, it is slowly pulled towards the fisherman, causing the weighted base of the net to converge at a single point, effectively confining the fish within. The fisherman then carefully gathers the net, along with the captured fish, onto his arm. The captured fish are subsequently removed and placed into a bamboo basket.

3.4 Pie Method (Stick Trap method)

The Pie method, also referred to as the stick-trap method, is

an indigenous fishing technique that holds significance in capturing mud-skippers. This traditional method involves the utilization of a wooden stick meticulously tied with nylon thread, which is expertly crafted by local fishermen with extensive knowledge of the fishing practice.

Operation: The operational procedure of the Pie method unfolds during low tide when experienced fishermen and fisherwomen deliberately target locations known for their high abundance of mud-skippers.

To initiate the trapping process, the fishermen employ a delicate technique of gently scooping up the wooden stick in close proximity to the mud-skippers' burrows. Having secured the wooden stick, the fishermen proceed to construct a trap using the flexible nylon thread. The thread is deftly maneuverer and meticulously arranged, forming a bow-shaped net that encircles the entrance of the mud-skipper burrow.

As the mud-skippers cautiously emerge from their burrows, they unknowingly encounter the meticulously woven nylon thread. The nylon thread acts as a confining barrier, preventing the mud-skippers from evading capture. With a gentle and careful approach, the fishermen retrieve the trapped mud-skippers from the trap while ensuring minimal harm or damage to the captured individuals. Traditionally, a specialized container known as a "Todiyu" is employed for the safe transportation of the collected fish.

3.5 Vidi (Gill net)

Vidi, scientifically referred to as a gill net, is an active fishing method employed by fishermen to efficiently capture fish. This technique involves the utilization of a net comprising small meshes that are tightly secured around a durable rope. The construction of the net allows for the effective entrapment of fish species.

Operation: During the operational phase of Vidi, it is customary for two fishermen to engage in this fishing method, working in tandem within close proximity to water bodies. To initiate the fishing process, the fishermen affix bamboo poles on both sides of the net, serving as support structures. These poles contribute to the stability and maneuverability of the net as it is deployed into the water. Once the net is properly prepared, the fishermen strategically traverse through the water currents, carefully navigating the aquatic environment. As they move, the net actively functions to entangle and capture fish that come into contact with its small meshes. This active nature of the gill net enhances its effectiveness in trapping targeted fish species.

Throughout the fishing operation, the net diligently captures fish, ensuring a successful catch. By moving through the currents with precision, they optimize the chances of capturing a diverse range of fish species. Upon completion of the fishing activity, the fishermen collect the captured fish. The fish are carefully placed in the Todiyu, which ensures their safe transportation and minimizes the risk of damage or injury.

3.6 Vavani (Gill net)

It is a gill net commonly employed by local fishermen in nearshore areas, and encompasses three primary variations: surface, mid-water, and bottom-set gill nets. This gill net consists of a single netting wall and is positioned in the water vertically, facilitated by a float line and ground-line. Anchors or weights are used on both sides to maintain the net's stationary position. The size of the nets varies between 50 meters and 500 meters, featuring mesh sizes ranging from 25 to 130 millimeters.

Operation: Fishermen deploy the Vavani net into the water during low tide, ensuring it remains open vertically with the assistance of floaters and sinkers. As the high tide ensues, fish are entangled in the net when they approach its vicinity. During low tide, the fishermen return to the location and gather the captured fish from the net, transferring them to a basket.

In these villages, fishermen employ various types of gill nets tailored to target specific fish species, utilizing different mesh sizes based on the size of the fish. The following gill nets are used within the villages, each associated with specific names and targeted fish species:

- **Ramchani jal:** Utilized for capturing threadfin fish, (Rawas, *Polinamus indicus)*.
- **Mag net:** Employed to catch Bombay duck, commonly referred to as Bumla (*Harpadon neherius)*.
- **Jarva:** Primarily used for capturing Pomfret, locally known as Paplet (*Pampus argenteus)*.

3.7 Gholiyu/ Kadhiya (Fixed bag net)

This net comprises a single netting wall and is positioned vertically in the water using floaters, sinkers, and an iron rod (Nikhara) for stabilization. This net is characterized by its large mesh size.

Operation: The Gholiyu/ Kadhiya fishing method involves the strategic placement of a bag net at a distance of approximately 5-6 kilometers from the shore or within a creek/bay. To ensure stability, the net is secured in place using two iron rods. The timing of the net deployment is crucial, as it is set during low tide.

Once the net is properly positioned, the rising tide facilitates the accumulation of fish within the net's codend. As the water level increases, the net becomes immersed, effectively trapping the fish. When the tide reaches its peak, the fishermen retrieve the net, carefully hauling it in. During the retrieval process, the catch, which has accumulated in the codend, is carefully collected. The captured fish are then transferred and stored in a container known as a "Khola." This container serves as a temporary holding space, facilitating the preservation and transport of the captured fish.

3.8 Dor (Dol net)

The Dol net, a variation of the Gholiyu net, is characterized by its longer length compared to the standard Gholiyu net. This particular net is widely used for Bombay duck and other associated small species fishing, with its operation primarily conducted during the months of October to December when the abundance of Bombay duck is higher. This fishing method involves securely anchoring the Dol net at a depth ranging from 70 to 80 feet in the water column. To maintain the net's stability, it is firmly fastened using iron rods.

Operation: During the operation, as the Dol net is skilfully deployed, it acts as an effective capture mechanism, ensnaring both the targeted Bombay duck and other small species that happen to come into contact with the net. The entangled fish are subsequently collected and carefully extracted from the net's codend. This codend serves as a containment area, preventing the captured fish from escaping during the retrieval process.

From the Ukai reservoir, seven different conventional gear types have been found. Gill nets, cast nets, drag nets, hook-and-lines, pole-and-lines, scoop nets, and hand nets were

among the many different types of gear listed (Bhakta *et al.*, 2016) [1]. There were found to be 12 different traditional fishing methods in the Narmada Estuary, Gujarat (Bhakta *et al.*, 2017) [2].

Table 1: Types of fishing gear used in selected villages of Navsari district with a mode of operation and species caught

Sr. no	Name of gear	Local name	Required Manpower	Target Species
1.	Encircling gear	Kadar net	2-3	Mullet, Catfish, and other small fish
2.	Crab trap	Zaliyu	1	Crab
3.	Cast net	Chhogiyo	1	Mixed catch
4.	Stick-trap method	Pie method	1	Mud skipper
5.	Gill net	Vidi	2	Small shrimp and fish
6.	Gill net	Vavani	1	Mullet
		Ramchani jal	2-3	Threadfin
		Mag net	3	Bombay duck
		Jarva	1-2	Pomfret
7.	Fixed bag net	Gholiyu/ Kadhiya	2-3	Mixed catch
8.	Dol net	Dor	2-3	Bombay duck

Kadar net (Encircling gear)

Zaliyu (Crab trap)

Chhogiyo (Cast net)

Todiyu (Fish/crab-collection basket)

Pie for catching mudskipper

Vidi (Gill net)


Kadhiya net (Fixed bag net)


Vavani (Gill net)


Goliyu net (Fixed bag net)


Ramchani jal (Gillnet)


Dor net (Dol net)


Jarva (Gillnet)

Fig 2: Types of gears used in selected villages of Navsari district

4. References

1. Bhakta D, Manna RK, Meetei WA, Solanki JK, Sah RK. Traditional fishing crafts and gears of Ukai reservoir, Gujarat, India. International Journal of Fisheries and Aquatic Studies. 2016;4(4):142-145.
2. Bhakta D, Meetei WA, Vaisakh G, Kamble S, Chanu TN, Das SK. An Account of Indigenous Fishing Gears of Narmada Estuary, Gujarat, India. Journal of the Indian Society of Coastal Agricultural Research. 2017 Jan 1;35(1):76-81.
3. Bhatta R. Socio-economic issues in fisheries sector in India. In: Kumar, A., Pradeep, K. K., & Joshi, P. K. (Eds.), A Profile of People, Technologies and Policies in Fisheries Sector in India. 2003 Mar:17-42.
4. Bhilave MP. Traditional fishing methods of Kolhapur district. International Journal of Fisheries and Aquatic Studies. 2018;6(6):368-71.
5. King MG. Fisheries biology, assessment, and management. Blackwell Publishing. Fishing News Books, Oxford; c1995. p. 341.
6. Mohan Rajan KV. Some indigenous fishing gears and methods for squids and cuttle fishes along SW coast of India. Seafood export Journal. 1983;15(6):19-30.
7. Sathiadhas R, Katiha PK, Shyam SS, Narayanakumar R. Indian Fisheries: The Setting. In: Livelihood Status of Fishers in India. CMFRI, Kochi. 2014, 2015:3-16.
8. Quinn JN. Traditional methods of fishing (Southwest Pacific). The role of food, agriculture, forestry and fisheries in human nutrition. 2011;2:140-161.