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## Traditional fishing crafts and gears of Ukai reservoir, Gujarat, India

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### Abstract

The present study deals with the Indigenous technical knowledge (ITK) related to fishing crafts and gears used in Ukai reservoir, Gujarat, India. Lots of works have been carried out regarding crafts and gears in freshwater sector of India but first kind of attempt has been made to document the crafts and gears used in Ukai reservoir. During the present survey (2014-2015), a total of 5 types of traditional crafts and 7 types of traditional gears being have been encountered from the reservoir. The recorded crafts were plank-built boat, catamaran, tin made boat, rubber tube platform and thermocol raft. Wide varieties of gears were recorded as gill net, cast net, drag net, hook and line, pole and line, scoop net and hand net.

**Keywords:** Ukai reservoir, fishing crafts, fishing gears.

### 1. Introduction

The Ukai is the largest reservoir in Gujarat commissioned over river Tapi is situated at Latitude 21° 15'N and Longitude 73° 35'E has a catchment area of 62255 km<sup>2</sup> and water spread area of 52000 ha at Full Reservoir Level (FRL) with a mean depth of 11.8 m [1]. Department of Fisheries, Ukai District, Gujarat recorded 2327 numbers of traditional fishing crafts from Ukai reservoir. Reservoir fish production of Gujarat state during 2014-15 accounted 21572 t forming 22.72% of the total state Inland fish production [2]. Production from Ukai reservoir alone contributed 9612 t with 44.56% out of the total reservoir production of the state [2]. Total number of fisherman villages supported by Ukai reservoir is around 118 with 14956 active fishers [2]. In the modernization era, the tribal fishers' community uses traditional fishing crafts and gears with certain limitations. For sustainable and judicious fishing, it is very important to understand the existing fishing practices and devices in the region.

Documentation of crafts and gears in freshwater sector of India is scanty in many sectors. Several researchers have studied the fishing crafts and gears in selected inland water bodies [3-6]. Detailed record of fishing crafts and gears in river Krishna documented by Manna *et al.* and fishing nets and traps operated in the middle stretch of Ganga river system reported by Saxena [5, 7]. Documentation of fishing crafts and gear used of northeast India have been studied by several authors [8-12]. Indigenous fishing gears and methods for squids and cuttle fishes along the south west coast of India [13] is well known but documentation of fishing gears and crafts in inland sector of Gujarat region is not attempted by the researchers in recent past. The present investigation was undertaken to document the traditional fishing crafts and gears of Ukai reservoir, Gujarat.

### 2. Materials and methods

The present investigation was carried out to understand different fishing methods followed in Ukai reservoir (constructed across the Tapti River at Ukai village, Tapi District, Gujarat) by using different crafts and gears. The data were collected by personal visit to the different landing sites, covering all three fishing zones viz., lotic, intermediate and lentic of the reservoir in every month during 2014-2015. A scheduled questionnaire was made to collect data mentioning different points like, local name, materials used, person(s) involved in operation, mesh size, method of operation, season of operation, cost, life periods, type of species caught etc. The measurements of crafts and gears were taken out in the field and recorded accordingly.

### 3. Results and Discussion

Ukai is one of the most productive reservoirs in the country among larger reservoir. Regular stocking of Indian Major Carps (IMC) practices in the reservoir to build up carp fishery, since the year 1972. The success of stock enhancement in this reservoir is phenomenal. Catch data of 2013-14 revealed that, major carps contributed 51% of the total production comprised of species like *Catla catla*, *Labeo rohita*, *Cirrhinus mrigala* and *labeo calbasu*. The major carps are not only making bulk share of the total Catches, they represented higher year classes also. The dominant species in the reservoir were *Catla catla*, *Labeo rohita*, *Labeo calbasu* and *Cirrhinus mrigala* among Indian Major Carps (IMC), *Sperata seenghala*, *S. aor*, *Wallago attu*, *Ompok bimaculatus*, *Mystus cavasius* from cat fishes, others were *Systomus sarana*, *Salmophasia bacaila*, *Mastacembalus armatus*, *Tenualosa ilisha* and *Macrobrachium rosenbergii*.

During the present survey (2014-2015), as many as 5 types of fishing crafts and 7 types of fishing gears were encountered. The crafts were documented viz plank-built boat, catamaran, tin made boat, rubber tube platform and thermocol raft. The gears were recorded as gill net, cast net, drag net, hook and line, pole and line, scoop net and hand net. Brief discussion of individual crafts and gears were given below. List of the crafts and gears along with the species caught and Catch per unit effort (CPUE) is given in Table 1.

#### 3.1 Fishing crafts

##### 3.1.1 Plank-built boat / Hodi or Nao

This is locally known as 'Hodi' or 'Nao' and the most common crafts used in Ukai reservoir (Fig. 1). The boat is spindle shape in structure and made by joining good quality wooden plank, generally teakwood with iron nails and screws. The size of the boat varies from area to area and respective fishing methods. The size of the boat varies from 5.3 m × 1.22 m × 0.50 m to 10 m × 1.44 m × 0.51 m. Each boat consists of one wooden or bamboo oar and two wooden peddles and are operated by 2 to 5 fishermen with manually peddling. The cost of construction of the boat is around Rs. 50,000 to 60,000 and needs proper care and maintenance. The bottom of the boat is periodically coated with coal, neem oil and kerosene oil to preserve from foulers and borers. Antifouling and finishing

enamel paints gaining importance in present days to protect the bottom from barnacles. The average life span of such boats is around 15 to 20 years.

##### 3.1.2 Catamaran / Tarapa

It is locally known as 'Tarapa' and made by logs tied together (Fig. 2). The number of logs used at Ukai reservoir varies from 6 to 10 and the logs are tied together by coir or nylon ropes. The size of the craft is about 3.0 m × 0.74 m to 3.8 m × 1.2 m, when tied with 6 to 10 logs respectively. *Tarapa* is operated by one or two fisherman and mainly used for operation of gill nets, hooks and lines and cast nets. Long bamboo pole is used to operate the craft. This craft is operated throughout the year in the reservoir and required minimum maintenance. Cost of construction of such *Tarapa* is around Rs. 2,000 to 5,000 and life span is around 8 to 12 years.

##### 3.1.3 Tin made boat / Nao

Locally called as 'Nao' and once was very popular in the reservoir but is gradually lost its importance as fishing boat (Fig. 3). The size of the boat is around 3.4 m × 1.7 m × 0.42 m and operated by 1-2 man. This boat used to catch small fishes and prawns by using gill net in marginal areas. Cost of the boat is around Rs. 3,000 to 4,000 and life span is 3-5 years.

##### 3.1.4 Rubber tube platform / Tube

Rubber tube locally known as 'Tube' is very popular fishing craft at upper part of Ukai reservoir (Fig. 4). It is a single man operated craft and measured 0.9 m in diameter. Tube is mainly used for operation of gill nets and hooks & lines. Bamboo or wooden made peddle is uses to operate the tube; it needs only periodic air to float in the water with zero maintenance cost. The cost of the *tube* is around Rs. 300 to 500 and life span around 3 to 5 years.

##### 3.1.5 Thermocol platform / Thermocol

Thermocol sheet tied with coconut made coir or nylon rope is also observed to be used as craft in the reservoir. This is single man operated and mainly used to catch prawns in shallow areas. This craft is very vulnerable and need frequent maintenance.

**Table 1:** Types of gears used in Ukai reservoir with mode of operation and species caught

Sl. No.	Name of the gear	Local name	Fishermen involved for operation	Species caught	Catch Per Unit Effort (CPUE)
1	Gill net	Jal/Gill net	1-5	All type of fishes	1.0-15.0 (kg/day)
2	Cast net	Chogia	1	Indian major carps, small fishes	0.2-1.0 (kg/hour)
3	Drag net	Mahajal	6-12	Small weed fishes, juveniles of prawns and fishes	2.0-50.0 (kg/day)
4	Hook and line	Waga	1-3	Cat fishes	0.5-7.0 (kg/day)
5	Pole and line	Gul	1	Cat fishes, small fishes	0.1-3.0 (kg/day)
6	Scoop net	Sorpan	1-2	Small fishes, spawns and juveniles of IMC, prawns and cat fishes	0.2-5.0 (kg/day)
7	Hand net	Jarnia	1	Big fishes	Nil-5.0 (kg/day)

#### 3.2 Fishing gears

##### 3.2.1 Gill net / Jal

This is the most common nets used in the reservoir due to its low cost fishery. It is mainly of three types i.e., surface, mid-water and bottom set gill net and mainly operated during night hours. Gill net consists of single netting wall and kept in water more or less vertically by using float-line and ground-line. The net is set in the surface, mid-water or bottom and also kept stationary by anchors or weights on both sides of the nets.

These nets are very common and popular among artisanal fishers in the reservoir due to its low cost operation. The size of the nets varies from 50 m to 500 m with 25 to 130 mm mesh size. Most common mesh size used in the Ukai reservoir is 50-120 mm with white colour netting thread to keep the net less visible in the water (Fig. 5 & 6).

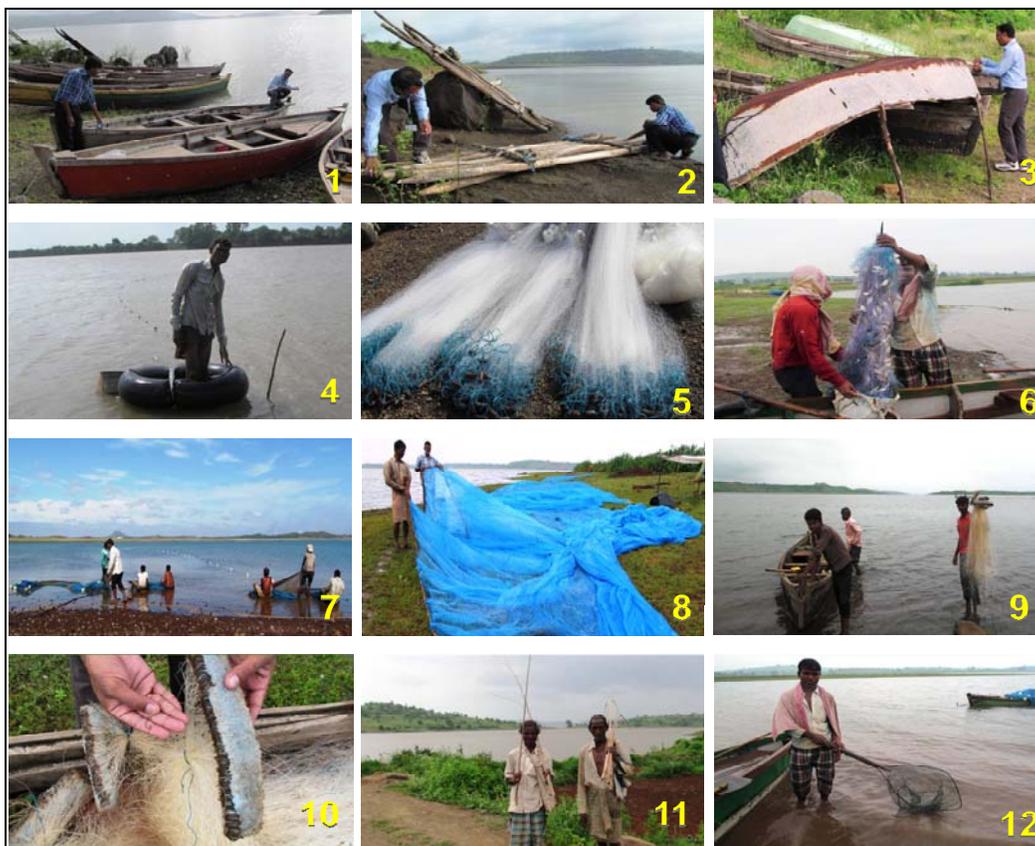
### 3.2.2 Cast net / Chogia

This is the most popular net in Inland water. Cast net is operated in marginal water areas either by using some platform or boats. It is single handed operated net with different mesh and pockets size to catch targeted fishes, prawns, throughout the year.

### 3.2.3 Drag net / Mahajal

Drag net locally known as 'Mahajal' with a very small mesh

size is used in Ukai reservoir, though the practice of such nets is banned in the reservoir. The average length of such nets is 200 m and width 16 m. The head rope of the net is made by coconut coir and foot rope by nylon. The net is usually dragged by a set of 6 to 12 man with targeted species like, *Amblypharyngodon mola*, *Puntius spp.*, minor carps, prawns, juveniles of carps and cat fishes, hilsa juveniles etc. The cost of such drag net is around Rs. 50,000 and can be operated for 4 to 5 years with little maintenance (Fig. 7 & 8).



**Fig 1:** Plank-built boat; **Fig 2:** Catamaran; **Fig 3:** Tin made boat; **Fig 4:** Rubber tube platform; **Fig 5:** Gill nets; **Fig 6:** Fishes harvested by gill nets; **Fig 7:** Mahajal in operation; **Fig 8:** Mahajal; **Fig 9:** Hooks and lines ready to operate; **Fig 10:** Hooks with lines; **Fig 11:** Pole and lines; **Fig 12:** Hand net

### 3.2.4 Hook and line / Waga

Hook and line is reported to be very popular and common means of fishing practice at Ukai reservoir and is operated throughout the year (Fig. 9 & 10). Both fishermen and women are involved in hook and line operation by using boat. Earth worm, small fish, molluscs flesh used as bait to capture the fishes and prawns. The main targeted fishes are *Wallago attu*, *Sperataaor*, *S. seenghala*, *Clupisoma garua* etc.

### 3.2.5 Pole and line / Gul

Pole and line is a traditional fishing methods followed by the tribal fishers. Pole and line consists of a hook attached with fishing line and rod (Fig. 11). Baits are used to lure the fishes; live baits like earth worms, insects, and molluscs muscle are used to catch cat fishes like *S. seenghala*, *S. aor*, *W. attu* etc. during monsoon season.

### 3.2.6 Scoop net / Sorpan

This is also called as push net and made by triangular bamboo frame with small mesh size net, preferably with mosquito net. Small size scoop net is operated by single hand and bigger one

often operated by two men. These net always operated in the shallow marginal area with targeted species like prawns, small fishes etc.

### 3.2.7 Hand net / Jarnia

Hand net with both bamboo splits/strips and steel or iron made handle used in Ukai reservoir (Fig. 10). The diameter of the net is around 0.3 to 0.6 m with nylon meshed and usually used to catch slow moving fishes and crabs. These nets are also used to scoop the big fishes from gill net, mahajal etc.

## 4. Conclusion

Present investigation concludes that traditional fishing practices are still followed by the local fishers even after modernisation of fishing crafts and gears in other parts of the country. While construction of fishing crafts by locally available materials and their respective fishing methods with different fishing gears, ITK is common practice by the local fishers. Such ITKs need to be protected and has to be upgraded with latest modern technologies.

Catching of small juveniles by means of small meshed mahajal and scoop net during monsoon season has to be stopped totally. The poaching of giant freshwater prawn juveniles by using insecticides and small size mesh net are to be strictly prohibited in the marginal and upper stretch of the reservoir. Wanton killing of fishes using destructive ways has to be monitored properly and stopped immediately by conducting awareness and motivational camps. Studies on efficiency of fishing crafts and gears in terms of net selectivity, socio-economic aspects of operation may be considered for further investigation.

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