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## Indigenous fishing crafts and gears of Krishna River with respect to Sangli district of Maharashtra, India

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### Abstract

The present study was conducted to study different types of craft and gears used by local fisher folk within the five selected stations in 105 km stretch of River Krishna in the Sangli District of Maharashtra. Five types of fishing crafts and four gears were identified from the region and their dimensions vary from place to place. The crafts were Coracle, Fibre glass boat, Plastic cans, Thermocol raft, and Rubber tube platform. The gears were Gill net, caste net, hook and line and box trap.

**Keywords:** Fishing craft, Gear, Krishna River, Sangli district

### 1. Introduction

The Krishna is one of the longest rivers of India and flows about 1400 km in length. It originates at Mahabaleshwar in Maharashtra, flows through the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh and meets the sea in the Bay of Bengal at Hamsaladevi in Andhra Pradesh (A.P) [1]. The river Krishna enters in Sangli district approximately an area of 105 Km at 16° 86' 70" N latitude and 74° 56' 70" E longitude and play an important role in ecology and fishery of the district, which are being used for various purposes like fish culture, drinking, irrigation etc. It is largely impounded by number of dams and barrages along its course [2].

It was well described the different types of fishing gears were employed along Behar district of West Bengal [3], Bhopal District of Madhya Pradesh [4] and Nalbari district of Assam [5]. However, limited work has been done on craft & gears of Krishna river of Sangli district Maharashtra. Therefore the present study is aimed to document different types of craft and gear used in Krishna river of Sangli district of Maharashtra.

### 2. Material and Methods

The present study was undertaken to document the craft and gear operated in River Krishna. Keeping in view the nature and requirement of data for the study, exploratory survey research design was considered most appropriate and was used with necessary operational modifications. The study was conducted for a period of March 2015 to Feb 2016.

Five sampling stations of district were selected randomly for the purpose of collecting data for the study. Namely Tambave (A), Takari (B), Bhilawadi (C), Kasba Digraj (D), Haripur (E) situated along the river bank in the district. Actual visit of different selected sampling station was done on monthly basis and the data collection with the help of semi structured interview schedule (Exploratory research survey). Crafts and gear were studied and materials and description were recorded for each sampling station.

### 3. Results and Discussions

#### 3.1 Inland Fishing Craft

The floating and movable platform on which the fishermen operate the gear is known as fishing craft. It may be a simple wooden piece, inflated hide or a raft made of few banana stems to some improvised vessels. Artisanal fishermen operating simple gears may not require any craft as they operate the gear along the shore. The nature of inland fishing crafts varies from place to place and it mainly depends on the geographical and hydrological features of the region.

Five types of fishing crafts were identified from the region and their dimensions vary from place to place. The craft were Coracle, Fibre glass boat, Plastic cans, Thermocol raft, and Rubber tube platform.

### 3.2 Coracle

Coracles are locally known as 'Kyle' (circular) in Sangli district (Fig: 1). Coracles are exclusively used in all rivers in Maharashtra by the migratory fishermen. Modified version of coracle it is fabricated with galvanised plates. Internal diameter varied in a range of 2-3 m with inner depth of around 0.5 m. Apart from being simple and inexpensive, coracle are durable and had very good movability in all types of waters. It is also a versatile craft used for laying and lifting of nets, beside navigation and transport of fish and other materials. Weight of the Coracles ranges from 10-15 kg. Usually two fishermen carry out fishing from a coracle. Like other canoes, oars are used for propulsion.

The Coracle were dominant in the reservoirs of South India like Tungabhadra (Karnataka), Mettur (Tamil Nadu) and Nagarjuna Sagar (Andhra Pradesh) [6]. Sreekrishna and Shenoy has described as main features of coracle as large wide mouthed circular flat bottomed basket, it measures about 4 m in diameter at the mouth, the bottom being smaller, a hide is firmly secured outside to exclude water and used for operation of gill nets, shore seines and long lines [6]. Coracle, a sauce shaped country craft, was one of the major fishing craft used in fisheries of peninsular India [7]. Coracles were prepared by wrapping High Density Poly Propylene (HDPP) sheet over the split bamboo frame with the help of coal tar as an external covering the diameter varied a range of 2-3 m and inner depth 0.5 m. This modified version of coracle was cheaper and durable as the conventional one was made of costly leather.

### 3.3 Fibre glass boat

It was the most common fishing crafts used in different stretches of the river (Fig: 2). Only non-mechanised boats were observed to be used in fishing. Length of fishing boats varied in a range of 3-5 m with 1-1.5 m breadth. No motorised craft was observed either for fishing or fish transport.

According to researcher, tin boats it was made by tin material, the sheet is carved in boat shape and edges are mounted by locally available wooden planks [8]. Below the sheet, a wooden keel is fixed and internally wooden ribs are arranged. The size of boat was 12-15ft length and 4-5 ft wide and 2-3ft depth. It was operated with help of oar. The authors reported that gill nets, cast nets, traps and lines are operated from this type of boat [6]. Plank built canoe was (i) Built with planks which are sewn with coir ropes (ii) propelled by split bamboo oars sails (iii) used in pairs to operated boat seines and individually to operated gill nets and long lines. Manna *et al.* observed length of fishing boats varied in range of 8-10 m with 1-1.5 m breath in Krishna level [6].

### 3.4 Thermocol raft

In upper stretch, especially near confluence of Tambave and Takari, fishermen were observed to use an improvised raft made of thermocol for gill net operation. Slices of thermocols were tied with rope to make a bundle of length 0.4- 0.5 m with a diameter of 0.2-0.3 m. Two such bundles were tied with rope on which fishermen used to seat and go for fishing (Fig: 3).

Similarly, the thermocol raft was used during drag net

operation. Similar description was reported [7].

### 3.5 Plastic cans

For floating during fishing, Fishermen were used empty oil cans or ordinary plastic cans with 5-10 L. capacity. Two such cans were tied together using a piece of rope or cloth, 1 ft. distance kept between two cans (Fig: 4). During fishing, the cans are placed between legs, one in the front and other in the back. Since the upper part of the body remains above water, fishermen are able to operate the net and paddle some distance.

There was no report on the fishing craft of plastic cans, therefore, the result of the present study cannot be compared with the earlier report.

### 3.6 Rubber tube platform

In some stretch of river, the fishermen were observed to rely on another kind of improvised materials. They showed considerable ingenuity in fabricating makeshift out of discarded old rubber tubes (Fig: 5). A wooden platform 1 sq.m. area was placed over the rubber tube and tied tightly with rope. It was mostly observed from Takari station for hook and line operation and also setting and hauling of gill nets. Similar results of rubber tube platform was observed by Manna *et al.* [7].

In the present study 5 types of crafts were encountered in Sangli district. But, Manna *et al.* have reported total 6 numbers of craft as they have studied entire stretch of Krishna river [6].

### 3.7 Inland Fishing Gear

Fishing gears adopted by fish farmers of Sangli district were simple. Simple tools are used by local fishermen for commercial catches of fish. The gears were mostly traditional or indigenes and 4 different types of gear were encountered during the survey of the river. Gears are basically of two types—active and passive. Fishing with active gears rely on the movement of gears, whereas passive gear rely depend on the movement of the fishes. Passive gears were observed to be use traditionally to harvest maximum fishes from the river Krishna.

Traditional way of fishing in this region varies from fishing without any gear like hand picking to gill netting using modern netting materials like Nylon Polyamide monofilament and Polyethylene twisted monofilament. Cast net, lines and different types of traps are also in operation.

### 3.8 Gill nets

Gill net locally known as 'Jali'. The mesh sizes of gill nets were recorded as 25 mm, 45 mm, 55 mm, 65 mm, 75 mm and above for the mesh selectivity studies in these stations. The operation is mainly conducted during night. The fishermen set the gear in the evening and haul up early in the morning. Monofilament was used for the manufacturing of gill net. Thermocol and wooden stick attaching for the floating and also, 1500-2000 nos. of sinkers were used for the sinking purpose (Fig: 6 and 7). Generally, length of the gill net was observed in the range of 400-500 ft. and the height was 15-20 ft. Generally, Thermacole and wooden stick attaching for the floating and also, 1500-2000 nos. of sinkers were used for the sinking purpose.

According to Manna *et al.* different mesh size was observed in the gill net used in the river Krishna [7]. The different mesh size ranging from 16 mm to 250 mm of gill net was recorded

in the entire stretch of the river Krishna in Mahabubnagar district [1]. During monsoon, some of the large mesh size gill nets were used for the catching brooder fish. The small mesh size (25-50 mm) monofilament fixed gill net usually used to catch small species. Gill net with large mesh size (50-160 mm) were used mainly for capturing Indian Major Carps and *Mystus* spp. while nets with small mesh size (10-20 mm) were used for catching catfishes, carps and others in winter and summer. The gill netting is very common fishing technique in shallow and moving water bodies of Tripura [9]. Selective types of gill net with different mesh size were found to be in operation in the study area. Gill nets are generally fixed against the flow of water with bamboo stakes and the catch is collected after 6-8 hrs. In Tripura gill net are widely used fishing gears during the rainy season especially in shallow moving water bodies. They are also known by various names like *fash jal*, *kanke jal*, *chat jal* and current net. They are single walled nets with mesh size 2-12 cm (mostly 5.2-6.2 cm) and length of gear varies from 10-50 m depending upon the width and depth of water bodies. It has been observed that gill nets operated in the study area were mostly made up of polyamide monofilament. Head rope used with this gear is made of polypropylene. The small stones or gravels are used as sinkers. Gill net is usefully operated during the night time, from the evening to the next morning. After 4-6 hrs, fishes are collected from the net. Gill net locally called *Phansi jal* is commonly used to catch fishes by gilling. Fishes which try to pass through it get gilled. Mesh size of gill net varies from 0.6-7.5 cm for different sized target fishes. It is wall netting, rectangular in shape and is provided with a head rope of polypropylene carrying floats and a foot rope with or without sinkers. Gill nets are made up of polyamide monofilament [3].

### 3.9 Cast net

Cast net also known as '*fake jali*'. It was the most commonly observed gear being operated throughout the river. The cast net was generally made of Polyamide multifilament (PA). They were used for catching small size fishes; the length of the gear was generally size varies from 2 to 4.5 m length. Once the net is cast and drawn, the bottom part of it is closed together by the weight of the lead and the fish are entrapped inside the net. The net is hauled up and the fish is emptied. It is made with polypropylene (PP) ropes of 3.0 to 5.0 mm dia. with varying lengths of 6.0 to 8.0 m. The mesh size varied from 15 to 50 mm. In most of the areas uniform size of mesh was used from top to bottom. Thicker twines were used at the top and bottom. The cast net was operated by a single handed was show in Fig 8.

They have observed the cast net being operated throughout the river the obvious reason was that it can be operated single handed [7]. Different mesh and pocket size targeted to particular species were also encountered. Laxmappa and Bakshi have reported similar observation<sup>1</sup>. Furthermore, they added that different mesh and pocket size targeted to particular species were also encountered. These net are not important as it contributes only 2-3 percent of the total catch in the river Krishna. Some fishermen were found operated this net in the river Krishna throughout the year. *Gumau jal* or *Bhanver jal*, known as 'Cast net'<sup>4</sup>. It operated in shallow water near the shore line to catch small fish. It is circular shape looking like umbrella, with a strong rope attached to apex. A number of weights of iron or lead are attached along the margin. The fishermen throws the net skilfully over the water from a boat, in such way that the rope is held in one

hand the net falls on the water surface fully expanded. The cast net or *Chhabi jal* is the main fishing gear of Cooch Behar district [3]. Cast net is small bell shaped net with weight on the periphery and having a string. The principal of this gear is to throw the net in a circle for trapping the fishes of a water body. Cast net operated in rivers, beels and ponds throughout the year.

### 3.10 Hooks and Lines

Long lines popularly known as '*Davan*' were operated in all stations (Fig: 9). Main line is 200-800 m long and is made of PP twine of 2 to 3 mm dia. or PA monofilament of 1 to 1.2 mm dia. Long lines for eel are fabricated with cotton twine having 1.5-2 mm dia. Branch lines having 30-40 cm length are also fabricated with PP twine of 2-3 mm dia. or PA monofilament of 0.6 to 0.8 mm dia. Distance between branch lines varies from 0.6 to 1.5 m. Generally round barbed hook of size ranging from number 8-12 are used depending on the target species.

The hook and line was observed to be used throughout the entire stretch of river Krishna [3]. This was rampant at Satrasala, a deep pool of 16-18 m, due to higher water level and less flow. Using earthworm as living bait and snail-flesh as dead bait, fisherman used to catch prawns from the river. This gear is used throughout the entire stretch of river Krishna [8]. Using earthworm as living bait and snail-flesh as dead bait, fisherman used to catch cat fishes from river. The size of the fish caught up for this was normally 250 gms to 2 Kg and occasionally caught up to 10 Kg or even more size fishes. *Bansi* and *Kanta* is known as "Hook and Line" [4]. Fish is caught by offering a baited hook and the gear is operated by hand. In a hand line one and more hooks are attached at the end of a cotton line (dori) whose other end is tied to a long bamboo stick. The hook and line is an iron hook is usually attached at the end of a line (nylon cord) [3]. This line with attached hook is then fixed to the end of a bamboo stick. Additional arrangement includes a sinker to sink the hook in water and a reel for casting the line. The hooks are provided with baits like earthworm, nymph of beetle, small frog. The hook and line fishing method is operated throughout the year. The hook is also known as *Barshi* [9]. A Nylon line is tied on the tip of bamboo pole. Length varies between 1-3 m. The hook is provided with small live bait. As the name of the fishing hook suggested, that net is specially used to catch riverine fishes.

### 3.11 Box trap

Box traps are locally known as '*Dalgi*' which included different fishing traps used box trap, conical shape trap, one of the minor gears used in Krishna river. The dimension of box trap was 2.25 x 1.75 x 1.75 feet size and consist of only one-way entrance slits from both opposite sides and there is no way from inner to outside (Fig: 10 and 11). These entrance slits allows organism to enter inside and closes sticks automatically. These traps are cheap and made locally available material of bamboo sticks.

Manna *et al.* have observed among different fishing traps, box was one of the major gears used in prawn fishery in river Krishna [7]. Box trap was a cube shaped trap made of bamboo sticks knitted with some durable creepers. The sticks used to make this valve were thinner and knitted with nylon rope. The trap was kept in vertical position under the water facing the water current. A float made of thermocol was tied with the trap. *Tapai* is rectangular fish trap made up of bamboo stick

interwoven by nylon threads [3]. The dimension of *Tapai* varies as per the need. However, the standard size is 0.5 m to 1.5 m in length, 0.30 m to 0.40 m width and 0.10 m to 0.2 m height. The gear having two sides has 2 to 7 doors on each side. The entrance or doors are of very specialized structure and works as one-way valve. Due to this valve, fishes entering the box cannot escape. The diameter of the door is 0.25m wide so that fish of large size can be caught. *Anta* trap it is rectangular box-shaped trap made up of bamboo wire mesh or iron or polythene strip [9]. There is a small opening which only opens only in its inner side by water pressure. Earthworms, rice bran mixed with dry fish are placed inside the box to attract prawns. These traps are placed in series making each with bamboo sticks. These traps are placed in the evening hours. The mouth opening of the box trap is kept against current. The Ghani is a cylindrical fixed trap slightly flattened at the bottom to enable it to lie stable on the floor of the Beel. On the other end of the cylinder have a concave surface, going into the cylinder and ending up into a narrow orifice. The meshes are of generally 50-70 mm square. It is used for catfishes and large fishes. It has a door at the top of the neck which is emptied once after 6-8 hours [5]. 10 different gears were encountered in the entire stretch of Krishna [7]. This gear is used throughout the entire stretch of river Krishna [10]. But in the present study only 6 types of gears were recorded mainly due to limited area of survey.



Fig 1: Coracle



Fig 2: Fibre glass boat



Fig 3: Thermocol raft



Fig 4: Plastic cans



Fig 5: Rubber tube



Fig 6: Monofilament Gill net



Fig 7: Parts of Gill nets: Sinkers and Wooden floats



Fig 8: Cast net operation



Fig 9: Hook and line



Fig 10: Outside view Box trap



Fig 11: Inner view Box trap

#### 4. Conclusion

The present study was undertaken to document different types of fishing craft and gears operating in Krishna river in Sangli district, Maharashtra, India. Five types of fishing crafts and four gears were identified from the region and their dimensions vary from place to place. It is observed that some gears have adverse effect on river ecology and fish catch. Therefore, it is imperative that efforts should be undertaken to develop ecosystem-based management strategies with inputs from government, non-government organizations and other stakeholders, with the objectives of sustainable utilization of resources.

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