

Fishing Gear for Reservoirs and Inland water

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Introduction

India is one of the leading centres in the world in inlandwater resources, which are in the form of tanks, estuaries, brackish water lakes, swamps and paddy fields. Over the years, India has built a large number of dams and barrages to harness the water potential for irrigation, generation of electricity, navigation and fisheries. Of these, reservoir constitute the prime inland fisheries resources. Based on the available records fresh water lakes constitute 2,588,000 ha. Exploitation of fisheries in these areas was insignificant in the earlier years, fishing being conducted purely on a subsistence level. The last few decades have witnessed many technological advances in fishing techniques.

Fishery resources

The fishery resources in the inland water and rivers mainly constituted of Gangetic carps, viz. *Catla catla*, *Labeo rohita*, *Cirrhina mrigala* and *L. calbasu*. In addition to this *Puntius serrana*, *Labeo bata*, *C. reba*, *L. fimbriatus*, *L. diplostoma*, *Barbutor*, *Mystes seenghala*, *Mystes aor*, *Silonia silondia*, *Notopterus chitala*, *Notopterus notopterus* etc. occur in the North Indian lakes and reservoirs whereas *L. fimbriatus*, *L. kontius*, *C. cirrhosa*, *M. aor*, *N. chitala*, *wallago attu* and gangetic carps etc. are found in peninsular Indian reservoirs, lakes and rivers, besides there are many species of fishes categorised as cat fishes, trash fishes and weed fishes which also constitute a sizable proportion of the fish fauna. Majority of this group is either predators or uneconomical.

Fishing Craft

The vessels used for fishing in reservoirs, lakes and rivers are small, wooden, nonmechanised and transported easily to remote areas. Normally dingy, dug out canoes, catamaran and country boats are used by the fishermen who catch

fish from reservoirs. In Karnataka and Tamilnadu, fishermen use coracle type boats of size 1.50 - 2.00 metres dia which are made of wooden sticks bamboo and covered with water tight materials, which are quite cheaper and lasts for nearly 2 - 3 years. In North Indian states, they use small dinghis and 'jappas' which resemble any other country crafts. The overall length varies from 3.5-4.008 metre and breadth from 1.1 m - 1.60 m. In some of the reservoirs such as Gobindsagar, Gandhisagar and Pongdam, Hirakud and Jaisamund, motor crafts of 6.00 -9.00 m OAL fitted with inboard diesel engines have been introduced by the State Fisheries Corporation for fishing activities and quick transportaion.

Fishing in reservoir

Development of reservoir fisheries in Asia was organised on scientific lines about 20-30 years ago. Now it has assumed considerable importance in view of its significant contribution to the inland fish production of the country. Although reservoir fishing is a relatively new development in our country it is fast becoming an important tool of socio economic development.

Fishing Gear Material

The introduction of synthetic fibres like nylon in place of natural fibres enhanced the catch efficiency of gill nets used in inland waters. High density polyethylene monofilament twine and fibrillated tape twisted twine are added recently as new cheap and effective substitutes for nylon monofilament.

Fishing Gear

The fishing gear used in reservoirs and in inland waters are gill nets, wall nets, cast nets , traps, line and drag nets. Drag nets and cast nets are mostly used in the marginal areas of the rivers for the capture of weed fishes and minnows.

The term fishing gear, as it has come to be used to all those implements and devices, that are used for catching fish. Some of the earliest methods of

collecting food from aquatic areas are not based on the use of fishing gear. A review of the gear used in the capture of fish throughout India will review that the same variety of gear is commonly used in both in inland and marine fishing.

Fishing without gear

Groping

Fish lurking in crevices and amidst rocks and those that live in shallow waters and burrow into mud are searched and caught by hand. In Kashmir large parties of people squat close together across a shallow stream thus forming a barricade and move up the river slowly. Fish living among rocks are distributed and while trying to escape strike against the human barricade. They are skillfully caught and thrown on the bank.

Stranding

This type of collecting fish is common in shallow ponds. Selected areas of water ponds are cut off from the main water body by erecting low barricade or earthen bunds. The water thus enclosed is bailed out of the place is allowed to dry partially and whatever fish stranded are collected by hand.

Hook and lines

This is a common gear in our rivers, reservoirs and lakes. This is used mainly for predatory fishes. This gear initially was made of cotton twine and later replaced by nylon twine. It has main line and many branch lines hung from the main line. At the end of the branch line hooks are attached. Hook nos 11-20 are most common. The main line will be of a thicker twine and the branch line are of thinner twine. This gear may be according to the area of operation. Small fishes earthworms, prawns, algae etc, are used as baits.

Drop line

This gear is employed for the capture of scale and cat fishes. It consists of a main line and a number of hooks of the same specifications attached to the end.

The length of the line is either equal to or a little more than the depth of the fishing area. At the upper end of the line a float is attached. The length of the main line is adjusted by winding the extra length of the main line on the float so that the bunch of hooks remain just above the bottom during fishing operation. This type of fishing is done only in the day time as constant vigil on the line has to be kept for retrieval and recovery of fish and line. This gear is effective during winter for the capture of scale fishes viz *L.rohita*, *L.calbasu* and cat fishes.

Fish Barrier

In principle this consists of leading the fish by means of bamboo screens and their final capture by lever lift nets. This method is practiced along river Ganga in the vicinity of Allahabad. When operated for ascending Hilsa, the barrier consists of three sections, the main section being set in an inclined direction across the river making an angle of 30-40° to the shores of the river. The other two sections are set in the form of a 'V' with the apex of the 'V' facing the ascending hilsa.

The barrier, in case of descending hilsa is set in the form of a 'V' but the areas of the V are comparatively longer than the former. "Ganch" is fixed between the arms of the 'V'. The shape of the net is triangular with the mouth supported by frames each 6.6 m in length. The webbing is rectangular and loosely mounted on the frame. The season for operation of this gear extends from January to June.

Fish Pot

The gear is popular in the upper reaches of rivers and rivulates where flow of water exists. 'Kumni' of Hosangabad has cylindrical shape with one end tapering to a blind end where the trapped fishes accumulate. The trap is 60 cms in length and 75 cms in circumference. The entire trap including the body and

valve is constructed of bamboo strips and fastened by cotton twine. The valve is fixed to the mouth of the trap.

The trap is set across the current, a number of them in rows with mud or pieces of rocks in between to secure them to the ground. They are set in the evenings and lifted in the morning. The catches are small varieties, of fish like *Barbus stigma*, prawn etc.

Push Net

This type is found in all water systems. A typical one consists of a 'V' shaped frame of appropriate size to which the webbing is attached. The frame is constructed by securing bamboo poles on light wooden pieces at an angle of 45° . The two arms of the 'V' forming the sides of the mouth and the side opposite the angle being the base.

The net is pushed through water by man wading and during operation it scrapes the bottom. It is hauled at frequent intervals shifting the catch to the cod end. The catch thus accumulated is collected after 10 to 12 operations. The catch consists of small fishes and prawns. The net is operated during all the seasons especially during morning and evening. Operation during night is also not uncommon.

Stow net on anchor

This type is common in Hoogly estuary. "Beem jal consists of a bag tapering into cod end and two wings tapering towards the free end. The mouth of the net is kept open during operation by bamboo poles two in number fixed in between the head and foot ropes at the joining of the bag to the respective wings. It is anchored during operation by wooden anchor or iron anchor or even by stout poles driven to the bed of the estuary. Pulvanised iron wire tope is used as anchor ropes.

Usually two floats, sealed kerosene oil tins are used, secured either in the middle of the wing or at the free end. At Diamond Harbour large earthen pots

are used as floats. The net is operated from large boats across the estuary with the mouth of the net against the flow of the current. It is set prior to the tide and hauled in after the tide. Catches are mainly sciaenids, gobids, polynemids and prawn.

Stick-held drag net

This net is known as "khadijal" in Orissa, "Do-dandi" in Allahabad, "kondala" in Vijayawada. It is generally 15-20 length and 2-3 depth. The mesh sizes ranges from 10-15 mm box. The webbing is fixed to bamboo sticks of 70 mm to 90 mm length at regular intervals of 70-80 mm to form a pouch. The gear is dragged by two persons in the shallow marginal areas which are devoid of bottom obstructions to capture small shore line fishes. While hauling the net the fishes are driven into the net from both sides by the men by splashing the water with one hand. Catch comprises of *G. chapra*, *Puntius sp.* *Chela sp.* etc.

Singiri jal

The net is made of a rectangular piece of webbing having very small meshes with a maximum dimension of 1.8 x 0.9 m. The edges of the webbing are mounted on nylon twine and the webbing is fixed at the four corners to criss cross bamboo poles. This net is dragged along the shore in shallow areas for the capture of small prawns and fishes.

Beach seines

Considerable variations are noted in the general size and mesh size of the net due to the area of operation and fishes caught. The larger nets are divisible into three parts namely the two wings and the middle landing part or bag. The landing part is differentiated from the wings by a greater fishing height and smaller mesh. "Mahajal" and its various modifications represent the common beach seine in vogue. "Karia jal" and "Derwari" of Allahabad are respectively big meshed and small meshed edition of Mahajal. The wings in usual cases are equal but in Derwari the wings are unequal, the shore wing being shorter.

All the beach seines are operated in an identical manner from one boat. The net is paved in the form of an arc from the shore. The number of men required depends on the size of the net. Towards the final stages of hauling the foot rope is manipulated in such a way that it reaches the shore prior to the head rope, but never rising from the bottom.

Ghanti Jal

This gear consists of a single piece of webbing fabricated out of nylon twine. This is a type of drag net used in shallow waters along the shore line. The lower half of the net is wider than the upper half. Loops are formed at the extended side of the bottom half as in cast nets. To prevent fish from escaping when the net is dragged the edges of the bottom half are re-curved inwards to form pockets in which the fishes are trapped. Two ropes are attached to the webbing to drag the net. Its length is about 100 m and palmyrah leaves are inserted into the rope at 1.0 m intervals for a distance of 15-20m from the net for the purpose of tickling. The net is operated from two boats. The gear is taken to a distance of 100-200 m from the shore and released. Both the ropes are taken simultaneously by each of the canoe and brought to shore. Two fishermen in either side haul the net from the shore. Catch consist of *Rohitee cotio*, *Rita chrysea*, *Mystes aor*, *Mystes seenghala*, *M. Tingra*, *Pangasius pangasius* etc.

Falling nets

Cast nets: This net has many varieties differing from one another in the size of the meshes, the diameter of its circle etc. It is a light circular net somewhat bell shaped and weighted around its perimeter. To prevent the fish from swimming out when the net is hauled, the circumference is re-curved inwards to form a pouch around the edge of the net.

Cover pots or plunge baskets

This basket usually is of wicker construction with the main opening at the top. "Japar" of Jaisamand lake has the shape of a bell. The material is bamboo strips secured by rope. This gear is cast on the fish and traps and the fish is taken from above. Catches are mainly *Ophiocephalus sp.* Smaller baskets are in use all over the country. "Ootha" or "Ottal" is the type found in Kerala, Tamilnadu and Karnataka.

Lantern net

In "Kuriyar" of Allahabad the wicker work of 'Japar' is replaced by webbing. The webbing is held in form by bamboo poles radiating from the apex. The webbing is in the shape of a cone and is in turn fixed along the lower margin to the free ends of the bamboo poles. The top end of the webbing terminates in a rope which is held fast during shooting and then let loose entangling the enclosed fish.

Dip net

A typical dip net consists of a square piece of net fixed on to a rectangular wooden or bamboo frame. It is kept lowered in water below the surface and raised at short intervals with the help of a wooden pole which acts as a lever. In fresh water this net is operated mainly in the night and a lantern is hung over the water surface to attract fish.

Gill nets

The gill nets are still the most widespread form of nets in inland waters and prove to be an effective and economical gear. It is used where fish are scattered in light density. Gill nets rank next to trawls and purse seines in total catch. They are highly selective, by adopting proper mesh size, fish of the designed size range can be caught leaving undesired fish unharmed making the nets suitable for conservation and mesh regulation. The advent of synthetic materials notably nylon has caused a major renaissance in gill net fishing.

Another advantage is that the gill nets can be operated even from primitive unpowered crafts a matter of great importance to inland fishing.

Gill nets are long walls of webbing hung vertically in water, are either set in one particular spot or drift with the current. In inland it is either set in the surface or bottom. Gill nets are passive gear, in the sense that the fish are caught in the nets by their own behaviour either by gilling or entangling or both.

Gill nets are with head rope and with or without foot rope and sinkers. Numerous variations are noticed in the operation of gill nets. In "Gochail Jal" of Allahabad, when fishes are gilled the floats of that particular region sink giving indication to the fishermen, who immediately remove the fish. In Hoshangabad, gill nets are set parallel to the shore while "Thangadi" is payed in the form of 'L' with the shorter arm perpendicular to the shore line. Scaring by beating the sides of boat is practiced in the operation of this net. In Orissa, scaring is by beating the water with bamboo poles. In Mettur reservoir nets are set at the bottom in the night and surface in the day.

There are many modifications made in a simple gill nets viz vertical line, frames, and trammeling.

Vertical line net

In a vertical line net, the slackness is increased by providing vertical line to the net from head rope to foot rope.

Framed nets

In framed nets, the maximum slackness is obtained by making square compartments of required dimensions by passing horizontally and vertically, Framed nets are generally more efficient than simple gill nets because apart from having greater horizontal and vertical slackness, their design creates small net bags in which fish become tangled as well as gilled. In addition the frame localizes the tangle caused by gilled fish making more net available for catching

other fish. As these nets are used mostly for the capture of large fishes the latter feature is of major importance.

Trammel nets

This is a modification of simple gill nets with an inner loosely hung wall of small mesh and two outside armourings of large mesh wall on either side of the small mesh wall.

Trawl fishing

Recent addition to inland fishing technique is trawling CIFT at Burla, Orissa, has introduced trawling in Hirakud reservoir for the first time in 1979. This is a quite effective method for the removal of bottom dwelling trash fishes. This type of fishing can be done mainly in the river course which are devoid of under water obstructions.

Conclusion

The topography of area and the habit of the fish play a dominant part towards the distribution of fishing gear.

In the pond system, cast net, stick-held drag net, lantern net, gill nets, hand lines etc are the gear in order of importance. The shallow depth of the ponds make the above gear relatively more effective.

The gill nets of the set type are the principle gear in reservoirs in which, usually there are many underwater obstructions. To a limited extent beach seines and trawling are done where the bottom is clear stick-held drag nets, hand lines, cast nets are of minor importance.

The fishing gear of the river system also show certain divisions along its entire course. In the upper reaches where normally a swift current prevails cast net, stick-held drag net cover pots and traps are common.

In the middle reaches, seine nets and gill nets are equally important. Cast nets, drag nets, (stick-held), lift nets, and barriers are of secondary importance.

In the lower reaches (Delta), estuary), bag nets and gill nets are the prominent gear followed by seines, lines, cast net etc.

Some of the gear like push net, and small lift nets are common in all inland waters.

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